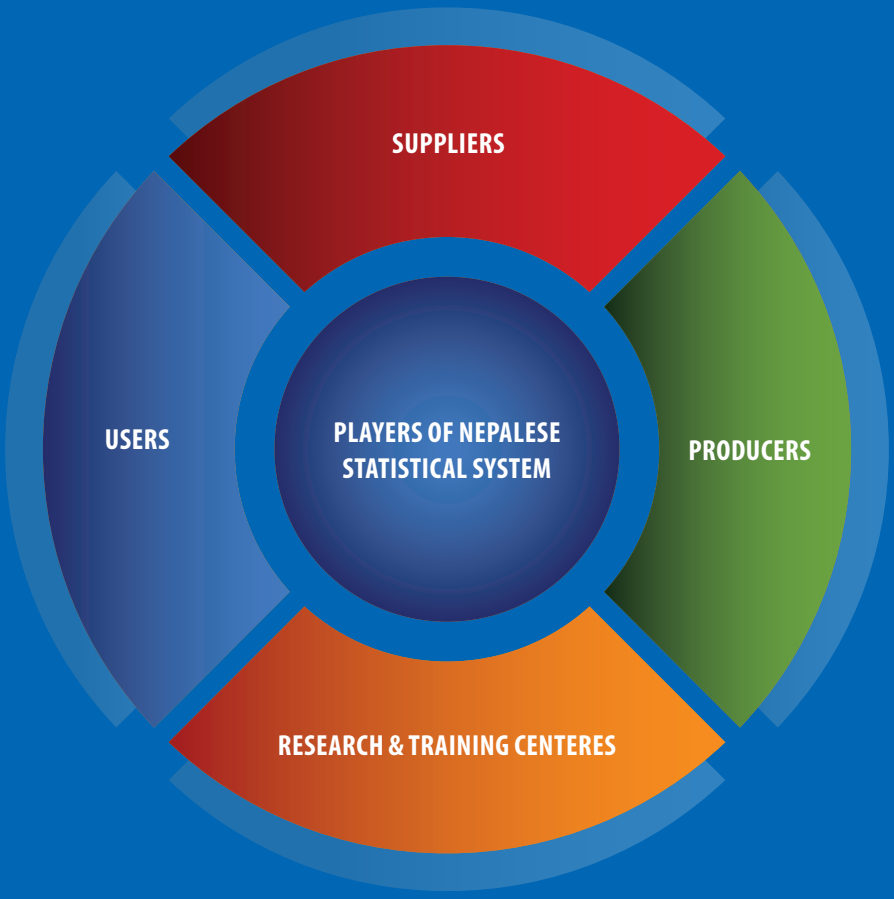
A Compendium of
National Statistical System of Nepal



Government of Nepal
National Planning Commission Secretariat
Central Bureau of Statistics
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Recommended citation:
Central Bureau of Statistics, 2017. A compendium of National Statistical System of Nepal. Kathmandu, Nepal: Central Bureau of Statistics.

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Government of Nepal
National Planning Commission Secretariat
Central Bureau of Statistics, Kathmandu, Nepal

Published by
Government of Nepal
National Planning Commission Secretariat
Central Bureau of Statistics
Thapathali, Kathmandu, Nepal
Tel: 977 1 4245947, 4229406
Website: www.cbs.gov.np

Edition: First

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UNDP-NPC joint implementation project **"Strengthening National Planning and Monitoring Capacity (SNPMC)"** Project supported the preparation of this publication.

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ISBN: 978-9937-0-2609-3

Price: …….

Printed in Nepal
June 2017 (1000 copies)

Design & Process by: Master Piece with Imagination, 9851031259

PREFACE

The national statistical system (NSS) is the ensemble of statistical organizations and units within a country that collect, process and disseminate official statistics on behalf of national government. An effective and efficient national statistical system that provides regular and reliable data is an important indicator of good policies and a crucial component of good governance. Central Bureau of Statistics (CBS) is the nodal agency of Nepal to collect, compile and disseminate socio-economic data in Nepal. It is involved in conducting surveys and censuses since last six decades. A number of other Ministries and Government Agencies are also involved in producing statistics relevant to their field.

This publication 'A Compendium of National Statistical System of Nepal' consists of analytical articles of different thematic statistics contributed by the experts of statistics related field. It can be used as a reference material by a variety of readers related to statistics, including the professionals, university teachers and students, human resources working on statistical service and others. The book makes an attempt to provide a national picture of statistical system of Nepal, its' historical development and includes an in-depth assessment of the NSS. Furthermore, it has also portrayed the future scope and development of the NSS. Some of the important statistical topics could not be included in the publication due to space limitation which will be incorporated in the future editions.

I would like to express my sincere gratitude to all the authors who contributed articles for this publication. I am grateful to Mr. Nebin Lal Shrestha and Dr. Rudra Suwal, the Deputy-Director Generals of CBS for their valuable contribution and guidance to bring out this publication. I am grateful to National Statistical Institute which coordinated with respective authors for collecting the articles. I thank the reviewers who provided valuable inputs for furnishing the articles. I should remember Mr. Rajan Silwal, Director, Planning Section for shouldering the overall responsibility throughout the process.

The Strengthening National Planning and Monitoring Capacity (SNPMC) project of UNDP/NPC deserves our special appreciation for providing technical and financial support for preparing this publication. I would especially acknowledge the contribution of Mr. Deependra Kaji Thapa, Statistics Development Officer of SNPMC for coordination, compilation and bringing out this publication in time.

Finally, I appreciate any suggestions and comments from the users that will be useful for further improvement in the future editions of this publication.

Suman Raj Aryal
Director General
Central Bureau of Statistics
March 2017

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ABBREVIATION

ADB	Asian Development Bank
ADER	Average Dietary Energy Requirement
AHS	Annual Household Survey
AMIS	Agriculture Management Information System
BOP	Balance of Payments
BMIS	Building Management Information System
CAPI	Computer Assisted Personal Interview
COFOG	Classification of Outlays of producers by purposes
COICOP	Classification of Individual Consumption According to Purpose
COPNI	Classification of the Purpose of the N-profit Institutions Serving Households
CBS	Central Bureau of Statistics
CLS	CROPS and Livestock Survey
CNSP	Consolidated National Statistics Plan
CPC	Central Product Classification
CPI	Consumer Price Index
CRVSS	Civil Registration and Vital Statistics System
DDC	District Development Committee
DFID	Department for International Development of United Kingdom
DPMAS	District Plan Monitoring and Analysis System
DQAF	Data Quality Assessment Framework
DSS	Designated Statistical System
EMIS	Education Management Information System
FAO	Food and Agriculture Organization of the United Nations
FBS	Food Balance Sheet
FPOS	Fundamental Principles of Official Statistics
GDDS	General Data Dissemination System
GDI	Gender Development Index
GDP	Gross Domestic Product
GHI	Global Hunger Index
GIS	Geographic Information System
GoN	Government of Nepal
HDI	Human Development Index
HMIS	Health Management Information System

HS	Harmonized System
ICT	Information and Communication Technology
ILO	International Labour Organization
ISCED	International Standard Classification of Education
IMF	International Monetary Fund
JICA	Japan International Cooperation Agency
LDC	Least Developed Country
LMBIS	Line Ministries Budgetary Information System
LMIS	Labor Management Information System
MDER	Minimum Dietary Energy Requirement
MDG	Millennium Development Goals
MIS	Management Information Systems
MOAD	Ministry of Agricultural Development
MOCPA	Ministry of Cooperatives and Poverty Alleviation
MOCS	Ministry of Commerce and Supplies
MOCTCA	Ministry of Culture, Tourism and Civil Aviation
MOE	Ministry of Education
MOF	Ministry of Finance
MOH	Ministry of Health
MOFALD	Ministry of Federal Affairs and Local Development
MOHA	Ministry of Home Affairs
MOFSC	Ministry of Forest and Soil Conservation
MOHP	Ministry of Health and Population
MOLE	Ministry of Labour and Employment
MoU	Memorandum of Understanding
NADA	National Data Archive
NAICS	North American Industry Classification System Establishment
NCME	National Census of Manufacturing Enterprises
NDHS	Nepal Demographic and Health Survey
NEPSS	Nepal Economic Planning and Statistics Service
NER	Net Enrollment Rate:
NGO	Non-Governmental Organization
NLFS	Nepal Labour Force Survey
NLSS	Nepal Living Standards Survey
NMICS	Nepal Multiple Indicator Cluster Survey
NPC	National Planning Commission of Nepal
NPHC	National Population and Housing Census
NRB	Nepal Rastra Bank (Central Bank of Nepal)
NSC	National Statistical Council

NSCs	National Statistical Classification
NSDS	National Strategy for the Development of Statistics
NSIC	National Standard Industrial Classification
NSO	National Statistical Office/ Organization
NSOC	National Standard Occupational Classification
NSCA	National Sample Census of Agriculture
NSS	National Statistical System
OCR	Optical Character Recognition
OECD	Organization for Economic Cooperation and Development
PARIS21	Partnership in Statistics for Development in the 21st Century
PC	Personal Computer
PMAS	Poverty Monitoring and Analysis System
PPIS	Project Performance Information System
PSU	Primary Sampling Unit
SAARC	South Asian Association for Regional Cooperation
SDDS	Special Data Dissemination Standard
SDGs	Sustainable Development Goals
SI	Statistical Infrastructure
SITC	Standard International Trade Classification
SNA	System of National Accounts
SUT	Supply and Use Table
SWOT	Strength, Weakness, Opportunity and Threats
TMIS	Tourism Management Information System
TU	Tribhuvan University
UNDP	United Nations Development Programme
UNGD	United Nations Development Group UNSC: United Nations Statistical Commission
UNESCO	United Nations Education and Social Council
UNFPA	United Nations Population Fund
UNFPOS	United Nations Fundamental Principles of Official Statistics
UNICEF	United Nations Children's Fund
USAID	United States Agency for International Development
VDC	Village Development Committee
VSS	Virtual Statistical System
WBSCI	World Bank Statistical Capacity Indicator
WCO	World Customs Organization
WFP	World Food Programme United Nations
WHO	World Health Organization
WTO	World Trade Organization

NATIONAL STATISTICAL SYSTEM OF NEPAL

Nebin Lal Shrestha*

Abstract

The statistical history of Nepal goes even back to the first population census held in 1911 A.D. There are a couple of State's initiatives to build a statistical system in the country. The Census Act 2009, establishment of Janasankhya Goshwara in 1938 A.D., the Statistics Act 2015, Statistics Regulation 2041, establishment of CBS in 1959 A.D. are the major incidents in the statistical system of Nepal. Likewise, formation of National Statistics Council in 1988 A.D., the Consolidated National Statistical Plan (CNSP) in 2001 A.D., provision of Nepal Economic Planning and Statistics Service in the Civil Service Act 2049 and more recently the formulation of National Strategy for the Development of Statistics (NSDS) in 2016 A.D. are regarded as other major events of the national statistical system (NSS) of Nepal. The Statistics Act 2015 envisaged the NSS as a centralized one. However, the growing demand for multi-sector data guided the NSS to move towards a decentralized system. At the present, having CBS at the cohort and other government, semi government and private institutions at the perimeter the NSS is functioning as a sub-system of the governance. It, on the one hand, suffers couple of challenges and bottlenecks. On the other, the NSS finds ways for a carefully set vision, mission and objectives. It has experienced a lot for its way ahead. In this chapter, efforts have been made to have an overview of the NSS.

1. Introduction

There lies no single definition of the national statistical system (NSS). NSS, in general, is understood as a composition and interplay of various stakeholders, viz., data providers, producers, users, and academic and training institutions as well in the field of statistics. Since a system is a joint function of various organs (in a body) and interplay of interdependent components in any field of real world the statistical system bears the same sort of characteristics. The OECD[1] has defined the NSS as follows:

"the NSS is the ensemble of statistical organizations and units within a country that jointly collect, process and disseminate official statistics on behalf of national government."

Hence, it is clear that the NSS basically deals with official statistics. Various statistical organizations collectively produce and disseminate statistics primarily for the government. There should be data collection, processing, production, use and dissemination activities to stand as a sound statistical system. According to PARIS21[2], an NSS is characterized as follows:

* Deputy Director General, CBS (The author is thankful to Mr. Rajan Silwal, Director, CBS for his valuable inputs in the preparation of this article).

1 URL: https://stats.oecd.org/glossary/detail.asp?ID=1726 retrieved on 28th July 2016.

2 PARIS21 (2004). Models of Statistical System, p. 6

"the UN fundamental principles do not define a national statistical system, although a working definition could be the totality of statistics produced and published by national government."

Another wider definition of NSS is:

"National Statistics System is a partnership between those responsible for policy formulation and those responsible for policy implementation so that the latter know precisely what the former wish to achieve, and thereby facilitate production of relevant information to reinforce the planning cycle."[3]

It is observed that there are generally two types of national statistical system, viz., centralized (e.g. Canada and Australia) and decentralized (e.g. in the USA, UK, China, Philippines and France). Again, it is important to note that it is difficult to find an NSS which is either completely centralized or decentralized. Most of the countries (e.g. Pakistan Mozambique, Nepal) have adopted a moderate option. Stated otherwise, they fall under the two extremes.

The NSS, according to PARIS21, is generally steered and coordinated by a central organization such as 'Office of National Statistics' in the UK, 'INSEE' in France and the 'General Statistics Office' in Vietnam.[4]

2. Objectives

Drawing a bird's eye view of the NSS of Nepal is the main objective of this chapter. Further, it aims at briefly discussing the SWOT analysis of the NSS. In reading the chapter the reader is expected to have a picture of Nepalese statistical system and the author's views for its betterment.

3. Findings and analysis

3.1 National Statistical System of Nepal

The NSS of Nepal is not officially defined. It demonstrates a functional nature rather than envisaged in Statistics Act 2015. Bastola (2066)[5] has synonymously used official and government statistics. He argues that the record keeping system in a State is a common business of government even in the ancient time; we cannot coin the activity as a system of statistics. The NSS of Nepal as has been envisaged by the Statistics Act 2015 is a centralized one. In course of time, other laws of the State have clearly designated various agencies to produce statistics of their respective areas. For example, Nepal Rastra Bank (NRB) Act 2058 allows the NRB to produce monetary statistics including consumer price index (CPI). The Ministry of Federal Affairs and Local Development (MoFALD) deserves right to

3 Statistics South Africa (2002) The National Statistics System: Our Challenge, available at https://www.paris21.org/sites/default/files/774.doc retrieved on 5th August, 2002.

4 PARIS21 (2005). Models of Statistical System. available at http://www.paris21.org/sites/default/files/2101.pdf retrieved on 31st July, 2016. p. 6

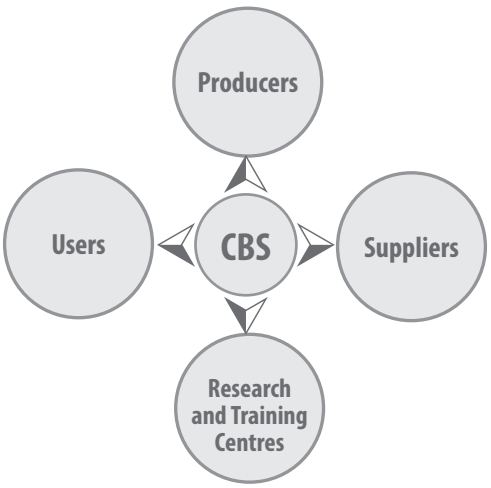
5 Bastola, T.S. (2066) in 'Nepalese Statistical System', System and Methods of Official Statistics in Nepal. Central Bureau of Statistics, Kathmandu.

produce disaggregated data at local level. Right now, the civil registration and vital statistics (CRVS) has been a big concern of the MoFALD. The Election Commission, on the other hand, holds right and obligation to collect and produce data on voters. These are few instances to argue that the NSS of Nepal is a decentralized one. However, it is still not fully decentralized.

Prior to the promulgation of Statistics Act 2015, there were still some statistical entities in the country. Some of them are the then *Janasankhya Goshwara* (1938 A.D.), *Audyogik Byaparik Samachar Sangraha Adda* and *Sankhya Bibhag* (1950 A.D.). Founded on the Statistics Act 2015, the Central Bureau of Statistics came on existence in 1959 A.D. An indispensable characteristic of a sound NSS, that is a central statistical organization, thus filled the gap of a regulating and coordinating body in the system. The CBS officially represents as a national statistical body in SAARCSTAT, UNSD, UNSIAP and other international forum and organizations.

Bastola[6] tries to portray the NSS of Nepal in the following diagram:

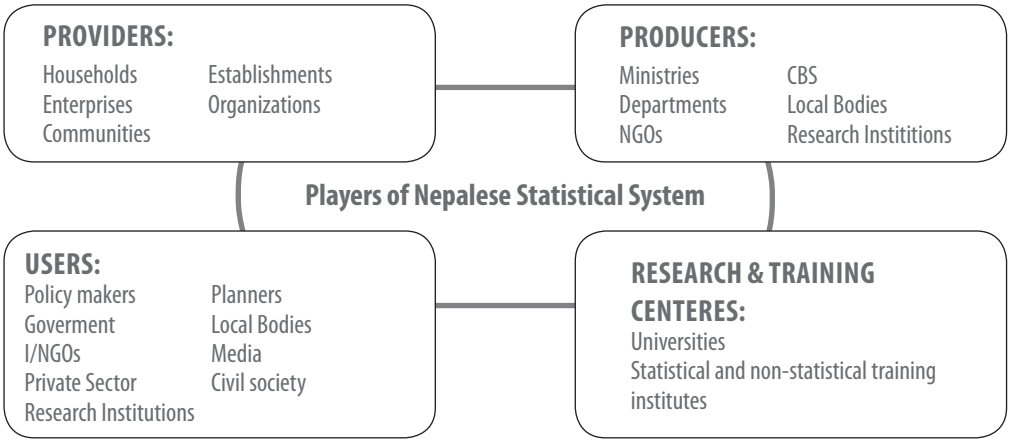
Figure 1: National Statistical System of Nepal



In the diagram, it is vivid that the NSS comprises four equally important sectors. The producers, users, suppliers and research and training centres are mutually bonded to build a sound national statistical system. It applies almost everywhere in the world. Being at the nucleus of the system the CBS totals the NSS of Nepal in the given diagram. The diagram can be further expanded by disaggregating the CBS, ministries and other agencies under producers. Likewise, the users' group comprises the government agencies, I/NGOs, academia, research institutions, media, students and general public. The households, establishments, enterprises are actually the data suppliers. Producers, on the other hand, are those agencies which indulge in producing data from primary and secondary sources. Finally, the research and training institutions remain an important part of the NSS. Specifically, they involve in producing human resource and use available data for research works. The Four players of the NSS has been shown in Figure 2.

6 report submitted to CBS. p.6

Figure 2: Four players of the Nepalese statistical system



It is perhaps an irony of NSS that the bonding among data providers, producers, users and research and training institutions are not integrated to the extent they should have been.

3.2 Key features of Nepalese statistical system

The Nepalese Statistical System is old enough to discuss as an important issue of national development initiatives. The periodic plans of the country well spelled the need and rationale of good statistics for planning and good governance. A number of turnings are realized in the life of NSS. These turnings can be attributed to Census Act 2009, Statistics Act 2015, the Statistics Regulation 2041, Formation of National Statistical Council in 1988 A.D. Establishment of 33 Branch Statistics Offices under the CBS in 1993 A.D. counts another important achievement in this regard. The latter developments in the NSS are the creation of Nepal Economic Planning and Service Group within Civil Service in 1992 A.D., the CNSP in 2001 A.D., restructure of CBS with some expansion and contraction within the CBS. The CNSP was actually a strategic document determined for a decentralized national statistical system. It therefore advocated for establishing a designated statistical system. Even its recommendation for implementing a survey clearance system gives way to a decentralized NSS. Likewise, the recommendations for formalizing the National Statistical Council (NSC) and formation of various technical committees are distinctly prone to a decentralized NSS.

Recently, the NSS is waiting the approval and implementation of much awaited National Strategy for the Development of Statistics (NSDS). The Constitution of Nepal 2072 has also well described the domain of statistics in the central, federal and local government structure. Annex 5, 6, 8 and 9 have explicitly mentioned the statistical rights and responsibilities of the Centre, Federal, Province and local government.[7]

Viewed from the demand side, the NSS is still not well organized to benefit from the supply side. The demand sides which include the user groups are not in a position to demand and acquire what they actually needed. Similarly, not all of them have ability to use and interpret the data produced so far. Another big sphere of the NSS includes the academia and the research institutions. To be said

7 See, Constitution of Nepal, p. 177-186 available at http://www.can.gov.np/np/ncd.html

objectively, these institutions are focused more on producing the university graduates and few research works. The integration of these agencies into the NSS is an important question to be answered properly.

3.3 Issues of NSS of Nepal

There are several issues in the NSS of Nepal. These issues are perhaps not different than that of other developing countries. Basically, the priority given to the supply and use of statistics counts the highest price in this regard. Other major issues are level of decentralization, vertical and horizontal coordination, financing of statistical activities, professionalism of statistics service, level of statistical literacy and a strong statistical organization. Similarly, the ever demand for a new statistics act, restructure of the CBS and reshuffle of 33 Statistics Offices at districts. The administrative records raised from the various government bodies have minimally been used in the NSS. Use of administrative data on the one hand, saves the scare resources of the government and on the other, it saves time. The 10 fundamental principles of official statistics (FPOS) are limited to the CBS and some few agencies of NSS. It is widely realized that the FPOS needs expanded advocacy and realization among the key stakeholders. The CBS can play a leading role on the advocacy of FPOS.

The next but equal important issue is the use of modern means of data collection, processing and dissemination. There is gradual use of ICT in the statistical activities; however, the pace of ICT adaptation in government bodies is too slow to reap the benefits of technologies. The private sector and the INGOs are found relatively on the frontline in this regard. Given the best organizational structure, provided the excellent statistics law and regulation it is widely argued that without a highly motivated statistical human resource the dream for establishing a sound national statistical system remains an untimely break of the same.

Adoption of standard concepts, definitions, classifications and methodologies is the next important issue of the NSS. Data produced by various government agencies are not strictly comparable due to the differences in concepts and definitions. Besides, there is no similarity in reference period and scientific methods applied. There is another important issue, which is coordination. It is mostly spoken and minimally practiced. Although the National Statistical Council (NSC) is formed especially for the task of coordination among the stakeholders of NSS, the problem of coordination has almost remained the same. Obviously, the NSC lacks a legal power to be active and efficient. It lacks its organizational entity, in addition.

Lastly, there are several other issues which are considered important in case of NSS. They are as follows:[8]

- Lack of current data;
- Duplication of data on the one hand, and inconsistencies in data generated by different producers on the other;
- Absence of effective coordination among the key players of NSS;
- Strengthening of the 33 Statistical Offices under the CBS and capacity building of the Statistical Units located in ministries and other government agencies;
- Human resource development;

8 For detail, see Roadmap for NSDS Nepal (an unpublished document by CBS in 2013), Section 1.9

- Raising statistics as a public goods;
- Activation of Nepal Economic Planning Group as provisioned in Civil Service Act;
- Streamlining of external resources for the development of statistics in Nepal;
- Establishment of a Statistical Training and Research Centre;
- Advocacy for the maximum use of produced data; and
- Adoption of modern technologies in the statistical activities.

4. SWOT analysis of NSS

The NSS experiences various strengths, weaknesses, opportunities and threats. These factors help understand the NSS more objectively. The prime objective of this chapter is not to concentrate deeply on the SWOT analysis. Interested readers are suggested to refer the NSDS documents for a detailed description. Table 1 demonstrates the SWOT of the NSS in a nutshell.[9]

Table 1: SWOT of the NSS

Strengths (Major ten):	Weaknesses (Major ten):
1. Legal instruments are on place 2. Skilled human resources are available 3. M&E system is established in many government institutions which requires large volume of data 4. International guidelines and principles are followed in general 5. Use of ICT is gradually increasing in recent census and surveys 6. A longer history of census taking 7. Advanced means of data dissemination are in practice 8. Financial and physical resources are available (though not sufficient) for statistical activities 9. Sub-national statistical offices are established 10. Statistical literacy is gradually increasing	1. Prevailing Statistical Laws and regulations have not been updated/amended 2. Weak statistical infrastructure 3. Survey clearance system is not functional 4. Mutually conflicting legal provisions are in action 5. Inadequate coordination in statistical activities 6. Data/information sharing policy is not established 7. Limited use of administrative data/records 8. Low status of CBS 9. Limited statistical advocacy/education 10. Lack of statistical training center
Opportunities (Major ten):	**Threats (Major ten):**
1. Diverse knowledge with existing human resource in the CBS and ministries 2. Continual support of Development Partners for statistical purposes 3. Public awareness for the use of data is scaling 4. Supply of skilled human resources in the market is increasing 5. Restructuring of the state is underway 6. The need for a new Statistics Act is realized at higher level of government 7. Statistical activities are increasingly owned by the government 8. Users are aware of quality and sources of data 9. Coordination among producers are gradually increasing 10. Research and academic institutions are increasing	1. Barriers to adoption of new innovation of ICT 2. Financial uncertainty continues 3. Respondents' burden is increasing 4. Restructuring of the state may be delayed 5. National priorities and development partners' interest may not coincide 6. Capacity diversion may continue due to brain drain 7. Prolonged political transition may affect priority given to statistics 8. Approval and implementation of NSDS 9. Obstacle in the full activation of Nepal Economic Planning and Statistics Service 10. Slow motion of statistical education/literacy

9 Derived mainly from the Final Draft of NSDS Nepal: an unpublished document (2016) by CBS.

5. Challenges of Nepalese statistical system

One of the biggest challenges of NSS of Nepal is to cash the growing concern for statistics among parliamentarians, policy makers, bureaucrats, academia, research institutions, students, professionals and heavily the media. Production of disaggregated data by sectors and sub-sectors on a regular basis is another challenge of the NSS. Satisfying the growing demands of government, civil society, media and international organization is also regarded as a challenge to the NSS.

Government agencies producing the official statistics are not equally competent to discharge their statistical activities. Apart from the CBS and a few of key ministries, viz., Ministry of Health, Ministry of Agriculture Development, Ministry of Finance, Ministry of Culture, Tourism and Civil Aviation, Ministry of Children, Women and Social Welfare; and Ministry of Cooperatives and Poverty Alleviation there are no statistical professionals to perform the statistical jobs. It is a positive indication that there is gradual realization among the government agencies to have statistical cadres in their organizations. Emphasis on training and building the physical and statistical infrastructure has been scaling up.

Given the political changes in the country and establishment of federal system by the new constitution, the distinct challenge is to shape the NSS up to local bodies. The proper designation of statistical duties to branches of CBS, the district offices of line ministries and local bodies counts much in this regard. Readiness for data sharing and establishing an IT-friendly mechanism is another challenge of the NSS. The system need not spend scarce resources for new census and surveys rather it should find way to use administrative records of government agencies.

Harmonization of resources dedicated to statistical activities should be a priority of the NSS. Except in key ministries and agencies of the NSS, the financing of statistical activities is not easy as it needs to be. Even in case of CBS, the pivot in the NSS, sometimes realizes financial deficiencies to conduct the list of proposed surveys.

The NSS is a part of global statistical system. It has thus many obligations to fulfill. There are couples of global initiatives like MDGs, GDDS, SDDS, NSDS and SDGs. The NSS needs to statistically represent in such global endeavors. We must accept that our statistical infrastructure coupled with institutional and organizational capacities is not enough to supply data and indicators globally. The NSS as such has a big challenge to be somewhere visible in regional and global statistical forum.

Statistical education for the large section of the data suppliers and users remains a challenge for the system. Even the policy makers and bureaucrats should enrich their decision makings by the use of reliable and timely statistics. Adoption of new technology in the field of statistics is costly in the beginning but the cost is highly reimbursed by timely good statistics used in planning, monitoring and evaluation stages.

Motivation of human resource is, perhaps, a big challenge generally undermined. It leads to distraction of job and professionalism. It could be the common reflection of developing countries and hence also prevails in Nepal.

6. The NSS: reform or rebuild?

Development of a statistical system is a continuous process over the time. It does not necessarily support the changes that come in the life of a country. An NSS requires necessary adjustments

and adaptation to cope up with a country's political, bureaucratic, social, economic, demographic and technological developments. The Statistics Act 2015 turns insufficient to address the newer dimensions of development. The traditional data world has been stepping to the modern open and big data realm. Plans in our context are formulated soundly but what we generally lack is its successful implementation. The same fate we have experienced in case of NSS. Most of the periodic plans, the CNSP and some other ad hoc committees have explicitly put goals, objectives and action plans for the improvement of NSS. However, we achieved far less than what we wanted to. At the same time, it is also true that we are not absolutely behind the other countries in the field of statistics. Our history of census taking and our age-old statistics act exhibit that we have begun our journey long time ago.

Reform is our need which comes on the foundation we led in the past and rebuilding is our demand for further betterment. There are number of areas where NSS of Nepal requires reform. The Statistics Act actually needs to be replaced by a new one. At least, there should be amendment of couple of Sections (e.g. the preamble, definition of data, rights and responsibilities of the Director General, fine and punishments) to make them relevant in the current situation. Likewise, the current organizational set-up of the CBS as well as other key ministries discharging statistical activities should have been expanded and strengthened. Apart from simply keeping the official records, there should be development of appropriate forms and formats, sound MIS system, a culture of processing and timely disseminating the data generated.

Rebuilding starts from the replacement of old Statistics Act and Regulation with new ones. Establishment of designated statistical system along with survey clearance system gives strength and clear direction to the NSS. In view of the present federal structure of the nation, the present statistical system needs to be restructured so as to efficiently fulfill the data needs at different political, administrative and geographical divisions. Production of statistical human resource should be harmonized with the needs of the agencies involved in producing official statistics. Academic and other statistical training curricula are subject to rewritten. Above all, statistical system does not live independent and isolated from the plans, policies and development initiatives of the nation. In this light, the NSS necessitates appropriate alignment and harmony with existing policies and development initiatives. In fact, the NSS calls for both, that is, reform and rebuilding.

The NSDS in the life of NSS is a new strategy to reform and rebuild the system. It is not the objective of this article to go in detail regarding the rationale and need of NSDS. It is, however, relevant to state that the NSDS has well analyzed the existing statistical system of Nepal and clearly set the vision, mission, strategic objectives and action plans for the future. It has recommended both the elements of reform and rebuild. The sooner the NSDS is approved and implemented; the NSS of Nepal will lay a stronger foundation and build a superstructure thereof for the long run. It gives a new and broader horizon for a strong and well-functioning NSS of the country.

7. Conclusion

There are varied models of national statistical system in the world. The selection of an ideal statistical system depends on several phenomena, viz., political system, administrative set-up, economic development and the awareness and unity of data suppliers and users. Besides, the organizational and institutional capacity of the data producers as well as the space of statistical research and training institutions also play a vital role. Further, an NSS is largely guided by the priorities given to the statistics by the policy makers, bureaucrats, professionals and institutions involved in planning and

development. There are adequate strengths and opportunities prevailing in the NSS. However, it holds dozen of weaknesses to convert to strengths and threats to transform into opportunities.

In the beginning, Nepal realized a centralized NSS having CBS mandating for the production of almost all the statistics. The NSS was built on the legal foundation of Statistics Act 2015. Induced by the growing demand for data and needs of the country the NSS thus automatically turned to a decentralized statistical system though horizontally at large. The NSS, at present, is grown to a larger structure and coverage compared to the one in 1958 A.D. Statistical literacy and awareness has been continuously rising. The urge for evidence-based policy making is continue. Use of modern technologies in collection, processing and dissemination of data has been an immense need.

Formation of the NSC has served the central level coordination among key stakeholders. The periodic plans of the country has given due space for statistical system. There lags what is full implementation of statistical plans and strategies. The NSS has deserved its space in the constitution of Nepal 2072. The boundary of NSS is defined well by the constitution. It is, of course, a great legal infrastructure to the NSS. There are limitations and challenges prevailing in the NSS but it shows its ever progressing trend line and a clear destination in the days to come. Lastly, the existing decentralized model of NSS of Nepal turns appropriate for the federal democratic Nepal.

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INTRODUCTION TO OFFICIAL STATISTICS AND ITS SYSTEM

Dr. Rudra Suwal*

Abstract

Official statistics are extensively produced and used among a wide range of data users. In this perspective, this chapter discusses on the concepts, coverage, data sources, and methodologies of official statistics and official statistics system with the main focus on "Fundamental Principles of Official Statistics" as adopted by the Statistical Commission in 1994 as reaffirmed and endorsed in 2014. The main purpose of this article is to introduce the concept of official statistics in general and presents scope of official statistics by broad category. The concept of official statistics contained in 10 principles is briefly elucidated in the relevant sections of the topic. With the reference and explanation of the principles of official statistics, it is the conclusion of the topic that the effectiveness of the system and its functioning largely depends upon the level of implementation of those principles in the country's statistical system.

1. Introduction

Official statistics are statistics published by National Statistical Organization, government line agencies or other public bodies such as international organizations. They provide quantitative or qualitative information on all major areas of citizens' lives, such as economic and social development, living conditions, health, education and the environment.

Statistical information collected, produced and disseminated by national governments, their agencies, and the international bodies are the agents of official statistics. These data are almost invariably nationally representative, because they are obtained from complete censuses or very large-scale national sample surveys, and they usually seek to present definitive information conforming to international definitions and classifications or other well-established conventions.

The Official Statistics System is the government-wide system of policies, practices, processes, underlying data sources, and people that are involved in producing and disseminating official statistics. Official statistics provide a picture of a country or different phenomena through data, and images such as graph and maps. Statistical information covers different subject areas (economic, demographic, social,

* Deputy Director General, CBS

environment etc.). It provides basic information for decision making, evaluations and assessments at different levels. The goal of statistical organizations is to produce relevant, objective and accurate statistics to keep users well informed and assist good policy and decision-making.

Official statistics are collected and produced by national statistical organizations (NSOs), or other organizations (e.g. central banks) that form part of the national statistical system in countries where statistical production is de-centralized. These organizations are responsible for producing and disseminating official statistical information, providing the highest quality data. Quality in the context of official statistics is a multi-faceted concept, consisting of components such as relevance, completeness, timeliness, accuracy, accessibility, clarity, cost-efficiency, transparency, comparability and coherence.

The core tasks of National Statistical Offices (NSOs), for both centralized and decentralized systems, are determining user needs and prioritize them and transform the prioritized relevant user needs into measurable concepts to facilitate data collection and dissemination. The NSO is in-charge of the coordination between statistical producers and of ensuring the coherence and compliance of the statistical system to agreed standards. The NSO has a coordination responsibility of the entire national system of official statistics, both at the national and at international levels.

2. Objectives

The main purpose of this paper is to introduce the concept, coverage, and principles of official statistics in general. Therefore, the topic focuses only on the theoretical (principles) aspects of official statistics without concerning the practical side – status of production and dissemination official statistics in Nepal, which are presented and explained in detail in other relevant topics. The paper is largely based on the literatures available on official statistics by international organizations (United Nations and Overseas Development Institute), national intuitions (Central Bureau of Statistics and government line ministries/departments).

3. Coverage of official statistics and common indicators used in official statistics

Statistical indicators provide an overview of the social, demographic, economic and environment structure of a society. Moreover, these indicators facilitate comparisons between countries and regions.

Table 1: Scope of official statistics by broad category

Scope of Official Statistics/ Areas	Data/Indicators	Category
Population/ household	Number, fertility, mortality, migration status,	age, sex, regions, language, caste ethnicity, economic activity, occupation, etc.
Food and agriculture	Holdings, production, value, number, food balance	area, tenure, land use, crops, livestock, yield rate, types.

Scope of Official Statistics/ Areas	Data/Indicators	Category
Health	Number of health workers, patients, vaccines, immunizations, contraceptives use, maternity services, child care, diseases prevalence, etc.	Types of diseases, area, types of health facilities used/ provided, age , sex etc.
Education	Enrolment, level of education, primary, lower secondary, higher, number of students, teachers, literacy.	Age, sex, location/region, education types, subject, institutions, quality, rates.
Environment Forest Climate Atmosphere Flora and Fauna	Coverage area, parks, products, quantity, value, cultivated forest, etc. Mean temperature, precipitation, rainfall, wind speed, noise level, radon concentration, Ozone depletion, dust emission, air quality, land use, irrigation, sediment yield, soil quality, use of pesticides, water quality, plant and animal species, mineral extraction, solid waste, disaster statistics, energy production /consumption	Types of forest/ products, region, quantity, quality etc. size, frequency, types and by different measurement units
Transport and communication	Length of roads, transport facilities by types, telephone exchanges, post offices, newspapers, etc.	Area, types, number, region, percentage etc.
Labor force	Employment/ unemployment, labor force participation, decent work	Number, rates, ratios, occupation, industry, age, sex, region etc.
Gender	Economic and social indicators relating gender theme	Count, rate, ratios, occupation, industry, age, sex, region etc.
Poverty	Poverty level, gap, severity	Rate, ratios, percentage(line), regions, groups
Peace, welfare and justice*	Access to justice, protection of human rights	Region, sex, age, groups
Economy:		
National accounts and price	GDP, GNI, GNDI, GFCF, deflators(Inflation) saving, investment, Consumer price index	Volume/value, rates, ratios, percentage, annual, annual/quarterly
Industries	Production, GVA, employment, GFCF	Industrial divisions, region, sex, occupational category
Energy	Production and consumption of fuel and other types of energy	Types, quantity, value, sources
Trade	Volume of trade-imports and exports of goods and services, indices, price of traded goods, distributive trade and international trade,	Trade divisions (classification)
Money and banking	Demand for and supply of money, BOP, Central bank and other banks' transactions of financial institutions, Purchasing Power Parity, Exchange rate	Value, rates and ratios, indices
Government finance	Tax and non-tax revenue, current and capital expenditure by functions of the government, borrowing and other budgetary transactions.	Types, regions (central and local), value, rates and ratios.

**In addition to social, economic and environmental aspects peace and justice measure is included in SDG no. 16*

Data sources

In broad term, data can be derived from two major sources. Primary sources are data that are collected primarily for creating official statistics, and include statistical surveys and censuses. Secondary sources are data that have been received indirectly from other sources (administrative data, business records, etc.) than direct sources (census and surveys).

4. Fundamental Principles of Official Statistics (FPOS)

The statistical system of a country is guided by the Fundamental Principles of Official Statistics (FPOS), which is a pillar of the Global Statistical System. By enshrining profound conviction and commitment that official statistics have to adhere to well-defined professional and scientific standards, FPOS have stood equally relevant and appropriate. After adoption of FPOS in 1994 by the UN Statistical Commission, the ten Principles are still as relevant today as they were in the past. They have become an integral part and a common reference in the statistical systems at global and national level. They have proven as a guideline for producing and practicing official statistical activities.

Principle 1 – Relevance, impartiality and equal access

Official statistics provide an indispensable element in the information system of a democratic society, serving the government, the economy and the public with data about the economic, demographic, social and environmental situation. To this end, official statistics that meet the test of practical utility are to be compiled and made available on an impartial basis by official statistical agencies to honour citizens' entitlement to public information.

"Relevance" is the degree to which statistics meet current and potential users' needs. Official statistics compiled by National Statistical Agencies and international and supranational organizations exist to provide information to the general public, governments, business and research communities in the economic, demographic, social and environmental fields. This information is essential for evidence based decision making, for mutual knowledge and trade among the States and people of the world.

Official statistics as an important public good in democratic societies have to meet the needs of users and – as mentioned above in order to be credible and trusted – must be compiled in an objective, transparent and independent manner and in respect of the rights of respondents, and must be disseminated in an impartial way.

The use and benefit of official statistics is dependent on their credibility and confidence towards users. Professional independence of statistical agencies, scientific competence of their staff and impartiality are the crucial preconditions of trust in official statistics. Secondly, the benefits of statistics are increasingly recognized as essential tools for Transparency, Accountability, Results and Transformation (START).

The overall purpose of official statistics is to serve the information system of democracies. This is a big, demanding and complicated role to play. In addition to traditional economic, social and environment dimensions, new ones have emerged, e.g., peace and security or welfare. Official statistics have to serve not only governments but all the stakeholders involved in the political debates and all the users including the public at large when monitoring all kinds of development. Several preconditions have to be fulfilled to guarantee that official statistics can play this demanding role.

The independence of statistical agencies is essential for the credibility and integrity of official statistics. "Professional independence" is not an objective per se; it is rather a means to provide objective statistical information free from any pressures from political or interest groups. It covers elements of institutional independence, such as a possibility of setting up and publishing statistical work programmes autonomously (programme planning), a responsibility to manage the budget of the statistical agency and a prominent role of the head of the agency. The independence in developing, producing and disseminating statistics, in particular the selection of definitions, methods and data sources, and decisions on the timing and content of all forms of dissemination, is best assured via the professional independence of the head of the statistical agency and transparent recruitment and dismissal procedures based on clear professional criteria and not on political grounds.

Independence and impartiality are interrelated. Similarly to professional independence, "Impartiality" means that statistics must be developed compiled and disseminated in a neutral and unbiased manner (determined by statistical considerations when deciding on choices of data and methods), and in addition, all users must be given equal treatment and equal access to statistical information. A law or formal provision is in force, which specifies that statistical agencies are professionally independent and impartial, develop, produce and disseminate statistics following professional standards, and treat all users in the same way in an equitable manner.

Transparent procedures for recruitment and dismissal of Head of the statistical agency are vital. These procedures must be independent of changes of government. Head of the statistical agency is responsible for the budget management and has a right to publicly comment on the budget allocated to the statistical agency. Head of the statistical agency has sufficiently high hierarchical standing to ensure senior-level access and coordination to policy authorities and administrative public bodies. Statistical agency, when appropriate, comments publicly on statistical issues, including criticism and misuses of official statistics.

Statistics are compiled on the basis of common standards determined only by statistical considerations, e.g., guidelines for assuring impartiality and objectivity explain the compilation of statistics. Choices of sources and statistical methods as well as decisions about the dissemination of statistics are only made by statistical considerations e.g., regular assessments statistically validate the collection mode and the methodology used. Similarly information on methods and procedures used in statistics should be free from political interference.

Principle 2 – Professional standards, scientific principles, and professional ethics

To retain trust in official statistics, the statistical agencies need to decide according to strictly professional considerations, including scientific principles and professional ethics, on the methods and procedures for the collection, processing, storage, and presentation of statistical data.

Public trust in statistics relies heavily on the strict observance by statistical agencies to scientific principles. To do this, the Chief Statistician and staff of the National Statistical Office(s) need a profound understanding of official statistics and the relevant scientific principles. It is also necessary that staff and statistical experts follow and respect professional ethics for statistics. Laws, regulations, and other mechanisms reinforce adherence to scientific principles and professional ethics. The National Statistical Office(s) must guarantee that official statistics are based on scientific principles, and, therefore, that inference is useful, objective and of high quality. Users may have access to other

data and statistics that do not guarantee that inference is based on solid scientific ground. Statistics is a strong tool when the scientific principles are followed but may be misleading when these principles are not followed.

"Professional ethics" is crucial in statistical work. For statistics, there are international standards, as well as several other national principles of ethics. While ethics is often conceived of as an individual code of conduct, the National Statistical Office(s) must also reflect professional ethics in organizational conduct and practice.

Building and maintaining public trust requires not only transparency of methodology, application of professional ethical guidelines, and objectivity of reporting, but also the assurance that all statistical decisions are based on scientific principles.

Principle 3 – Accountability and transparency

To facilitate a correct interpretation of the data, the statistical agencies are to present information according to scientific standards on the sources, methods and procedures of the statistics.

To guarantee user access to necessary information, to understand the characteristics and quality of official statistics by explaining and making available policies and practices surrounding statistical production and dissemination in order to facilitate correct interpretation by the user and thereby improving the use of statistics, sources methods and procedures of statistics should maintain scientific standards.

Official statistics need to have high ambitions as regards the use and benefit for the users but also indirectly for all society. Transparency on the sources, methods and procedures used to produce official statistics as well as quality assessments readily available to users will enable them to judge the *fitness of use of the data*. Transparency therefore contributes greatly to increase the confidence and trust of users in statistics and thereby increasing use of statistics as evidence in decisions.

For the qualified users it is necessary not only to read the pure statistical results but also to have a professional understanding of how the statistics have been produced. The qualified user will reach the necessary understanding on how to use the statistical results only after knowledge about data sources, methods and procedures

Principle 4 – Prevention of misuse

The statistical agencies are entitled to comment on erroneous interpretation and misuse of statistics.

To comment and respond to erroneous interpretation and misuse of official statistics in order to ensure that trust in statistics is maintained and thereby improving the use and understanding of statistics. To develop interventions to educate users on the correct interpretation of official statistics is therefore crucial.

Statistics can be used and interpreted in many different ways. Statistics are sometimes misused. It is important to maintain trust in, and the credibility of, official statistics. Hence, statistical agencies should draw attention to obvious public incorrect use or interpretation.

"A misuse of statistics occurs when a statistical argument asserts a falsehood. In some cases, the misuse may be accidental. In others, it is purposeful and for the gain of the perpetrator. When the statistical reason involved is false or misapplied, this constitutes a statistical fallacy. Misuses can be easy to fall into. Professional scientists, even mathematicians and professional statisticians, can be fooled by even some simple methods, even if they are careful to check everything. Scientists have been known to fool themselves with statistics due to lack of knowledge of probability theory and lack of standardization of their tests."[10]

Principle 5 – Sources of official statistics

Data for statistical purposes may be drawn from different types of sources, be they statistical surveys or administrative records. Statistical agencies are to choose the source with regard to quality, timeliness, costs and the burden on respondents.

To ensure that producers and statistical operations, as well as the characteristics of the production process and the quality of the data generated are fully identified and are governed by the rules established to meet the demands of information.

The conceptual and methodological framework for statistical production, which is the basis for approval or statistical harmonization, include the precise conceptual definition of variables, documentation (metadata), response categories, using classifiers and coding as well as the establishment of methodological processes from the scope of its objectives until analysis and dissemination, through the collection, processing and data validation.

The reliability of statistical information criteria is present in various models of statistical quality assessment. It implies the absence of non-sampling errors in the case of operations from administrative records such as design, register or sub-register, misclassification, partial responses, etc. It also implies the reduction of non-response and data reliability by applying rules of internal and external validation in the case of sample surveys. Reliability rests largely on the work of collecting the data and performing the analysis in its consistency. If there are failures in these processes, reliability is affected directly, so that measures should be taken to prevent such an anomalies.

Principle 6 - Confidentiality

Individual data collected by statistical agencies for statistical compilation, whether they refer to natural or legal persons, are to be strictly confidential and used exclusively for statistical purposes.

A fundamental requirement for official statistics is confidence and acceptance of public. Accurate and timely data are reliant on public goodwill and cooperation – no matter if their participation is facultative or if it is based on compulsory response. In order to maintain the trust of respondents it is the utmost concern of official statistics, to secure the privacy of data providers (like households or enterprises) by assuring that no data is published that might be related to an identifiable person or business. At the same time this guarantees quality by avoiding loss of accurate data. Confidentiality protection is supposed to be implemented on each level of the statistical process – from the preparation of surveys up to the dissemination of statistical products.

10 Wikipedia.

Principle 7 - Legislation

The laws, regulations and measures under which the statistical systems operate are to be made public.

High quality legislation is critical to the effective performance of a national statistical system. Such legislation should clearly set out the authority and powers of the national statistical office and establish its independence. Openness in all aspects of the production of official statistics is important for maintaining the trust of the providers of data and the credibility of the statistics produced. This openness is facilitated by the public availability of laws, regulations and measures under which a national statistical system operates. It is essential to the effective functioning of a national statistical system that it is governed by a high quality legal framework in any country.

a. There should be clear laws and regulations governing official statistical activities within a country.
b. The laws and regulations should be consistent with, and give effect to, the Fundamental Principles of Official Statistics.
c. The independence of official statistics should be clearly set out in legislation. There should be transparent procedures for the recruitment and dismissal of the chief statistician
d. The laws and regulations should be modern and up-to-date.
e The laws and regulations should cover the activities of the national statistical office as well as the activities of other organizations involved in official statistics.
f Ideally, there should be a specific statistics law.
g. The laws and regulations should be comprehensive and provide sufficient detail to ensure that roles and responsibilities are properly understood and to avoid political arbitrariness.
h. Critical aspects of the national statistical system should be established in legislation, with regulations and other measures providing supporting detail.
i. There should be consistency between the statistical laws and regulations and other laws and regulations governing the activities of the national statistical office and the national statistical system.

Principle 8 – National coordination

Coordination among statistical agencies within countries is essential to achieve consistency and efficiency in the statistical system.

To describe how national statistical offices effectively coordinate statistical activities and thereby improve the consistency and efficiency of their statistical systems. According to the United Nations Statistics Division's Global Review 2013, "No matter what the organizational arrangements are for producing national statistics, coordination of statistical activities should be undertaken to avoid duplication of work, to minimize the reporting burden of respondents and to facilitate the integration of data from different sources through the use of statistical standards" (Global Review 2013). This means that it is mandatory and this coordination system consistency derives from the information generated and disseminated by the National Statistical Offices. Moreover, to be considered official, it must be bounded within a legal and institutional framework, which will determine the coordination rules, structure and processes, according to country's legal system.

In order to maintain relevancy of national statistics, coordination among statistical agencies within countries is essential. It implies the mandatory provision of this coordination mechanism and this system derives from the information generated and disseminated by the National Statistical Offices. Furthermore, to be considered official, it must be bounded within a legal and institutional framework, which will determine the coordination rules, structure and processes, according to country's legal system.

Principle 9 – Use of international standards

The use by statistical agencies in each country of international concepts, classifications and methods promotes the consistency and efficiency of statistical systems at all official levels.

Without common standards and metadata, comparability of data produced by different agencies would be impossible. This applies equally within a country, and between countries. Comparability is an important dimension of quality. If data are not comparable, they lose a lot of their utility. If data lose their utility, the agency that produces them loses relevance. It is also a key principle of work to modernize official statistics production and services, that the use of common standards improves efficiency, both within individual agencies, and within the official statistics system as a whole.

Principle 10 – International cooperation

Bilateral and multilateral cooperation in statistics contributes to the improvement of systems of official statistics in all countries.

An indispensable requirement so as to have high-quality statistics is to know the lessons learned and share the best practices of the Statistical Institutes/Agencies with the purpose of implementing the best models/methods available according to international standards. In order to guarantee sustainability, statistical capacities have to be established as fundamental for producing high-quality statistics, which is first of all the modernization of the Statistical Institute as an effective authority and at the same time ensuring the permanent implementation of statistical knowledge. A high international engagement has an impact on the image of the Statistical Institutes and may have an impact on domestic trust in the Statistical Institute of both sides (beneficiary and donor). In general, international cooperation is not one-way but a win-win situation for both Statistical Institutes, working hand in hand on an equal footing. For example, twinning projects as administration partnerships are based on the joint solution of challenges and tasks of Statistical Organizations.

Furthermore, for staff members of both sides these cooperation activities are an incentive as they become aware of other cultures, perspectives and insights. Also, based on partnership and ownership, the Statistical Institutes should actively participate in the main discussion forums pertaining to statistics, such as the United Nations Statistical Commission, in order to ensure continuous improvement of statistics at the international level.

Finally, due to the scarcity of international cooperation resources that are allocated to statistics, the issues where cooperation will be requested pertaining to statistics need to be prioritized and different forms of cooperation and new sources of cooperation with the private sector need to be explored. Continuous exchange of views and knowledge between Statistical Institutes is an essential prerequisite to ensure effectiveness in the Statistical Cooperation for both sides – the recipients and

providers of assistance. Advantages of an existing close partnership between Statistical Institutes are, besides others, the establishment of strong consortiums in order to cope with large-scale projects and the facilitation of the implementation of the consulting project itself. Advantages of a close partnership between the Statistical Institutes comprises

a. Official visits of Heads of Statistical Institutions
b. Meetings at working level to exchange knowledge
c. Newsletters and webpage to inform about current projects
d. Hosting trainees from other Statistical Institutes
e. International training programs for exchange of best practices (e.g., European Statistical Training Program ESTP and Training Program of the Statistical Institute for Asia and the Pacific SIAP)
f. Institutes should have a space on the website of the Statistical Institute for disseminating best practices and lessons learned that can be applied by other statistical institutes.

Official statistics inform decisions right across society; and those decisions affect the lives of all for example, funding for public services, in determining economic and social policies and the commercial decisions of businesses. They are also essential to the public understanding of society, economy and of the performance of the government. Moreover, official statistics are widely used not only by national users but also demanded by global community. It is a basis of evaluating the status of a state and comparing among each other.

It is, therefore, self-evident that good official statistics are essential to the proper functioning of a democratic state. However, the meaning of 'good statistics' deserved careful consideration, as goodness is not an intrinsic quality; it is a much broader concept than just 'accuracy'. More specifically, the reliability of official statistics heavily depends upon the soundness of that statistical system supporting fundamental principles as mentioned.

5. Conclusion

There are many factors responsible for the implementation of the principles of official statistics in the national statistical system of a country. The functioning of the system mainly depends on the status of the national statistical office, degree of government support and commitment towards the implementation of the principles, steps taken for the improvement of data quality, coordination among all statistical agencies within the country, the establishment of national coordination mechanism, the support of line ministries and sub-national level statistical agencies, procedures adopted for coordination, sharing and deployment of resources, use of international concepts classifications and methods for statistical activities and use of unified concepts to produce qualitative official statistics. Moreover, the position of the development of statistics in a country depends mainly on the level of implementation of these principles in real practice. To maintain the quality standards of statistics and its comparability, the principles of official statistics is necessary to be adopted and implemented in the national statistical system.

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STATISTICAL PLANS AND FRAMEWORK IN NEPAL

Rajan Silwal*

Abstract

The history of statistical activities in Nepal goes back to more than a century. The importance of statistics is ever increasing among policy makers, researchers, students, academia, media and public at large. Since the initial days of periodic plan, the statistics was a matter of government's concern. During the first periodic plan, the Statistics Act came in existence and the Central Bureau of Statistics (CBS) received an important position in the government set-up. The growing demands of statistics led the national statistical system (NSS) towards expansion, quality assurance, timeliness, capacity building and motivation of statistical human resource, users' satisfaction and adoption of modern technologies. All these factors have put pressure in formulating the statistical plans and policies in a certain interval. The consolidated national statistical plan (CNSP) was the first attempt to strengthen and expand the NSS. Guided by national needs and following the global initiative, Nepal has recently drafted its national strategy for the development of statistics (NSDS). The NSDS capitalizes the lessons learned from the CNSP and adopts the global framework that has been recommended by the PARIS21. In fact, the NSDS is both a statistical plan and a policy. In this chapter, effort has been made to discuss and highlight how statistics was incorporated in periodic plans and the CNSP and NSDS came in the last decades.

1. Introduction

It is now widely accepted that statistics is the foundation of planning. The subject is equally powerful and painful for development and planning. Statistics was in place before and after the unification of present Nepal. The history of statistics goes far back to the history of periodic plan. One can logically argue that statistics is the starting point of evidence-based planning and policy formulation. Statistics not only provides a vivid roadmap for planning process but also help effective monitoring and evaluation of policies, plans and projects. It will not be an exaggeration to claim that statistics is the strength of planning.

The first population census in Nepal took place in 1911 A.D. It can be regarded as an important year in shaping the statistical system of Nepal. Realization of the need of a population census by the then

* Director, CBS

government, statistics received a big concern by the State. In the successive decades and years, statistics continued its existence, expansion and development. In this write-up, efforts will be made to throw light on the deliberate and focused statistical plans and policies. To be more specific, the remaining sections will be spent on examining the CNSP prepared in the year 2000 and the NSDS drafted in 2016.

2. Objectives

In order to provide a brief review of statistical plans and policies of Nepal, effort has been made to highlight the principal statistical plans and strategies till date. It is therefore an attempt to serve the need of various stakeholders in the national statistical system. Specifically, the students, teachers/ professors, professionals, media as well as data users and producers will be well informed on this topic. It is meant to assess the rationale and total impression of statistical plans and strategies.

3. Methodology

The entire chapter is based on the review of relevant literatures which are either available on hard copies or retrieved from online sources. A descriptive argumentation has been followed to explain the subject matter.

3.1 Statistical system and need of Statistical Plans and Policies in Nepal

Prior to the Statistics Act 1958, the statistical system of Nepal was somewhat unorganized and primarily focused on conducting population census. The political system, administrative set-up, level of development, size of the population, structure and size of the economy were the major factors in drawing the map of the statistical development. The function of government kept on expanding in each decade. Globalization of social and economic lives led to newer dimensions of plan formulation and policy making. Statistics stood as a prime factor for evidence-based planning. In this regard, the periodic plans gave space to the development of statistics. Gradually, it is realized that the Statistics Act alone is not sufficient to satisfy the growing demands of statistics.

On the other hand, the CBS alone stood insufficient to produce multi sector statistics. Issue of coordination and designation in statistical activities led to the expansion of the NSS. Awareness for good statistics increased among policymakers, politicians, bureaucrats, academia, media and general public. Similarly, the development partners also emphasized for the overall development of statistical system. The result was that statistics continually received space in periodic plans and the birth of CNSP and NSDS took place.

3.2 Statistical issues in constitution and periodic plans

The constitution of Nepal has explicitly mentioned statistics in different articles. Article 27 ensures the right to information while Article 28 mentions the right to confidentiality. Individual statistics has been considered as a confidential element. Similarly, Annex 5, 6, 7, 8 and 9 has stated the type of statistics to be maintained by the various level of government.

From the initial days of periodic plans, statistics remained an indispensable element for planning. It was realized that not only the government but also the private enterprise need statistics for their usual business. The first five-year plan (1956-61) has explicitly mentioned that '[t]he scope of statistical work be steadily broadened'[11]. It also proposed for the establishment of a Central Statistics Office with branch offices in appropriate localities. It has underlined the need for vital statistics, health statistics, price movements, export and import statistics, and meteorological data and so on. Above all, it emphasized on the steady flow of information to the implementing authorities.

The Third Five Year Plan (1965-70) has devoted a single chapter on statistics. It has emphasized a number of initiatives. Specifically, inception of industrial survey, domestic trade, vital statistics and the administrative reform of the Central Bureau of Statistics were the major activities to be undertaken.

The Fourth Five Year Plan (1970-75) highlighted the need for coordination, standardization and mechanization in the field of statistics. Besides, the plan proposed to undertake Animal Resources Survey, Agriculture Investment Survey, Internal Trade Survey, Industrial Census, Survey of Fishery, Family Survey and Annual Estimates of GDP.[12]

Development of statistics was also carried in the Tenth Five Year Plan (2002-07). It stressed on institutionally strengthen the CBS. It underlined the need for producing useful, timely, reliable and high quality data needed for the planning process. Further, it recommended the implementation of CNSP and activation of Economic Planning Group under the Nepal Economic Planning and Statistics Group[13].

The Eleventh Three Year Plan (2007/08-09/10) has mentioned that the national statistical system will be strengthened. Further, it has spoken for inclusive and engendered planning and statistics.[14] Similarly, the Twelfth Three Year Plan (2010/11-12/13) put emphasis on building the national statistical system more trustworthy and reliable in accordance with the new structuring of the country. It planned to establish a central level GIS-based data depositary at the NPC. The plan emphasized in the use of modern technologies which in turn could strengthen the data collection, processing and analysis.[15]

The Thirteenth Three Year Plan (2013/14-15/16) has stated a number of issues for the development of statistics. Four important strategies, viz., formulation of NSDS, implementation of Survey Clearance System, production of reliable and internationally comparable statistics for planning and monitoring, and strengthening bilateral and multilateral cooperation for the development of statistics.[16]

Other periodic plans have also included some similar issues on statistics. They are mostly related on supplying needed data for planning process and ensuring timely and reliable data.

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11 See Chapter 22: First Five Year Plan
12 See Fourth Plan (1970-75) Chapter 14
13 See Tenth Plan (2002-07), Chapter 34
14 See Eleventh Plan (2007/08-2009/10) Chapter 38
15 See Twelfth Three Year Plan (2010/11-2012/13), Sub-Chapter 8.3
16 See Thirteenth Three Year Plan (2013/14-15/16), Chapter 8, p.

4. Origin and introduction of CNSP

There was only the Statistics Act 1958 to regulate the whole statistical system in Nepal before the enactment of the Civil Registration Act 1976, Local Self Governance Act 1999, Electoral Rolls Act 2006, Nepal Rastra Bank Act 2002. The centralized national statistical system envisioned by the Statistics Act 1958 is still in place contrary to the decentralized national statistical system in the country in practice. The emergence of CNSP in 2000 was a breakthrough for the reorientation and restructure of the NSS in a nutshell.

The main objective of the Consolidated Statistical Plan of then His Majesty's Government of Nepal is to ensure that the data requirements in the preparation and implementation of the Government's Plan are available for governance, policy formulation, target setting, decision making, monitoring, and evaluation of government operations.[17]

Hence, the CNSP has not only clearly highlighted its significance in reengineering the NSS but also underlined the minimum conditions for its successful implementation in the following words:[18]

- A strong and efficient coordination mechanism must be established among government agencies;
- The major data producing agency, the Central Bureau of Statistics (CBS), must be reorganized so that it could respond effectively to new demands of the programs;
- The statistics unit in each data producing government agency must be strengthened; and
- The statistical skills of concerned staff in data producing government agencies must be upgraded.

For the first time, the CNSP put forth a vision for the national statistical system with an all-round proposal and means to implement it.

4.1 Recommendations by CNSP

The CNSP has explicitly raised the genuine problems and their remedies in the NSS. Known the legal boundaries set by Statistics Act 2015 summed up by financial, physical and human resources the CBS is not sufficient to satisfy all the data demands of users at large. Besides, the hierarchy of the CBS as well as the ever expanding dimensions of planning and development, it is realized that the NSS requires a consolidated endeavor for the well and effective functioning of the NSS.

The followings are the key recommendations presented by the CNSP.

i. Amend the age old Statistics Act 2015 given the political, social, economical and technological changes in the country.

ii. Establish a designated statistical system (i.e., clear, efficient and effective allocation of responsibilities in the production of data and indicators among data producing agencies) in place of unitary one as has been envisioned by Statistics Act 2015 B.S.

17 CBS: Consolidate National Statistical Plan 2001, Green Book p.1

18 Ibid.

iii. Establish survey clearance system that requires pre approval of the CBS before conducting any statistical surveys in the country.
iv. Reorganization and legalization of the National Statistical Council.
v. Establish a Technical Secretariat on behalf of NSC headed by an executive equivalent to secretary.
vi. Organize inter-agency Technical Working Groups (TWGs) that take care of the technical aspects of the different statistical activities within national statistical system of Nepal. As such CNSP has envisaged 12 different TWGs.[19]
vii. Produce an annual calendar of statistical activities.
viii. Reorganization and upgrading of CBS.
ix. Strengthen the national account system of Nepal.
x. Introduce Statistical Units in ministries and departments.
xi. Develop a national statistical plan which identifies the statistical indicators needed for multi-sector planning, monitoring and evaluation.
xii. The capacity of the local government, at least of the DDCs and the municipalities, should be enhanced with proper data dissemination system.[20]
xiii. Develop statistical human resource with relevant and special training to statistical professionals.
xiv. Establishment of a Statistical Coordination Board.
xv. Upgrade the statistical skills of concerned staff in data producing government agencies.
xvi. Strengthen the capacity of Statistics Unit in data producing government agencies.

4.2 Implementation of CNSP

The implementation of CNSP still carries a debate in the circle of NSS. The recommendations put forth by the CNSP are minimally implemented. Many of the valid recommendations made by the CNSP are left unimplemented within the proposed period of CNSP. However, the visible change brought by the CNSP is creation of Planning and Human Resource Division within the CBS. Environment and Satellite Account Section and Trade Statistics Section were also the structural changes in the CBS after the CNSP. In few ministries and departments a separate statistics unit was established. In other government agencies new positions of statistical professionals were created.

The urgent need for the amendment of five decades old Statistics Act could not be achieved. Further, upgrade of CBS did not take place. A high-level task force was created under the chairmanship of NPC member. The taskforce submitted a report recommending separate strategy for the short term and long term as well given the transitional scenario of the country.[21]

4.3 High level taskforce for the implementation of CNSP and immediate activation of Nepal Economic Planning and Statistics Service

Under the chairmanship of NPC's Hon'ble member a high level taskforce was formed in 2007. The taskforce has explicitly stated that the CNSP should be implemented since it is meant for the overall

19 See for detail, p.2. CNSP Green Book, Chapter 11.
20 CBS (2001), CNSP Green Book, chapter 8, p. 4
21 CBS and ADB (2007), Statistical Capacity Building in Nepal, p.1

development of the NSS. In the report, a clear indication of implementation measures has been mentioned.[22] It is, however, a bitter reality for the NSS of Nepal since many of the recommendations made by the taskforce were not materialized for various reasons.

In the year 2007 immediately after the plan period (2001-2005) of CNSP, the CBS came up with a new plan called Statistical Capacity Building (SCB) in Nepal. The project was funded by the Asian Development Bank (ADB). The project aimed at statistical development and capacity building of the CBS. It was actually brought to complement the CNSP. Since the CNSP could not come on action due to number of technical and administrative reasons, the SCB brought some flexibility in the implementation of CNSP.

4.4 Challenges of CNSP

Analysts have different views regarding the implementation of the CNSP. It is a common reality and irony that most of the plans in developing countries are partially implemented and the set targets are not fully met. In case of CNSP, the general understanding is that it came, at the first hand, from the supply side. It was more from the ADB and relatively less from the NSS of Nepal. Despite the effort to include key stakeholders of NSS in its formulation, some of the major stakeholders were missing. After the preparation of CNSP, it is felt that the document failed to receive the expected ownership from all the stakeholders. They hardly integrated the recommendations of CNSP into their periodic plans and strategies, if any.

Besides, CNSP is criticized for its overly ambitious elements. The plans for each sub-sector are not accompanied well by the respective activities. Gradually, it is understood as an output of CBS only. The much desired amendment of Statistics Act 2015 could not materialize. Had the aspiration of evidence-based planning materialized the CNSP would have implemented better. Being the pivotal agency of the NSS, the CBS could not play an effective role from its side so as to implement the CNSP. The royal massacre was there in 2001 which led the country to an uncertainty in political, bureaucratic, economical, social and other lives of the country at large. Many government polices at that time were left in shadows due to the transitional environment prevailing in the country.

4.5 Achievement of CNSP

It was the first such structural plan in the country dedicated to the development of statistics. It was raised from the wider participation of key stakeholders of NSS and praised for its rational recommendations. The plan rightly emphasized the need for amending the too old Statistics Act. Later, new draft of Statistics Act was presented to the Government bodies for its timely amendment. However, it could not move forward till date due to number of reasons. The reasons are indicated in separate chapter.

The recommendations for designated statistical system and survey clearance system are two big things which are still valid after 15 years. Likewise, the issue of restructuring the CBS is another praiseworthy recommendation of the CNSP. Further, development of motivated statistical professionals was another

22 See an unpublished report prepared by the High Level Taskf**orce for the Implementation of CNSP and Immediate Activation of Nepal Economic Planning and Statistics Service.** The report was submitted to the Vice-Chairman of the NPC in 2007.

plausible recommendation of CNSP which still carries votes from the big mass of NSS. Overall, the CNSP can be remembered as an unforgettable advocacy for raising a big statistical advocacy among the principal stakeholders in the NSS.

5. National Strategy for the Development of Statistics (NSDS)

NSDS is simply a global initiative to strengthen the national statistical system of a country. It underlines the immense need of a sound statistical system that helps evidence for development, better governance and greater aid effectiveness. The NSDS, in fact, is both a policy and a plan. It puts forth short, medium and long term goals of an NSS. The literatures reflect that NSDS came in existence from the minds of development planners apart from the core statisticians. The NSDS is premised on the strategy that countries need good statistics to achieve their development goals as articulated in the Marrakech Action Plan for Statistics (MAPS) ratified during the Second International Roundtable on Managing for Development Results in 2004.[23] According to PARIS21,

the [NSDS presents] *comprehensive and unified framework for continual assessment of evolving user needs and priorities for statistics and for building the capacity needed to meet these needs in a more coordinated, synergistic and efficient manner*.[24] It is further argued that the NSDS manages, mobilizes and harnesses national and international resources for establishing an NSS focused on results-orientated strategic management.[25]

The NSDS helps the NSS to operate smoothly, efficiently and sustainably. It advocates for laying institutional, organizational, professional and financial foundation of a national statistical system. Any technological development that eases the statistical activities is appropriated accordingly when an NSDS is on place. Since the NSDS is yet in the process of approval from the concerned authorities, only its rationale and challenges have been flagged in the remaining sub-sections.

5.1 Need for an NSDS in Nepal

The Thirteen Plan of Nepal has explicitly stated that a strategy will be prepared for the development of statistics.[26] Other guiding forces to develop an NSDS are the fundamental recommendations of CNSP. Specifically, the designated statistical system, survey clearance system, restructure and promotion of CBS to higher level, human resource development engaged in statistical activities. Besides, availing better estimates of national accounts and institutionalization of a sound coordination system are other demanding factors for an NSDS. Above all, need for a new Statistics Act stands just behind the NSDS.

The NSS of Nepal faces dozen of weaknesses and gaps in the system. Besides the fact that it crossed hundred years of census taking in the country and regardless of 58 years old Statistics Act on place, the NSS has to further grow, develop and raise its goodwill in the realm of statistics. It still faces data gaps,

23 CBS (2013): NSDS_Brief Roadmap of Nepal. An unpublished document. p.2.
24 URL: http://www.paris21.org/NSDS available on 2016.07.20
25 Ibid.
26 See GoN/NPC (2071). Thirteenth Plan (2070/71-072/73). p. 324.

data inconsistencies, duplication of resources, and under-use of administrative records and other data. Moreover, weaknesses are largely seen in data sharing, dissemination or results, use of modern information and communication technologies (ICTs), and in adoption of national/international standards and classifications. It shows a distinct problem of coordination in the system. The age-old Statistics Act turned insufficient in satisfying the growing demands of varied users and the changes that took place in the world of statistics.

Many development initiatives have also led the NSS to come up with a sound strategy on statistical development. They are the MDGs, PRSPs, SDGs, SAARC development goals and graduation of Nepal by 2022. All these factors collectively gave a ground for the NSDS. Without supply and use of adequate data development plan becomes single-legged and hence strengthening of NSS becomes a prerequisite.

5.2 Challenges of NSDS

The first and foremost challenge of the NSDS Nepal is its timely approval from the NSC and Government of Nepal. Given that the formulation of NSDS took a longer period it seems hard to expect its final approval on time. Another big challenge is the ownership and inclusion of all the stakeholders of NSS. Still some key ministries and institutions have not supplied their action plans. Since the NSDS is an extensive and broad based strategy paper, its implementation largely depends on wider participation, wider ownership and higher level administrative and political commitments. The next challenge is to finance the activities of NSDS. Given the constraint of government regular budget, the NSS should find some development partners for some big surveys and developing physical, human and statistical infrastructure. The desired alignment of NSDS with national development plan, policies and priorities is another requisite for its successful implementation.

Similarly, another challenge is to seek the commitment of CBS, line ministries and agencies to implement the action plans which are designated in their part. Establishment and functioning of a high level monitoring mechanism to regularly review the progress of NSDS is a must. Given the present organizational status and strength of the CBS, the aspirations of the NSDS are not very likely to be satisfied. Motivation of staff involving in the statistical jobs within NSS is a prime issue which can never be undermined. In fact, the implementation of the NSDS largely depends on the strength of statistical human resource. There should also be continuation of successive NSDS so as to ensure that it is not an ad hoc initiative rather a statistical cycle. Without having a new Statistics Act, there is possibility of minimally implemented NSDS despite the commitment of key stakeholders in the NSS. Besides, it is felt that the demand side of the NSS is equally important for the sound functioning of NSS. The demand side is comparatively unorganized and hence weak.

Lastly, an extensive advocacy is very likely to gather national and international support for its effective implementation. And, a strong statistical user groups from centre to local level compels the data producer not to deviate from what they are supposed to deliver.

6. Importance of statistical plans for monitoring SDGs

Without having an implementable statistical plan the objectives of measuring outputs and outcomes of SDGs are very likely to face severe data gaps, data inconsistencies and duplication of efforts as well. A statistical plan aims to address the data gaps, data inconsistencies, promote coordination,

and maintain quality and timeliness by establishing a strong institutional and organizational set-up. Furthermore, the statistical plan lays a strong foundation of statistical infrastructure which, in turn, effectively serves the supply of data in measuring the progress of SDGs indicators. Besides, statistical plan are, in general, formulated in line with the national development plans, and regional as well as global development initiatives. The NSDS Nepal has also been prepared paying adequate attention to the relevant and important indicators of SDGs. In fact, statistical plans are always supportive and indispensable for evidence-based policy making, monitoring the progress and evaluating the success.

7. Conclusion

Statistics always remained a subject of concern of the government which is vivid from the plan documents. Review of plan documents, Statistics Act and other relevant laws guides us in understanding the statistical development is necessary element for the overall planning and development of the country. Statistics, as in other developing countries, received more priority in words and less in action to the extent it could be. The history of statistical activities in Nepal is older than a century, however, its development lagged far behind. It is frequently questioned that whether the NSS has adequately supplied the data needed for national planning and policy formulations. On the other side, people from the statistical circle hold the view that data generated are not optimally used and the State has not paid real attention in building and strengthening the NSS.

Apart from the promulgation of Statistics Act and establishment of the CBS there are some significant initiatives in building, enlarging and strengthening the NSS. Specifically, the periodic plans, the CNSP and the proposed NSDS are two big investments in this course. The CNSP had its own rationale, limitations, coverage, strength, recommendations and beauties. It was the first extensive statistical plan in the history of NSS. A wave of statistical advocacy among the data producers was its one of the achievements. Despite the fact that its major recommendations are still valid, the CNSP stood largely as a good document. It lacked broad range of ownership of key stakeholders and approval from the government.

Capitalizing the lessons from the CNSP on the one hand, and inspired by national need on the other, the NSDS found its space in the Thirteenth Three Year Plan. Being an international initiative it has won the favour and concern of various development partners. The NSDS is formulated with the wider participations of data producers, users, providers and academia. Its formulation process was more practical than the former. Compared to other countries, the NSDS is introduced late in Nepal. It has objectivity and flexibilities compared to the CNSP. At the meantime, it carries some big challenges for the implementation and not to realize the fate of CNSP. The success largely depends on the wider ownership, extensive advocacy, cooperation of development partners, organizational and institutional changes and lastly, highly motivated human resources.

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STATISTICAL ACT AND REGULATION OF NEPAL: NEED FOR AMENDMENT

Dhundi Raj Lamichhane*

Abstract

Nepal's Statistical Act 2015, promulgated relatively much earlier than other contemporary acts after the decline of Rana regime in 2007, and has gone through two amendments in 2018 and 2030 B. S. to date. The emergence of various producers and users of statistics, methodological development in statistics, advancement in technology for data collection and analysis, and data sharing has prompted the amendment or rather replacement of this age-old act. Therefore, due to the inability of the prevailing act to address the newly emerged issues a new integrated statistical act is felt urgent. The purpose of this chapter is to review the prevailing statistical act 2015 and the statistical regulation 2041 while taking stock of the provisions in other acts for carrying out the statistical activities of some national institutions. In the same way, the aim is to advocate for a new act to make it relevant with the changed national and international perspectives. It is recommended that while drafting a new act, the specific provisions for statistics present in the national documents like Constitution of Nepal, the existing statistics act, High-level Administration Reform Suggestion Committee, and so on are to be looked at. Similarly, the UN guidelines for statistics, UN Fundamental Principles of Official Statistics, agenda for Sustainable Development Goals and especially the essence of official statistics are to be the main bases of revising this Act.

1. Introduction

It is frequently said that for the management of social, economic, cultural, geographical, and other development planning, monitoring and evaluation, government needs a foundation of statistics. In the same way, statistics are indispensable to the general public and the media to judge their government's transparency and accountability. Likewise, the private sector hardly prospers without them. But the accurate, relevant and timely production of quality statistics fundamentally depends on statistical legislation and its abidance by the stakeholders. The law also helps in establishing a relation and coordination among different wings of national statistical system.

* Director, CBS

Along with the beginning of the first five-year planning, the necessity of statistical system has been felt in Nepal. In those plans, it has been repeatedly stated that in the absence of statistics five-year planning remains baseless and incomplete. As a result of that the first Statistics Act, 2015 was brought into effect on 15th *Mangsir* in 2015 (1958AD). Before this, in order to make the population census regular, well managed and relevant, the first and second announcement *(Istihar)* were issued in 1977 and 1988 (B.S.) censuses. Likewise, the Government issued and implemented Census Act 2009 and the Census Act 2013 (B.S.) in order to conduct the respective population censuses. The objective of this act was to authorize the CBS for the collection, compilation, analysis, publication and dissemination of statistical information. And, above all, the act has assigned CBS the task of steering and co-ordination of the national statistical system.

2. Objectives

The Statistics Act 2015 has been amended twice in 2018 and 2030 B.S. to incorporate some minor changes and its regulation came very late in 2041 B.S. For many reasons, this act and regulation did not go through further revisions till now though they cannot cater the newly emerged issues and challenges in this sector.

The main objective of this paper is to study the general principles of formation of statistical law, taking into consideration of existing situation of statistical law, in the light of broader Nepalese context. It also aims at exploring its problems and challenges along with the recommendation for its amendment.

3. Methodology

The paper will basically review the existing statistical act and regulation, study the current national issues and challenges and recent developments in global statistical system. Similarly, issues like provisions in the constitution of Nepal, various laws and acts, plans, policies and programs of the government also have been studied while making recommendations for the new statistical act.

Similarly, UN guidelines on statistical law, UN ten basic principles of official statistics and UN Handbook of Statistical Organization have been considered as the secondary information of studies. Therefore, this paper will study the measures to be adopted for bridging the gap between the existing statistical law and the basic principles of statistics. In addition to this, various research reports and articles have also been taken into consideration. Moreover, statistical acts of various countries especially the countries with federal system have also been studied to recommend appropriate federal statistical system.

4. Results and analysis

4.1 Acts guiding statistical activities in Nepal

The Statistical Act 2015

The statistical act 2015 established Central Bureau of Statistics as an autonomous body. This act clearly framed the road map of the bureau of the statistics. It has also provisioned plenty of special rights to the Director General of CBS.

The act includes fourteen articles. It was amended in 2018 and 2030 BS. The Regulation of this Act was released in 2041 BS. Both of the Statistics Act and Statistics Regulation are meant to maintain the integrity, independence, professionalism, statistical quality and neutrality of the Bureau.

The following are the salient features of the Statistics Act, 2015 which are still relevant and should be considered while constructing a new act.

- Establishment of the CBS as an autonomous body with clear objectives and the rights to collect, consolidate, analyze and publish the statistics on any subject as required for Nepal Government.
- Providing the CBS advisory role to the government in the field of statistics.
- Providing special rights to CBS to seek details and examine records from any legal person or natural people for collecting the data.
- Seeking approval from CBS to collect data.
- Authenticating from CBS before publishing and using statistics
- Restriction in publication of personal details.
- Penalties for not furnishing the information required by the CBS.

Other national acts for carrying out statistical activities

In addition to Statistics Act 2015 and Statistics Regulation 2041, many other acts and regulations are in effect for the operation of statistical activities by other institutions in Nepal. Similarly, Local Self-governance Act 2055 and its Regulation 2056 have authorized District Development Committees, municipalities and VDCs for collection, analysis, consolidation, publication and management of data in the local level.

Nepal Rastra Bank Act 2048 BS has authorized NRB for collection, compilation, analysis and dissemination of financial statistics of the government and banking sectors. It also conducts the various surveys. Likewise, Birth, Death and other Vital Events Registration Act, 2033 B.S. and its Regulation 2034 BS, have authorized Department of Central Registration under the Ministry of Federal Affaires and Local Development, to register and manage the data of every individual such as birth, death, marriage, migration, divorce and adoption.

Education Act and Regulation have authorized the Department of Education for the management of educational statistics. And, Election Commission collects and analyses data of Voters under the Act of Voter List Collection Act and Regulation, 2066.

4.2 Statistical laws in other countries

Statistical Acts of other countries (India and Philippines) which can be taken as guidelines while constructing a new Statistical Act of Nepal, have been briefly explained below.

India

The erstwhile Collection of Statistics Act, 1953 of India, provided a legal framework for collection of statistics but it was not adequate to meet the ever growing requirements in the emerging socio-economic scenario. The Rangarajan Commission (2001) which examined the statistical system of India

and its requirement, recommended for making necessary legal provisions either by expanding the scope to the Collection of Statistics Act, 1953 or by passing a new act which could effectively meet the requirement of statistics. As such, a much more comprehensive new legislation called the Collection of Statistics Act, 2008 has been enacted in 2009 abolishing the earlier one. The rules under the act, the Collection of Statistics Rules, 2011 have also been notified in 2011.

As an implementation of the recommendation of the Rangarajan commission, National Statistical Commission of the Government of India came into existence in July 2006. The commission is mandated, among its functions, to exercise statistical co-ordination between Ministries, Departments and other agencies of the Central government; and to exercise statistical audit over the statistical activities to ensure quality and integrity of the statistical products (T J Rao 2013).

Some major features of the Collection of Statistics Act, 2008:

- The scope of the older act widened to collect all kinds of statistics not only from industrial/ commercial but also from individual and household. The local government including the Panchayats and Municipalities can also collect statistics under this act.
- In the new act, the Central Government is empowered to make rules for avoiding duplication and for maintaining methodological standards, timeliness, credibility and completeness in data collection by declaring certain subjects of national importance as 'core statistics' which the country needs.
- All the methods of data collection including oral interviews and filing of returns electronically have been covered in the new act.
- The meager penalties for not furnishing information in the older act have been enhanced. The procedure for trial has been simplified.

The Philippines

The Philippine Statistical Act, 2013 was enacted on September 12, 2013 with a purpose of reorganizing and strengthening the Philippine Statistical System. The act has explicitly mentioned stricter provisions in the formation of Philippine Statistics Authority, Inter-Agency Committees on Statistics, establishment of Philippine Statistical Research and Training Institute, establishing the use of Statistical Classification System throughout the Philippine Statistical System and strengthen Statistical Survey Review and Clearance System (GoP, 2013).

4.3 Issues and bases for construction of new statistical act in Nepal

The provisions in the following documents advocate for a new statistics act to be enacted to have an integrated and consolidated National Statistical System.

Constitution of Nepal, 2072

The constitution of Nepal, 2072 has restructured Nepal into Federation, State and Local bodies. The different levels will exercise the state power as mentioned in the schedules 5 to 9 of the constitution. The matter of statistics comes under all the levels but the nature and type of statistics varies. The local body is supposed to collect local level statistics and manage administrative records whereas the state level will deal with state statistics. The setting of national and international standards and quality and dealing with other central level core statistics will be dealt by the Federation. Therefore,

the amendment in the Statistics Act should clearly address the provisions in the constitution and provide appropriate rights and responsibilities to the statistical units in different levels.

Thirteenth plan

The Thirteenth Plan has provisioned strong guidelines of statistical system in Nepal. The long term vision, objectives, strategies, working policy and the main programs put forth by the thirteenth plan can be taken as the important base for amending the Statistics Act. The plan mainly includes the issues such as making the data and information reliable, standard, updated, institutionalization of statistical system and survey clearance system. Besides expansion of the management information system, institutionalizing the responsibilities of the bodies involved in carrying out statistical activities, ensuring the institutional and organizational development of different statistical units are also given due importance in the plan. Moreover, legalization and activation of the National Statistics Council as well as preparation of the strategies for open data and national statistics have also been a concern of this plan.

Fourteenth plan approach paper

This approach paper acknowledges the need of issuing and implementing a new statistical act which eases the implementation of the strategies and working policies such as the establishment of an efficient, effective and coordinating NSS, provision of statistics and statistical service for the production, improvement and supply of high quality data, promotion of institutional efficiency to ensure quality data supply as per the federal system of governance.

UN fundamental principles of official statistics

The ten fundamental principles of official statistics approved by UN in 1994 AD provide the basic ingredients to be covered in a modern statistics act. The issues and gaps in statistical act with respect to UN fundamental principles demands repealing the old statistical act in Nepal.

High-level administration reformation and suggestion committee

Administration Reformation and Suggestion Committee 2072 has pointed out the need of making a new Statistical Act to address the new scenario and modify the existing Statistics Act. The recommendations of the committee include making the CBS an autonomous body in its specific work area making the Prime Minister and Council of Ministers' Office as a liaison office; upgrading the CBS in the standard of National Statistical Bureau; fully activating the Nepal Economic Planning Group with the provision of reformation of experts on economics, statistics and planning in the bureau. Likewise authorizing the CBS as a regulatory body for the collection, processing, analysis, management and projection of data.

Sustainable Development Goals

Keeping in view, the goals and targets acknowledged by SDG and monitoring and evaluation of their progress, statistical system of the country needs to play vital role in the estimation and production of timely indicators. In order to strengthen the statistical system to measure the SDGs targets and indicators, a new Statistical Act needs to be promulgated.

4.4 Proposed provisions for a new Statistical Act

Almost all countries have a framework to regulate statistical activities and operations. These legislations vary depending on the form of government, the kind of administrative arrangements in force and legislative and administrative conventions, in addition. To address the change and innovations in the NSS and the production and use of statistics, Tim Holt (2003), Dennis Trewin (2002), UNHSO (2003) and Khawaja and Morrison (2002) provide a comprehensive checklist for possible contents of a statistics Act. As pointed out by Dennis Trewin (2002), *"[s]ound legislation is crucial to a good statistical system"*. In this context, the UN Handbook of Statistical Organization has also provided an annotated model of a National Statistics Act, which countries can use to assess the adequacy of their national statistical legislations.

The following additional provisions should be taken into consideration.

1 Make a provision for the establishment of a National Statistical Board (NSB) and its secretariat and provide regulations to govern its activities in the federation, state and local level.

2 Assign the duty to the head of NSB to coordinate the NSS.

3 Delegate NSB the power to define the official statistics and designated system

4 Make a provision for the establishment of State Statistical Board (SSB) and Local Statistical Board (LSB).

5 Establish National Statistics Office (NSO) that serves all users and confirms the role of statistics in the democratic process and serves as a public good.

6 State the additional responsibility of head of the CBS for the NSS and in the context of federalism.

7 Make a provision for the establishment of Inter-ministerial Committees such as agriculture, trade and industry, infrastructure, financial, social, gender, environment and natural resources, information and communications technology, science and technology, governance, migration, fiscal matters and many others where and when needed.

8 Establish statutory responsibility to designate staff and unit in NSS for producing official statistics.

9 Make a provision for the head of national statistics office to create and maintain a professional code of conduct for statisticians.

10 Provide for data linkage and sharing for statistical purposes (ability to link sets of data).

11 Require the head of NSO to promote the quality of national statistics throughout the production system and maintain data quality assessment frame work (DQAF).

12 Authorize the head of NSO to have full access to administrative records throughout the public services for statistical purposes.

13 Authorize the head of the NSB to release suitably anonymized micro data.

14 Provide for delegation to place statutory obligations on staff for confidentiality.

15 Assign responsibilities for head of NSB to present annual reports to national assembly.

16 Establish data repository system in national statistics office.

5. Policy recommendations

In order to fulfill the national and international obligations and commitments in development arena, the country needs a good information base and this is, no doubt, provided by a good national statistical system. The necessity of such a system has been realized in various national documents. But no appropriate action has been taken to strengthen the system so far.

On the other hand, because of the inability of the prevailing statistics act to renew and cover new activities, various players came into existence in this field. So it can be said that this resulted to a discordant and decentralized system of statistics in the country which encouraged the production of conflicting statistics and the duplication of resources. Therefore, a new integrated statistical act is to be enacted and implemented to cater the national and international requirements in statistics including the SDGs.

Similarly, the Statistical Act should be prepared in conjunction with the proposed monitoring and evaluation act that has already been drafted by National Planning Commission. The National Strategy for the Development of Statistics (NSDS) in collaboration with all the key stakeholders of NSS is soon coming on place. It can be considered as a good achievement in the process of strengthening national statistical system of Nepal. Government of Nepal should take the ownership for its implementation for establishing a strong NSS. The NSDS has also mentioned the enactment of a new statistical act as a prerequisite of a good NSS. The construction of the act should also be well guided by this strategy.

6. Challenges

Despite a regulatory role provided by the statistics act, 2015 to CBS, CBS could not play its regulatory role in this field as expected by the law. In this context, many of the provisions of the existing statistics act like survey clearance, penalties for not furnishing the information, coordination among the stakeholders, and so on have never been tried citing one or for the other reasons. Therefore, the major challenge lies in the implementation of the provisions in the act.

CBS prepared CNSP in 2001 AD in collaboration with Asian Development Bank. One of the major recommendations of the plan was to bring out a new statistical act to have an integrated national statistical system. But the higher authorities/bureaucrats seemed apathetic to implement the recommendations and no new act came in existence. Therefore, to have a new act in existence in time is really another challenge.

The existing statistical act has established the CBS as an autonomous body and provided it a leading role to steer the system. The more an act is implemented, the more important it becomes. Moreover, it undergoes a constant rectification along with its use. But the failure of its implementation is perhaps a major issue. As a result, the CBS has stayed nearly stagnant and virtually static in terms of organizational development for over a period of two decades.

The implementation of the recommendations for improvement in the national statistical system made in various national reports have been left to the bureaucratic level only and meager effort has been taken to raise this issue to the political level. So, seeking political commitment in implementing such recommendations is a great challenge.

7. Conclusion

There are some crucial reasons which justify the need of a new integrated Statistics Act. Among others, the reasons include the failure of the existing act to address the relevant issues, expansion in the demand for timely and quality data. Likewise, increased public awareness, emergence of new communication and information technologies in the field of statistics, international obligations like MDGs, SDGs, GDDS, SDDS and SAARC development goals, and so on. Similarly, a new act appears urgent for retaining the professional expertise and institutional memory of statistical cadres. It is equally necessary to maintain a long-term support and coordination for the central and local level statistical activities followed by management of the statistics of local and federal bodies and enhancement of the statistical infrastructure.

Given that the issue of amendment of Statistics Act finds its space in every periodic plan but this has not yet been translated while preparing annual government programs and budget. A sound statistical systems fosters only when we have a strong legal infrastructure. Hence, it is recommended for the timely formulation of a new integrated Statistics Act incorporating all the issues and gaps. The enthusiasm and commitment in this respect must come from the CBS in the first place and its supervising bodies, namely, NPC and Prime Ministers' Office must be vigilant and congenial.

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STATISTICAL INFRASTRUCTURE

Rajan Silwal*

Abstract

This paper attempts to describe the existing situation of statistical infrastructure (SI) in Nepal. The article is primarily generated from the review of available literatures. The conceptual context of SI are provided and the major components of SI in Nepal have been assessed. It emphasizes that the national statistical system of a country grows, develops and sustains on a sound statistical infrastructure. Statistical infrastructure is actually the engine of a national statistical system. Given a century old statistical history, the statistical infrastructure of the Nepalese statistical system is not as strong as it should have been. In the past the debate was mainly on institutional set-up and an organization for carrying out statistical operations. As the scope of statistics is expanding given the economic growth, social dimensions and technological changes the SI emerged as one of the key issues of statistical development. The SI constitutes number of components. More importantly, a new statistical act, a statistical business register, a master sampling frame and data sharing mechanism are the major factors of SI. The SI of Nepalese statistical system (NSS) revolves mainly around the CBS and it is obvious that the role played by the CBS counts much in developing the SI within the NSS. There still exist challenges to the proper development of all-round development of SI.

1. Introduction

Statistical infrastructure (SI) refers to the legal (plan, policies, acts, etc.), physical (equipment, building, Software, IT, etc.), methodological (concept, definition, classification and standards, management information system, sampling frame, EA maps, metadata, etc.), human resource and other structures aiming at improving the performance of statistical system of a country. SI is needed to prepare a strong foundation for the entire statistical system. It provides a frame of standardization, uniformity, comparability, legislation, repositories and choices of information and communication technology (ICT) systems.

Australian Bureau of Statistics[27] defines statistical infrastructure as the tools which support the operation of a statistical system. These tools can help to organize the statistical system, improve efficiency, add value, create new outputs or simply perform tasks within the system. In the words of Jackson (2015), an SI comprises activities and services that are administered to support a

* Director, CBS

27 URL: http://www.abs.gov.au/ausstats/abs@.nsf/Lookup/1395.0main+features312013

strong statistical system. The activities and services include the development of sound statistical methodology, standardized concepts and classifications, the development and provision of statistical metadata, the development and maintenance of registers of enterprises and addresses for statistical purposes, and the provision of advice with respect to the Statistics Act and data - sharing agreements. Jackson carefully highlights need for statistics act, standards in concepts, classifications, metadata, statistical business register and data-sharing provision. Neither the Statistics Act nor the Consolidated Statistical Plan (CNSP) of Nepal has explicitly stated the need of a SI. As we cannot imagine a statistical system without SI, It is always there in an NSS but the question rises on its level of development. Coupled with physical infrastructure, the SI helps to accelerate modernization and the development of an NSS.

2. Objectives

Many of us probably understand the conservative concept of infrastructure which alludes to physical and human resource. But a broader definition includes physical components including ICT, legal assets, principles, guidelines and manuals, procedures, databases, and frames as well. This paper is devoted to shed light on the SI of the national statistical system (NSS) of Nepal. It starts with the general concept of SI, develops with the existing condition, and tries to shape the ways ahead and concludes the chapter.

3. Methodology

The whole article is prepared by reviewing the literature available on hard copies and internet. A descriptive argument is built to assess the subject matter.

4. Statistical infrastructure in CBS

Statistical infrastructure comprises a wide range of areas including the field infrastructure, scientific methods and their application, standard definitions and classification and sampling frames. Similarly, it states on metadata systems, manuals and guidelines and the databases. Infrastructure does not escalate overnight and is a dependent on time on the one hand and priority of the concerned authorities on the other. The major components of SI in CBS and Ministries and Line Agencies are discussed.

4.1 Field infrastructure

Regarding the field infrastructure, CBS has 33 statistics offices at districts. These offices are very supportive and effective in launching local level statistical surveys and censuses. It is, however, mentionable that the physical infrastructure especially the computers, machineries, furniture and vehicle to discharge their regular activities are not sufficient.

4.2 Sampling frames

A sampling frame is the list of units used to draw a sample in surveys. A sampling frame is prerequisite for surveys so that conclusions on the target population can be drawn from the sample. List frame

and area frame are the two types of sampling frames used in surveys (CBS 2016)[28]. A list frame is a list of the selection units in the survey population. An area frame, on the other hand, is a complete and exhaustive list of non-overlapping geographical areas. Area frames are usually used in household surveys where lists of households are only created for selected geographic areas.

A master sample frame is the one which is developed for supplying different samples for different surveys or for the same brand of survey but different rounds. In the words of Turner (2003)[29], '[a] master sample frame is one in which the frame is used to select samples either for multiple surveys, each with different content, or for use in different rounds of a continuing or periodic survey.' It is perhaps important to note that the rationale of developing a master sample frame is actually an effort for standardization.

CBS has been using mostly the population census to produce a sample frame for the household surveys. In few cases, CBS has used the national sample census of agriculture (NSCA) to generate a sub-sample. Actually, the latter is often used as a reference. CBS has already initiated to develop a master sampling frame. However, development of a MSF targeted to household surveys does not fulfill the demand for MSF needed to establishment surveys.

4.3 Statistical business register

In the words of Ritzen (n.d.) the statistical business register is *"a full and comprehensive list of all entities, institutionally and formally involved in production and financing processes of the economy to facilitate and support the collection of statistical data and the compilation and dissemination of statistical information."*

Many countries in the world having a strong statistical system are found preparing and updating their statistical business register. CBS has recently initiated the preparation of a statistical business register. An intact statistical business register includes a complete list of manufacturing establishments, enterprises or enterprise group, institutions producing private goods and services for profit. The business register serves as a sampling frame for the subsequent statistical surveys. It is considered an important perquisite for producing economic statistics.

4.4 Statistical laws, plans and policies

The statistical laws, plans and policies can also be considered as a component of SI. Statistics Act 1958 gave birth to the CBS in Nepal. Majority of the statistical activities in the nation are guided by this law. Among the statistical plans and policies, the Consolidated National Statistical Plan (CNSP) and the ongoing National Strategy for the Development of Statistics (NSDS) are the major ones. These to policy documents have put forth many valuable policy recommendations to improve the NSS of Nepal.

28 See, CBS (2016) Developing a Master Sampling Frame for Household Surveys in Nepal. p.2

29 See Turner, A.G. (2003), *Sampling frames and master samples*. p 3-10

4.5 Application of scientific methods

CBS largely follows the scientific methods while conducting census and surveys. It also adapts the methods into Nepalese context. The methods and models developed by international statistical institutions including the World Bank, IMF, UNSD, UNEP, FAO, SAARCSTAT and others are generally followed to the extent possible and applicable in Nepalese context.

4.6 Standard definitions and classifications

Not only in producing national account estimates the CBS follows standard definitions and classifications developed by system of national accounts (SNA) in producing national account estimates. CBS realizes any other international standards while producing internationally comparable statistics. However, CBS is still lagging behind to produce significant number of publications on standard definitions and classifications. In 2056 BS, the CBS produced Nepal Standard Industrial Classification (NSIC) and Nepal Standard Occupational Classification (NSOC). In 2016, it has initiated to produce a revised version of NSIC. There are many untouched areas under standards and classifications which are very urgent in the context of national and international demand.

4.7 Metadata system

Metadata tells the story of any data under consideration. Almost for two decades the CBS has been increasingly paying its attention in the production of metadata. It is said that the principal objective of creating metadata is to provide data users additional information on other data and trace relevant resources. In its majority of recent census and survey reports, CBS has supplied metadata to the extent possible. The annual digital publication of the CBS, i.e., Nepalinfo which comprises hundreds of socio-economic indicators also provides adequate metadata for the convenience of users. What has been done is praiseworthy but there remain lots of things to be done in this regard.

4.8 Manuals, guidelines and collection of questionnaires

Manuals work as guides in conducting census and survey operations. Even at the time of data processing, a clear and comprehensively written manual is a must. For every census and surveys depending upon their nature and size, CBS prepares appropriate number of manuals to help the enumerators, supervisors and other concerned people. The manuals, in almost all cases are produced in hard copies. Similarly, guidelines are developed when and where necessary. CBS has also produced a collection of questionnaires which comprises the questionnaires of past population, agriculture and industrial censuses and f various household surveys. National data archive (NADA) is a project launched few years ago at CBS with the motive of achieving of census and survey outputs, procedural history, methodology, manuals, raw data, and metadata as well. So far 45 studies (as of Bhadra 2073) of past census and surveys are achieved. Basically, the NADA provides documentation, study description, data description and micro data. It has included even the studies of other agencies. At present, NADA is a regular business of the CBS performed by its own human resources.

4.9 Databases

Obviously, the CBS is a large library of socio-economic data regardless of how they are stored or managed. It is necessary to have a scientifically managed central data depositary at CBS or somewhere

under government control. There is a long practice of storing raw and output data in stand-alone computers. The servers of CBS do not hold these data for the use and storage. Domestic and international users find no way to online purchase or free access to the database of CBS. Access to databases is an issue repeatedly raised by the users and CBS in-house staff.

4.10 Information technology and software

CBS holds couple of licensed software for its regular statistical business such as SPSS, STATA and Arc GIS. According to the concerned officials of CBS the Arc GIS is getting too old for the time being and needs to be replaced by new version. There are also some statistical packages which are in use for free. CBS has used Computer Assisted Personal Interviewing (CAPI) technology in the recent surveys. The ICT facilities are largely inadequate and require upgrading. The major ICT-related include websites not updated regularly; lack of sufficient human resource trained in ICT; Problem in adopting new developments in the ICT field. The improvement in ICT requires training of the ICT staff, review of the systems and investment in software.

4.11 Enumeration area maps

Use of enumeration area (EA) maps is increasing day by day. The CBS has also been using EA maps for last few censuses and surveys. EA maps help for sampling purpose as well as the field operation. For last few years, CBS is continuously producing EA (settlement) maps.

4.12 Population register

A population register contains the personal information of the resident population of a country. The main features of a population register are that it records place of birth, sex, citizenship(s), marital status and data and place of death. Likewise, it adds language, ethnicity, education attainment and activity status and occupation as well. Till now, there is no such population register in Nepal.

4.13 Data Quality Framework (DQF)

Many countries in the world are found having their own data quality framework for their statistical outputs. IMF has also recommended the data quality assessment framework. Nepal has not yet built such DQF in order to ensure the quality of data.

4.14 Data sharing provisions

Data sharing provision(s) among the data producers and users can be considered as one of the inevitable components of SI. The stakeholders of the NSS should have easy access to each other's databases and archives. It benefits both the producers and users to disseminate and use the data where and when needed. Establishment of data sharing mechanism is a requisite of SI given the confidentiality and mode of sharing, i.e., for free or on cost. It speeds the timely dissemination, analysis, use and space for improvement. It fosters transparency, policies and plans.

There is no established systematic system of data sharing among the stakeholders of NSS in Nepal. The producers are either not giving due priority in it or they look reluctant for easy way. The process of accessing data from another organization within the government system is not easy and quick.

Not all the data produced are shared online or electronically. Even the CBS which needs access to the database of almost all government agencies has no such access. There is an opportunity to develop data sharing provisions among the organizations producing official statistics as well as with wider audience.

4.15 Statistical literacy

The level of statistical literacy among the data users and people at large is also considered as a part of SI. Raising the statistical literacy should be the priority of an NSS. Literate users on the one hand put greater demand for quality statistics and on the other hand use the statistics in better way.

Besides the above mentioned list, day-to-day or an annual statistical calendar is also considered as a statistical infrastructure. Despite spelled many times, we do not have this.

5. Statistical infrastructure in line ministries and government agencies

The line ministries have relatively weaker SI. Why do they hold weak SI? The possible answers could be nature of statistical tasks, information system (HMIS) which is largely a ministerial statistical system. MoH conducts the demographic and health survey (DHS) in every five years where it develops its own questionnaire, manuals and guidelines for conducting the survey. The MoH, in fact, lacks an up-to-date database and effective HMIS. Given the statistical workload, the human resource available at district health offices and departments are said insufficient.

Ministry of Education (MoE) is another major stakeholder of the NSS in terms of producing and using education related statistics. The MoE has developed education management information system (EMIS). Given the workload to produce education statistics, it is absurd that there is no single statistical cadre within the MoE. It is argued that had there been qualified cadres under NEPSS the statistics generated by the MoE could be more scientific, reliable, timely and user friendly. Despite a good statistical infrastructure, the EMIS suffers number of challenges. It is hardly complete due to the limitation of human resources at schools, resource centres and district education offices. MoE is not directly involved in conducting large-scale education surveys.

Another key ministry in NSS is the Ministry of Agriculture Development (MoAD). It produces current agriculture statistics. At its 75 district agriculture development offices, there is no single cadre under NEPSS. The statistical tasks are carried out by non-professional staff. There are professional statisticians at MoAD and Department of Agriculture who have been found vital in producing current agriculture statistics. MoAD is following FAO guidelines and it has developed some guidelines for collecting statistics at local level. MoAD does not have sampling frame and it applies the concepts and definitions followed by CBS. At the central level, MoAD works closely with CBS but there is no such coordination between district statistics offices and district agriculture development offices. Mutual cooperation and better coordination between these two government authorities could be effective in producing better agriculture statistics.

Another key agency in the NSS performing large scale statistical activities is Nepal is Rastra Bank (NRB). The Nepal Rastra Bank Act (2002) mandates the NRB to perform its statistical activities independently.

It has a separate unit of handling statistical activities. The household budget survey and generation of consumer price index are the two main statistical function of NRB. The balance of payment (BoP) and international trade statistics are also compiled by NRB. The field infrastructure of NRB is not strong since it has limited branches scattered in the country. The published reports of NRB are electronically available in its website but no database is made available for public use.

Other ministries and government agencies in NSS have their sectoral statistical activities with limited statistical cadres for carrying out the statistical activities. The components of statistical infrastructure as discussed under the CBS headings above are lacking in ministry and line agencies for efficient functioning of their statistical activities. However, some of kind and periodicity of statistical surveys, priority given to statistics and an organizational environment less favorable for evidence-based policy making. Likewise, there are other factors determining the SI of the line ministries such as legal arrangements, organizational set-up, a leadership which gives emphasis on statistics and indicators.

Among all the ministries the Ministry of Health (MoH) holds a good field infrastructure. MoH has at least one cadre of Statistical Service Group in every district office. It has statistical cadre at ministry and departments. It has developed its own health management information system (HMIS) which is largely a ministerial statistical system. Some of the ministries have legal ground for performing their statistical activities. Ministry of Federal Affairs and Local Development, for example, holds right and responsibilities to work on civil registration and vital statistics.

6. Recommendations

Statistical infrastructure is the foundation of a sound national statistical system which requires a number of good practices, elements, technologies and functional mechanism in order. Without having a good SI the efficiency and effectiveness of statistical system can hardly be achieved. The State should invest adequately in building the SI.

Development of SI in the federal structure stands a big challenge. Development of SI takes a long period. In order to shape and operate the statistical system at province level, the current Statistics Act should be amended. The statistical coverage of province government needs to be well specified. A sound national statistical system rests not only on strong SI at central level but also on the SI of province and local level.

Since the SI in line ministries and other government agencies is found relatively weaker, the NSS should concentrate more on building the SI of these agencies. However, it does not imply that the CBS is strong enough in delivering its mandated outputs. It is CBS which can play a lead role in expanding and strengthening the SI within the NSS. Nevertheless, the government should have given due priority in strengthening the SI of the nation. A separate and focused assessment for identifying and suggesting the appropriate measures to develop the SI of the NSS of Nepal is hence recommended.

More specifically, separate master frames for social and economic surveys, revised manuals of standards and classifications, data quality assessment framework and updated legal instruments should be on place. Besides, ensured statistical human resources in key stakeholders of NSS, an effective coordination mechanism and adoption of modern technologies in statistical activities should be key concerns of the Nepalese NSS. Likewise easy and uninterrupted access of users to digital data should be established and expanded. More importantly, there is need for upgrading the EMIS and HMIS.

7. Conclusion

SI is the life blood of an NSS. In Nepal, it has still long way to go to. It gives legal instruments in the form of act, regulations, guidelines and procedurals. The SI helps build a strong NSS. Actually, SI dictates the shape and structure of physical infrastructure of the NSS. The NSS of Nepal which is composed of the CBS in the nucleus and ministries, NRB and other agencies at the perimeter have to do a lot in building their SIs. The CBS has relatively a good statistical infrastructure compared to other key agencies of the NSS. The Statistics Act 2015 is not updated given the changes in socio-economic, technological and political changes in the country. Since it is the foundation of NSS it is an urgent demand for timely amendment or replacement with a new Act.

The NSS of Nepal has minimally worked on international standards and classifications to adapt them in Nepalese context. Nepal standard industrial classification (NSIC) and Nepal standard occupational classification (NSOC) are not updated timely. So is the case of other classifications on education, health and government finance. The fundamental principle of official statistics (FPOS) is not adequately adopted in all data producers of NSS. Despite its significant use in economic census and surveys, the statistical business register is not yet prepared in NSS. A master sampling frame (MSF) is the asset and one of the key components of SIs. It is expected that the MSF will be on place in the coming years. Establishment of data sharing mechanism among prime stakeholders of NSS is a must.

The database of not only the CBS but also the remaining agencies of NSS should be strengthened for large section of the data users. Except the CBS the other agencies of NSS should pay due priority in this regard.

Lastly, building of SI should be the priority of an NSS. There should be cooperation and coordination in the development of SI. Being the nucleus of NSS, the CBS should coordinate and lead the efforts to strengthen the SI of Nepal. The restructuring of the State also needs expansion to the NSS and hence there exists a big challenge and opportunity as well to build the SI in each province.

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STATISTICAL CLASSIFICATIONS AND STANDARDS IN INTERNATIONAL AND NATIONAL CONTEXT

Mahesh Chandra Pradhan*

Abstract

Statistical classifications and standards are key requirements for the production of reliable, comparable and methodologically sound statistics. The objective of this chapter is to briefly elaborate the basic notion of statistical classifications and standards that are developed in various aspects of social, economic and environmental areas and its adoption in statistical production process in Nepal. Various official publications on classifications and standards have been studied for deriving conceptual and practical aspects about it. Different family of classifications with different kinds of classifications exists in the domain of official statistics. Most of the national statistical classifications are based on the corresponding classifications. Nepal has also adopted and developed the international statistical classifications like Central Product Classification (CPC), Harmonized System (HS), International Standard Industrial Classification (ISIC), International Standard Classification of Occupations (ISCO), Classification of Functions of Government (CoFOG) etc. in the national contexts. Various statistical standards on concepts, definitions are also adopted in various statistical activities to produce quality statistics. Developing the national standard classification systems and its implementation in Nepal can be considered as challenges in the course of developing statistical infrastructure in the country. International cooperation and technical coordination among the stakeholders in country is a must requisite to develop the national statistical classification based on reference classifications for making strong and effective statistical infrastructure in the country. Nepal should have developed on its own national standard statistical classifications, ensuring compatibility and comparability of the statistics using the respective classifications, nationally as well as internationally. Development, maintaining, updating and implementation of standards and classifications in regular interval will only enhance the effectiveness of national statistical system of Nepal.

1. Introduction

Classification is the grouping of entities in separate categories in such a way that those entities are mutually exclusive with each other. Classification is considered as essential part of statistical production process. Lovitt (Ref. (V.K.Kapoor, 1983) has defined statistics as *the science which deals*

* Director, CBS

with collection, classification and tabulation of numerical facts as the basis for explanation, description and comparison of the phenomenon. The definition of statistics have emphasized that statistical classification has rather become indispensable in all phases of statistical processes. Classification of data has significant role in collecting, handling the numerical data, analysis and drawing valid inferences from them.

2. Objectives

The main objective of the present chapter is to briefly elaborate the concept, definition, type of classifications, international and national standard classification, family of classifications, and to discuss on the existing major classification systems practiced in the national statistical system of Nepal. It is expected that various categories of readers will get the basic knowledge of different standard classifications and its use in statistical or administrative operation.

3. Concept and definition on Classification and Standards

3.1 Classification

Classification means the arrangement of the data into different classes which are to be determined depending upon the nature, objective, and scope of survey or enquiry. Tuttle A.M. (Gupta, 1995) defined *classification as a scheme for breaking a category into set of parts, called classes, according to some precisely defined differing characteristics possessed by all the elements of the category.*

Hence, a statistical classification is a grouping having a set of discrete, exhaustive and mutually exclusive observations, which may be assigned to a specific variables registered in a statistical survey or in an administrative record, to be measured in the collection and/or presentation of data. The standard classification facilitates in the production of consistent and comparable statistics over time, geographic regions, and across different collection of variables.

3.2 Standards

Standards refer to a comprehensive set of statistical and methodological concepts and definitions used to achieve uniform treatment of statistical issues across a collection, across time and space. Standards facilitate in maximizing the effectiveness of statistical outputs and the efficiency of statistical production process. This definition implies that there exist two standards namely statistical standards and methodological standards. *Statistical standard* apply to data item definitions, concepts, statistical units, classifications, coding processes, derivation procedures, and question modules. Similarly, *methodological standard* apply to issues on survey sample design, concept on methods, data collection methodology, data processing, data standards, and dissemination modalities.

A statistical standard provides a broad set of guidelines for statistical operations collecting information on a particular topic. Various international statistical standards have been developed by concerned custodians for consistent and comparable data production across the countries. Such international standards contain concepts, definitions, classifications and rules, which can be used to support collection, processing and output of data.

4. Standard classification as integral part of statistical infrastructure

A standard classification follows prescribed rules and guidelines which are generally recommended and accepted. They ensure that the information is classified consistently. Often a standard is based on an international standard classification (e.g. ISIC, ISCO), or an international standard. The UN Handbook of Statistical Organizations mentions standards and classifications as essential part of the statistical infrastructure to ensure consistency and comparability.

Characteristics of standard classifications

1. A consistent conceptual basis for clear and unambiguous definitions of the categories
2. Exhaustive and mutually exclusive categories
3. A flat or hierarchic structure
4. Comparable to other related (national or international) standard classifications.
5. Well described stable categories
6. Availability of instructions, manuals, coding indexes, explanatory notes, handbooks and trainings on the classification
7. Revision and update of categories of classification

5. National custodians of classifications

Principally, country's national statistical offices have the responsibility for the collection to dissemination of official statistics. In this respect, national statistical authorities have the responsibility of developing and using of national statistical classifications (NSCs) in compliance with international standards and classifications. Thus the national statistical agencies need to take responsibility for developing classifications, planning activities to train about the classification to its users, for updating and/or revising the classification.

6. International custodians of classifications

Many international organizations have developed a number of standard classifications for collection of statistics or for compilation and comparison of statistics provided by different countries. The purpose of development and adoption of international standard classification (ISC) is to ensure right implementation of agreements and to standardize national and international classifications. The major international custodians for classifications are the United Nations Statistical Commission (UNSC) or another competent high-level board, such as that of the World Customs Organization (WCO), the World Health Organization (WHO), the International Monetary Fund (IMF), or the International Labour Organization (ILO), depending on the subject matter area. The ISCs may act as classification models for developing corresponding national, multinational and regional statistical classifications (NSC). Hence, ISC's are considered as international reference classifications. The national (NSC) and international statistical classifications (ISC) are mutually dependent. The NSCs are basically integrated or closely aligned with comparable international classifications. For example, the Nepal Standard Industrial Classification (NSIC) is aligned to International Standard Industrial Classification (ISIC).

7. International coordination and cooperation in classifications

With the guidance and fundamental principles of official statistics 9 and 10, the countries often cooperate and coordinate in standardizing, updating and revising the classifications on various relevant subject matters periodically. The purpose of international cooperation in classifications is to ensure harmonization and standardization, so that changes in statistical classifications at the international level are consistently transmitted through multinational/regional levels to the national level. Such changes for harmonization and standardization in classifications are accomplished through the sharing of information in different means of knowledge sharing forums.

8. Family of classifications

The family of International Classification is the various systems of classifications, whose custodians follow the "best practices". Its purpose is to enforce cooperation, coordination and improve quality of statistical classification in respective theme. In the family of classifications, the classification system may consists as per the subject areas like activities, products, expenditures, trade, health, education, employment, environment, etc.

9. Kinds of classifications

Classification system can be described into three kinds namely reference, derived and related classification in the process of harmonization. These classifications have separate scope.

9.1 Reference classifications

Reference classifications are considered as models for the development or revision of corresponding classifications with respect to the structure and concept definitions of the categories. Reference classifications are the product of international agreement as approved by UN Statistical Commission (or other international board such as those of the WCO, WHO, IMF, UNESCO or ILO). It is considered as means of harmonization of international statistics, and guidelines for the preparation of national classifications. Such reference classifications are used for data collection and comparison at the international level. It defines structure and building blocks of classification. The Harmonized Commodity Description and Coding System (HS), the International Standard Industrial Classification of All Economic Activities (ISIC), the Central Product Classification (CPC), and the International Standard Classification of Occupations (ISCO) are some examples of reference classifications.

9.2 Derived classifications

Derived classifications are developed from the corresponding reference classifications. Items from one or more reference classifications are made rearrangement or subdivisions to develop new groups in the derived classifications. Examples of derived classifications include the General Industrial Classification of Economic activities within the European Communities (NACE), which is based upon ISIC (reference classification).

9.3 Related classifications

Related classifications provide a set of organized categories for the same variable(s) as the corresponding reference classification. But the categories of related classifications either may partially refer to those defined in the reference classifications or may be associated with the reference classification at certain level of the structure. For example ISIC has 4 digit structures while the Indian ISIC has 5 digit classification structures. Up to 4 digit level, the classification relate with ISIC structure while it has own structure at the fifth digit. Similarly Nepal Standard Industrial Classification (NSIC) is aligned with the ISIC structure and some typical Nepalese activities are also amended in the more close activity class.

Most of the national statistical classifications can be both either derived or related. National statistical classifications (NSCs) derived from ISCs will use same structure and hierarchy of categories in the classification but it may go beyond the ISC structure in defining the detailed categories. The irrelevant parts of ISC can be truncated in NSC. The North American Industry Classification System (NAICS), Australian and New Zealand Industrial Classification (ANZSIC), Indian Standard Industrial Classification (ISICs-India), and NSIC are considered as examples of related classification. Table 1 shows the example of these three kinds of classifications.

Table 1: Example of Reference, Derived and Related Classifications, Economic activity classification

Reference	International Standard Industrial Classification of All Economic Activities (ISIC Rev.1, Rev.2, Rev.3, Rev.3.1, Rev.4)
Derived	Standard Classification of Economic Activities in the European Community (NACE Rev.1, Rev.2)
Related	The North American Industry Classification System (NAICS-Canada 1997, 2002, 2007; NAICS-Mexico 1997, 2002, 2007; NAICS-US 1997, 2002, 2007),
	Australian and New Zealand Standard Industrial Classification (ANZSIC 1993, 2006)

10. Uses of statistical classifications

The importance of statistical classification lies in its broad use. Statistical classifications are used for a diverse purposes like the collection and organisation of information, aggregating and disaggregating data sets meaningfully for purposes of analysis, the construction of indexes , construction of a classification for a different variable on the basis of the classifications for two or more component variables; presenting statistical information by different categories.

11. Implementation and adaptation of the classification

As we knew that the classifications are used for the collection of quality statistics as well as the producing statistics unambiguously. The unit of observation should be consistently and rightly recorded in the most appropriate category of the classification. When implementing or adopting the classification, one needs to know how to identify the information collected. For using classification, the collected information needs to be correctly coded in the most proper categories of the classification.

12. Maintenance, updating and revisions of classifications

Maintenance and update of any statistical classifications need to be carried out periodically or as required but not frequently, for ensuring the quality of statistical products. Revisions of international statistical classifications are undertaken in the interval of long time interval or in the compelling situation if revisions are required. This revision is made with the in-depth users' consultation and demands as well as the expansion of the activities. Revising an international classifications involve a complete review of users' needs as well as of the conceptual basis.

13. Major international statistical classifications systems

It will be relevant to mention some of the major international statistical classifications in regard to their concepts, major custodian and purpose, hierarchy of classifications. Due to space limit, explanations are not made for all existing standard classifications.

13.1 Harmonized Commodity Description and Coding System (HS)

It is the classification system of the Harmonized Commodity Description and Coding System, popularly known as Harmonized System (HS). The main international custodian of this classification is World Customs Organisations (WCO). It is a multipurpose goods nomenclature used as the basis for Customs tariffs. The HS was implemented in 1988 by an international Convention (HS Convention) and maintained by the WCO. About 170 countries and economies use it for customs tariffs and trade statistics. Governments, international organizations and the private sector use the HS for many other purposes such as internal taxes, trade policies, monitoring of controlled goods, rules of origin, freight tariffs, transport statistics, quota controls, economic research and analysis.

13.2 Central Product Classification (CPC)

Central product classification (CPC) is the classification of products. Its main objective is to provide a framework for international comparison of statistics dealing with goods, services and assets in any economy. The CPC constitutes a complete product classification covering all goods and services. CPC is used in national accounts, studying transactions in goods and services in detail, developing lists of goods and services for specific purposes, such as industrial surveys, price statistics surveys etc. CPC also serves as an instrument for assembling and tabulating all kinds of statistics that requires product detail, including statistics on industrial production, domestic and foreign commodity trade, international trade in services, balance of payments, consumption and price statistics, and other data used within the national accounts.

International custodian of CPC is UNSC. The CPC is reference classification which is classified hierarchically as sections, divisions, groups, classes, and sub classes. The broad structure of CPC is divided into 10 sections as follow in Table 2. An example of further division is illustrated in Table 3.

Table 2: Central Product Classification (CPC)

Sections	Product Descriptions
0	Agriculture, forestry and fishery products
1	Ores and minerals; electricity, gas and water

Sections	Product Descriptions
2	Food products, beverages and tobacco; textiles, apparel and leather products
3	Other transportable goods, except metal products, machinery and equipment
4	Metal products, machinery and equipment
5	Constructions and construction services
6	Distributive trade services; accommodation, food and beverage serving services; transport services; and electricity, gas and water distribution services
7	Financial and related services; real estate services; and rental and leasing services
8	Business and production services
9	Community, social and personal services

Table 3: Example of CPC

Group	Class	Subclass	Description
Section 0	Agriculture, forestry and fishery products		
Division 01	Products of Agriculture, horticulture and market gardening		
011			Cereals
	0111		Wheat
		01111	Wheat Seed
		01112	Wheat Other
	0112		Maize (Corn)
		01121	Maize seed
		01122	Maize other

13.3 International Standard Classification of Occupations (ISCO)

The International Standard Classification of Occupations (ISCO) is a system of classification of occupational information collected from population censuses and surveys, as well as from administrative records. The aim of ISCO is to provide an up-to-date and relevant basis for the international reporting, comparison and exchange of statistical and administrative information about occupations. ISCO is a reference classification for developing national classifications of occupation and serves as a basis for making occupational statistics internationally comparable.

International custodian of ISCO-08 is ILO. Classifications of occupations are used in national contexts for the collection and dissemination of statistics from sources such as population censuses, labour force surveys and other household surveys and other sources. The classification is arranged into four hierarchy levels namely major group (10) (see Table 4), sub-major groups (43), minor groups (130) and unit groups (436).

13.4 International Standard Industrial Classification (ISIC)

The International Standard Industrial Classification of All Economic Activities (ISIC) consists of a comprehensive and consistent classification structure of economic activities. ISIC is a classification

Table 4: ISC0-08

Group code	Major groups
0	Armed Forces Occupations
1	Managers
2	Professionals
3	Technicians and Associate Professionals
4	Clerical Support Workers
5	Services and Sales Workers
6	Skilled Agricultural, Forestry and Fishery Workers
7	Craft and Related Trades Workers
8	Plant and Machine Operators, and Assemblers
9	Elementary Occupations

according to kind of productive activity, but not a classification of goods and services. ISIC is considered as the official activity classification of SNA. ISIC provides a comprehensive framework within which economic data can be collected and presented or reported for purposes of economic analysis, decision making and policy formulation. ISIC is increasingly used also for administrative purposes such as in tax collection, issuing of company or business register etc.

First ISIC was developed in 1948, and then subsequently it has been revised and updated. The latest standard classification of activities is ISIC revision 4 revised in 2008. The scope of ISIC covers productive activities, i.e., economic activities within the production boundary of the System of National Accounts (SNA). ISIC revision 4 economic activities are subdivided in a hierarchical, four-level structure of mutually exclusive categories. The categories at the highest level are called sections (21), which are subdivided into broad divisions (88). The divisions are sub-divided into groups (238) and groups into classes (419). ISIC is used as reference classification while developing the country's own national standard industrial classification.

The use of the ISIC ranges from the selection of the establishments or businesses to be included in any of economic activities, through the data collection or compilation stage to the publication of reports. The individual categories of ISIC have been aggregated into the 21 sections (Table 5).

Table 5: ISIC revision 4 sections and descriptions

SECTION	DIVISION	DESCRIPTION
A	01-03	Agriculture, forestry and fishing
B	05-09	Mining and quarrying
C	10-33	Manufacturing
D	35	Electricity, gas, steam and air conditioning supply
E	36-39	Water supply; sewerage, waste management and remediation activities
F	41-43	Construction
G	45-47	Wholesale and retail trade; repair of motor vehicles and motorcycles
H	49-53	Transportation and storage
I	55-56	Accommodation and food service activities
J	58-63	Information and communication

SECTION	DIVISION	DESCRIPTION
K	64-66	Financial and insurance activities
L	68	Real estate activities
M	69-75	Professional, scientific and technical activities
N	77-82	Administrative and support service activities
O	84	Public administration and defence; compulsory social security
P	85	Education
Q	86-88	Human health and social work activities
R	90-93	Arts, entertainment and recreation
S	94-96	Other service activities
T	97-98	Activities of households as employers; undifferentiated goods- and services-producing activities of households for own use
U	99	Activities of extraterritorial organizations and bodies

13.5 International Statistical Classification of Diseases and health problem (ICD)

ICD is a medical classification list developed by the World Health Organization (WHO) which contains codes for diseases, signs and symptoms, abnormal findings, complaints, social circumstances, and external causes of injury or diseases. The purpose of the ICD is to facilitate the systematic recording, analysis, interpretation and comparison of mortality and morbidity data collected in different areas and at different times. ICD-10 is the 10th revision of the ICD, a latest version.

13.6 International Classification of Functioning, Disability and Health (ICF)

ICF is a framework or a multipurpose classification system developed by WHO for describing and organising information on functioning and disability, which provides a standard language and a conceptual basis for the definition and measurement of health and disability. ICF integrates the major models of disability and recognises the role of environmental factors in the creation of disability, as well as the relevance of associated health conditions and their effects.

13.7 International Standard Classification of Education (ISCED)

International Standard Classification of Education (ISCED) is the classification system developed by UNESCO. The purpose of this classification is to facilitate comparisons of education statistics and indicators across countries. It is mainly used for developing ISCED mapping. ISCED -11 education levels are early childhood education, primary education, lower secondary education, upper secondary education, bachelor's or equivalent level, master's or equivalent level and doctoral or equivalent level.

13.8 Functional classifications

The system of national accounts considers some specific classifications (referred as functional classifications) such as Classification Of the Functions of Government (COFOG); Classification Of Individual Consumption by Purpose (COICOP); Classification Of the Purposes of Non-profit Institutions serving Households (COPNI); and Classification of Outlays of Producers by Purpose (COPP) to analyse consumption, or more generally outlays, by different sectors according to the purpose for which the expenditure is undertaken.

Classification of the Functions of Government (COFOG)

COFOG is the abbreviation for classification of the functions of government, developed by the OECD. It classifies government expenditure data by the purpose for which the funds are used. It is used to distinguish between the individual and collective services provided by general government. Also it identifies consumption expenditures that benefit individual households, which in turn is utilised to derive the 1993 SNA aggregate of actual final consumption of households. COFOG is also used for making intercountry comparisons of the extent to which governments are involved in economic and social functions. COFOG classifies expenditure data into ten "functional" groups or sub-sectors of expenditures (such as defence, education and social protection). The groups are 01 General Public Services, 02 Defence, 03 Public Order and safety, 04 Economic affairs, 05 Environmental protection, 06 Housing and community amenities, 07 Health, 08 recreation, Culture and religion, 09 Education, 10 Social protection.

Classification of Individual Consumption According to Purpose (COICOP)

COICOP is an integral part of the system of national accounts. This classification is also intended for use in other major statistical areas like household budget (or consumption or expenditure) surveys, consumer price indices and international comparisons of gross domestic product (GDP) and its component expenditures. The COICOP classification is generally made more detailed by further subdivision of the classes for the uses is wide statistical areas. The COICOP is developed following the concepts and definitions of the SNA. COICOP shows items which are important indicators of national welfare. COICOP constitutes the following 14 main categories as mentioned in Table 6.

Table 6: Main COICOP classifications

CODE	CATEGORIES
1.	Food and non-alcoholic beverages
2.	Alcoholic beverages, tobacco and narcotics
3.	Clothing and footwear
4.	Housing, water, electricity, gas and other fuels
5.	Furnishings, household equipment and routine household maintenance
6.	Health,
7.	Transport
8.	Communication
9.	Recreation and culture
10.	Education
11.	Restaurants and hotels
12.	Miscellaneous goods and services
13.	Individual consumption expenditure of NPISHs
14.	Individual consumption expenditure of general government

Classification of the Purposes of Non-Profit Institutions Serving Households (COPNI)

COPNI comprise seven main categories namely Housing, Health, Recreation and culture, Education, Social protection, Religion, and Political parties, labour and professional organizations.

Classification of the Outlays of Producers According to Purpose (COPP)

COPP provide information on the "outsourcing" of business services, (catering, cleaning, transport, auditing and other services etc.). There are six main categories in COPP namely outlays on infrastructure, outlays on research and development, outlays on environmental protection, outlays on marketing, outlays on human resource development, and outlays on current production programmes, administration and management.

13.9 Standard International Trade Classification (SITC)

By 1960, many countries were compiling international merchandise trade data according to the original SITC or national classifications correlated to it and major international organizations had adopted SITC as a basis for the reporting of international trade statistics. The recent version for trade classification is SITC, Revision 4, which covers all goods classifiable in HS except for monetary gold, gold coin and current coin. SITC is now recommended only for analytical purposes.

13.10 Other standard classifications

Due to space limitation to explain of other classifications in this article, the other standard classifications are listed as below:

A. Product Classification
B. Employment, occupation or education classification
   - International Classification of Status in Employment (ICSE-93)
C. Social or Health, Environment Classification
   - International Classification of Impairments, Disabilities and Handicaps (ICIDH)
   - International Classification of Functioning and Disability (ICIDH-2)
   - International Classification of Crime for Statistical Purposes (ICCS)
   - United Nations Framework for Developing Environment Statistics (UNFDES)
D. Country and Area Classification
   - Standard Country or Area Codes for Statistical Use (M49, Rev.4)
E. Other Classifications
   - Balance of Payments Manual (BPM5)
   - Government Finance Statistics (GFS)
   - Classification of Environmental Protection Activities and Expenditure (CEPA)
   - Trial International Classification of Activities for Time-Use Statistics (ICATUS)

14. Implementation of statistical classifications in Nepal

Many countries, or group of countries, have developed their own statistical standards based on international standards modified to suit own needs. Likewise Nepal has also adopted completely or partially some international standard classifications such as ISIC, ISCO, CPC, HS and COICOP, ICD, ICF, etc. Central Bureau of Statistics (CBS) as a national custodian of most of the statistical activities has been employing the standard definitions and concepts as per the international guidelines. Statistical standards have been applied to data item definitions, concepts, statistical units, classifications, coding processes, derivation procedures, and questionnaires. As such, methodological standards have also been applied to sample design issues, collection methodology issues, processing issues. Ministry of Finance (MoF) of Nepal has developed and updated the classification system of revenue line items and budget expenditure in different titles. Government of Nepal has implemented a new line item codes and classification on government income, expenditures and investment to make it compatible with

international standard and government finance statistics from 2011.Similarly, Framework for Nepal National Health Accounts was published in 2004 with the aim to provide the roadmap to develop Nepal National Health Account. The framework was developed based on a combination of the OECD – SHA model. The framework has developed the classifications on health expenditure, financing source, health care provider, and health care functional classifications. Nepal Rastra Bank (Central Bank of Nepal) is a leading institution in publishing the financial statistics containing the characteristics like capital fund, borrowing, deposits, other liabilities, liquid fund, investment, loans and advances, other assets.

14.1 Use of International Standard Industrial Classification (ISIC)

The ISIC has been largely used for data collection as well as for processing the data on the economic activities in various censuses and surveys. CBS had developed Nepal Standard Industrial Classification of All Economic Activities (NSIC-2000) adapted from ISIC Rev.3 for the use in population census 2001 and other surveys. This has also been used by Office of Company Registrar of Nepal in assigning the industry code to the registered companies. CBS also used ISIC rev.4 in Population Census 2011, Census of Manufacturing Establishments for data collection as well as coding of the data, and result publication. Currently, NSIC has also been used in analysing the trend data from series of censuses of manufacturing establishments, deriving price index of industrial products, deriving gross domestic products by industrial classifications for national account purposes.

14.2 Use of International Standard Classification of Occupation (ISCO)

The ISCO has also been largely used for data collection as well as for processing the data on the occupations in various censuses and surveys. CBS had also published the Nepal Standard Classification occupations based on ISCO-88 which was used in population census 2001 and subsequent relevant surveys like Nepal Living Standard Surveys, Nepal Labor Force Survey. ISCO-08 was used in population census 2011 for data collection as well as processing and presentation of results.

14.3 Use of Central Product Classification (CPC)

Regarding the use of CPC, CBS has been using CPC for product classification especially in the census of manufacturing production of goods as well as deriving index of industrial and agricultural products. Central Product Classification (CPC) is also customized in the Nepalese context.

14.4 Use of Harmonized System (HS) in Nepal

Commodity Classification is one of the most important functions of the customs administration. The proper classification of commodities of exported and imported goods provides reliable and accurate statistics to be used in national and international trade facilitation. Department of Customs (DoC) of Nepal has incorporated fifth version of harmonization system (HS) as approved by World Customs Organization while coding the traded custom goods. The "Customs Tariff 2015/16" has been published based on harmonized system for official use, incorporating changes/revisions on customs rate and other relating provisions to be applied for export/import of goods for each fiscal year.

14.5 Use of Classification of the Function of Government (COFOG) in Nepal

Office of Comptroller General use to publish the government expenditures on different themes or classification. Among these, the office of comptroller also publishes the government expenditure data by COFOG classification, which is comparable with international standards.

14.6 Use of International Classification of Diseases (ICD)

Department of Health (DoH) has used ICD codes in deriving the morbidity statistics. It has published inpatients morbidity statistics by age group and sex based on ICD code.

15. Adopting standard definitions

In conducting population census 2011, CBS followed the standard definitions, for example, house, households, individuals, usual place of residence, economic active population etc. as mentioned in the "principles and recommendations for population and housing censuses".

In population census 2011, information on the disability status of the individual was also collected, of which the definition and concept on disability was made standardized as defined by ICF. Similarly, the standard concepts and definitions as guided by the manual of system of national accounts 2008 have been followed in preparing the national accounting statistics of Nepal.

The definitions and concepts in undertakings of census of manufacture of establishment have been standardized as UNIDO's manual on Industrial Statistics. Environment Statistics of Nepal has been published as far as possible to the classifications defined in UNFDES. The definitions, concepts, and classification has been standardized and classified as defined by the FAO manual on conducting agriculture census.

Similarly, statistics on national accounts and macro indicators in Nepal have been derived following the contemporary concept, definitions and standards defined by the System of National Accounts. As such, the data collection and result analysis on labour force, living standards have been adopted using respective international guidelines developed by the international custodians. The concept, definition and standards in conducting and deriving the agriculture statistics are used as per the guideline of the FAO.

16. Issues and challenges on statistical classifications and standards in Nepal

The ultimate goal of adopting the statistical classification is to derive concise, mutually exclusive statistics with quality assurance. There are a lot of issues and challenges like developing customized classification systems in compatible with reference classification, formulation of national regulation in adopting the uniform and scientific classification, knowledge transfer, to implement and sustain the classification system by concerned stakeholders, and making aware on the classification and standards to the stakeholders.

17. Example of use of standard statistical classifications in Nepal

Some of the examples of application of standard classification in publishing have been demonstrated as following:

Table 7: Usually active population 10 years of age and over by occupation and sex

	Total	Armed forces	Managers	Profession-als	Technicians and associate professional	Office assistance	Service & sale workers	Agriculture, for-estry & fishery workers	Craft and related trades workers	Plant & machine operators & assemblers	Elementary occupations	Not stated
Both Sexes	9,929,562	24,156	140,262	396,582	207,388	126,523	823,506	6,000,478	801,352	220,129	987,487	201,699
Male	5,656,027	22,331	92,834	262,589	160,609	89,266	572,768	2,856,516	640,197	204,403	613,581	140,933
Female	4,273,535	1,826	47,428	133,992	46,779	37,257	250,737	3,143,963	161,155	15,726	373,905	60,766

Table 8: An Example of NSIC use: Usually Economically Active Population 10 Years of Age and over by Industry and Sex

	Total	Agriculture, forestry and fishing	Mining and quarrying	Manu facturing	Electricity, gas, steam and air conditioning supply	Water supply; sewerage, waste mgmt. & remediation activities	Construction	Wholesale and retail trade; repair of vehicles & motorcycles	Transportation and storage	Accommodation and food service activities	Information and communication
Both Sexes	9,929,562	6,355,735	26,026	559,282	13,986	11,082	335,827	695,915	224,683	137,810	31,840
Male	5,656,027	3,081,814	18,809	405,719	12,969	9,260	300,747	478,824	216,662	85,853	25,327
Female	4,273,535	3,273,921	7,217	153,563	1,017	1,822	35,079	217,092	8,021	51,958	6,513

	Financial and insurance activities	Real estate activities	Professional, scientific and technical activities	Administrative and support service activities	Public administration and defense; compulsory social security	Education	Human health and social work activities	Arts, entertainment and recreation	Other service activities	Activities of households as employers	Activities of extraterritorial org. and bodies	Not Stated
Both Sexes	70,347	6,812	21,424	85,741	146,547	368,490	80,784	11,638	180,255	310,178	12,610	242,549
Male	48,295	6,068	17,604	69,237	126,080	235,388	48,744	8,749	129,914	146,676	8,711	174,577
Female	22,052	744	3,820	16,503	20,467	133,102	32,041	2,889	50,340	163,502	3,900	67,972

Table 9: An example of COFOG classification in Nepal

Groups	Expenditure in % (FY 2071/72)
01 - General public services	32.78
02 - Defense	6.24
03 - Public order and safety	6.39
04 - Economic affairs	25.99
05 - Environmental protection	1.42
06 - Housing and community amenities	3.16
07 - Health	5.55
08 - Recreation, culture and religion	0.63
09 - Education	15.03
10 - Social protection	2.82

18. Way forward on improving national standards and classifications

A statistical system of the country is effective, efficient if the statistical infrastructure is strengthened. Development and adoption of standards and classifications is one of the pre-requisites of national statistical system. Nepal has been adopting international standards and classification in relevant statistical activities partially or completely wherever relevant and possible. However, in order to future improvement of the statistical data collection and analysis and international comparison, there is a need to develop the national version of standard classifications based on reference classifications developed by international custodians. CBS should play a national custodian of national statistical classification in Nepal. A need to establish stable national coordination body and expert groups has to be realized to develop and update the national statistical classifications on various families of classifications. A separate permanent institutional unit need to be set to maintain regular task of developing, maintaining and updating standards and statistical classifications. Further official discussion with other relevant government agencies need to be proceeded to develop the national classifications.

Nepal do not have much experiences to develop own national product classifications on various reference classifications. An international cooperation need to be sought in developing and implementing the NSCs in the country. A sufficient resource also needs to be allocated for tasks of standards and classifications. The standards and classifications also need to be implemented by training the users, making advocacy, and policy formulation. In particular, the CBS as custodian should provide guidance on dealing aspects of classifications which will influence the quality of the statistics using the classifications.

New peculiar activities which are only practiced or exist in the country, and not included in ISCs, should be explored and make an effort to be included in international family of classifications. Data collection and compilation programs should be developed as per international guidelines and classifications to expand the statistical activities. Construction of correspondence tables linking the revised national statistical classifications with formal national statistical classification may necessary for comparison. Different guidelines are needed to develop for comparison of statistics under different national versions of statistical classifications. Implementation of various statistical standards and classifications will result the quality statistics.

19. Conclusion

Most of the countries have agreed and committed to fulfil different development agendas like sustainable development goals (SDGs), of which Nepal cannot be in exclusion. Nepal has envisioned graduating from underdeveloped to developing nation. To achieve the international as well as national development goals, a sound and effective policies, plans and legislations are required. These can only be formulated with the good quality of statistics. The good quality of statistics can only be resulted if the national statistical system is strengthened. The national statistical system is effective and tangible in the country only if all the statistical infrastructures are set and are operated effectively and efficiently. Statistical classification and standards are the most essential ingredients to build the strong statistical infrastructures of any country. Hence, necessary strategy, policy, and guidelines are essential for implementing the classification and standard systems.

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DATA DISSEMINATION SYSTEM IN NEPAL: DATA PORTALS AND MANAGEMENT INFORMATION SYSTEMS

Dr. Mahesh Kumar Subedi*

Abstract

This paper adopts a qualitative approach to review the current practices of statistical data dissemination systems in major official data producing agencies in Nepal. The online observation of websites of the official agencies in the National Statistical System shows that most of the agencies lack an organized web based data dissemination platform like Data portal and Management Information System. Although, few of them have started in using the web based platform, most of them are still heavily relied on digital publications of survey or administrative reports with published data in pdf format. The international experiences on monitoring the MDGs in last 15 years show that the IT enabled tools have played a significant role in addressing many of the challenges in data dissemination faced by statistical agencies in developing countries. Hence, a systematic and coordinated approach of adopting such organized tools of different thematic areas within the major data producing agencies in Nepal will be of immense help in avoiding duplication in data dissemination, opening of more data to public and policy use, and effectively monitoring national priorities and reporting of the international development goals like SDGs.

1. Introduction

The first point of the Fundamental Principles of the Official Statistics states "the official statistics that meet the test of practical utility are to be compiled and made available on an impartial basis by official statistical agencies to honour citizens' entitlement to public information".[30] That is, the official statistics is considered as a public goods and it is a duty of the government and related institutions to make it available for public use. The main thrust of the Open Data Initiative is that the government data should be freely available for everyone to access, use and republish as they wish, published without restrictions from copyright, patents or other mechanisms of control.[31] Although, Nepal is far behind in the "Open Government Data" initiative, a wide range of government bodies - ministries, departments, the devolved administrations and public bodies, central bank and the national statistics agency are

* Director, CBS

30 http://unstats.un.org/unsd/dnss/gp/fundprinciples.aspx

31 https://opengovdata.org/

producing statistics of their respective field covering all areas of activities including the economy, employment, population, crime, education and health. Generally, the statistics produced by the various agencies of the National Statistics System (NSS) are managed systematically in a standard format for further use in formulating and monitoring national development plans, or in international comparison. The process of an organized collection, storing and dissemination of statistical data is defined as database management. In addition to the database management, the drawing of meaningful information from the database for the decision makers routinely from the system is termed as a Management Information System (MIS).

Both the statistical database management and management information system are web-based and sound similar. However, the statistical databases are mainly confined to collection, storing and dissemination of data for public use. On the other hand, the management information system mainly focuses on an efficient organization of the data and information from a specific or different source to internal reporting and program tracking. The use of a database or an MIS in an organization depends on the type of data produced or gathered and the information needed for the decision making processes of the agency. This paper describes a general overview of a range of databases and MISs that have been using in various statistical organizations internationally and in the National Statistical System of Nepal in particular.

2. Objectives

The objective of this paper is to portray the overview of the mostly used statistical data and information management and dissemination system in national and international statistical organizations. It intends to provide a better understanding of the data dissemination tools that the major data producing agencies in National Statistical System (NSS) of Nepal have been using to disseminate data and statistical information to the public use under an open data initiative. It also aims to provide the key features of major statistical data management platforms for users' information and intends to show the importance of the dissemination platforms for monitoring national and global development indicators.

3. Methodology

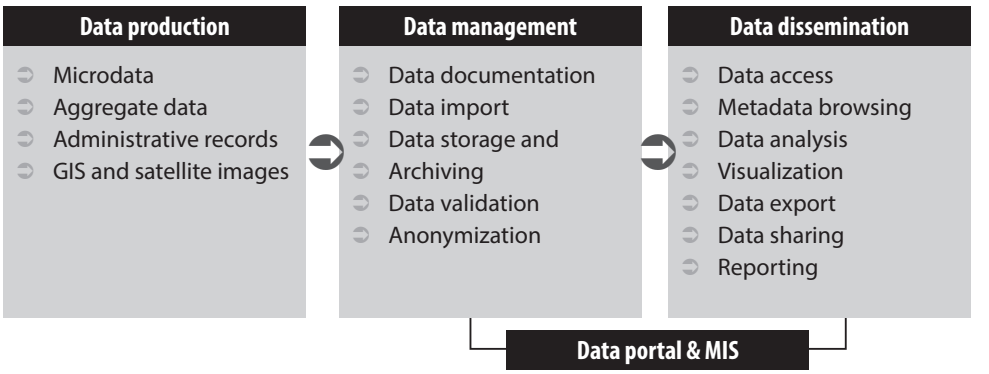
This paper mainly employs qualitative research design to review the current practices of statistical data management and dissemination systems in major data producing agencies in NSS. An online observation and review of technical features for selected statistical data management and dissemination platforms was conducted. Necessary communications and discussions with the agencies whose data management and dissemination platforms also called Management Information Systems (MIS) are not publicly available online were conducted to gather required information.

4. Statistical data management and dissemination system

The traditional, and still a prevalent way of statistical data dissemination system is a hard copy publication with derived tables and graphs of a survey and census results, or with an aggregated table of administrative records. It is gradually shifted to spreadsheet dissemination in Excel sheet data format with the development of computer technology. But, in recent years due to the modern development of communication technology and the advanced statistical analytical tools the statistical

data dissemination systems also developed to web-based and user-friendly way like "Data portal" and "Management Information System" for easy use of data to policy makers and for public access. Data capture, storage, retrieval, processing, dissemination, sharing, metadata management and user interface are some of the good features of the web-based data management platforms (UNECA 2011). Figure 1 illustrates the statistical data dissemination process and the main functions of Data portals and MISs.

Figure 1: Data dissemination process



The three main types of statistical data dissemination system in digital format are described as follows.

4.1 Spreadsheet

This is a periodic dissemination of sectoral or multisectoral data in Excel sheet format. It is a common practice of data dissemination system in many official and non-official data producing agencies. It is mostly used for publishing aggregate data from administrative sources, but it has been also widely used for disseminating final outputs of survey and census results. Due to its simplicity and less technical features, many agencies in statistical system prefer to use the spreadsheet format in preserving, analyzing and disseminating data for internal and external use. Some examples of spreadsheet data dissemination are: foreign trade statistics of Department of Customs, industry statistics of Department of Industry, rainfall and temperature data from Department of Hydrology and Meteorology, etc.

4.2 Database

Database is a digital collection of data in an organized fashion so that it can be easily accessed, managed and updated. Databases are mainly built for online compiling, storing, processing, archiving and disseminating data. The databases are also termed as "Data Portals". The data portal could be a multisectoral or for a single topic. The individual data portal can be built on different thematic areas like demographic, agriculture, national accounts, environment, or price statistics. These different areas have particular characteristics of organization and presentation formats. But a common characteristic of the various data portals are that they provide data dashboards on various topics for public access and display indicators in tables and charts (WB 2014). The DevInfo developed by United Nations Development Group (UNDG) for monitoring human development indicators under MDGs; CountrySTAT of FAO for disseminating food and agriculture statistics are some good examples of Data Portals in country and international level.

4.3 Management information system

Management Information System (MIS) is a broader concept which incorporates both database management and an effective use of the database for routine report generation and decision making (Harsh, 2012). It is a computerized digital data management technique which uses the modern online information technology to manage and convert to statistical data into meaningful information for the decision maker from the system easily. This system is often used in business proposes for producing routine reports from underneath database of the system to business managers. However, the concept of MIS is now being used in many fields of social sciences. For example, the MIS in heath sector called HMIS, in education it is termed as EMIS, in labour LMIS, etc.

5. International initiatives and national legal frameworks in data dissemination

5.1 International initiatives

The first point of the Fundamental Principle of Official Statistics 1991 which guides "official statistical agencies to honour citizen's entitlement to public information" is the main basis for dissemination of statistics in NSS of a country. The mandatory subscription of GDDS of IMF which was launched in 1997, by its member countries with less developed statistical system, is another important initiative in the dissemination of reliable economic and financial statistics. However, it is believed that the major breakthrough in wider opening up data in developing countries came after the adoption of the MDGs in 2000 (UN 2015). The process of promoting open access to statistics in developing countries was guided and facilitated by the 5th recommendation of Marrakech Action Plan for Statistics (MAPS) 2004, i.e., "Improving data for monitoring the Millennium Development Goals" and later on in 2011 the 2nd priority of its succession the Busan Action Plan for Statistics (BAPS), i.e. "Implement standards for data preservation, documentation, and dissemination that permit full public access to statistics", further extends the processes and provides direction ahead to increase the reliability and accessibility of statistics (PARIS21 2011).

In recent years, the open data initiatives such as the Open Government Partnership (http://www.opengovpartnership.org/), Open Data Watch (http://opendatawatch.com/), Open Data Charter (http://opendatacharter.net/), etc. and the Big Data and Data Revolution (http://www.undatarevolution.org/) movements are in the center of national and global agenda for open access to national statistics for supporting evidence-based policy making, enabling cross-sector collaboration, improving governance and monitoring impact[32]. Furthermore, the SDGs which are broader in scope and coverage than MDGs are expected to be reviewed and monitored by government using a set of national indicator frameworks which requires quality, accessible and timely data (UN 2016).

5.2 National legislations

The Statistical Act 2015 (1958 AD)[33] is the main legal framework which provides authority to CBS for the collection, analysis, publication and dissemination of statistical information subject to keeping

32 http://opendatacharter.net/principles/

33 The various Acts are accessed at http://www.lawcommission.gov.np/?workflow_state=prevailing-laws-statutes-acts

confidentiality of the respondents. The Act envisioned a centralized statistical system in Nepal and put CBS at the center. However, a de-facto decentralized statistical system has been practiced in Nepal and a number of other legislations are in use for the operation of statistical activities in the country. For example, the clause 11 of the Birth, Death and Other Vital Events Registration Act 2033 has authorized the Local Register Office (the Department of Civil Registration at present) to collect, document, analyse and publish an annual report of the vital events. The clause 12 and 104 of the Nepal Rastra Bank Act 2058 allows the NRB to compile, analyse and disseminate banking and financial related statistics. Likewise, the clauses 44, 112, 199 and 212 of the Local Self-governance Act 2055 authorize local bodies (VDC, Municipality and DDC) for the collection, management and dissemination of information in the local level of their jurisdictions.

Some other Acts and Regulations might include the legal provisions related to the statistics activities as part of their routine job. But all these legal provisions related to statistics are in favour of the host agencies – the dissemination of information to public use is not mandatory. In contrast, the Right to Information Act 2064, specifically the Clauses 3, 4 and 5 of Section 2: Right to Information and Provision Regarding the Flow of Information, puts users at the forefront of the public information with provision - "Every citizen shall have access to the information held in the public bodies". Furthermore, the Clauses 4 and 5 of the Act have instructed a pubic body to update and make the citizens' access to information simple and easy. The Article 27 of the new Constitution of Nepal 2072 also ensures the citizen's right to information.

Apart from the existed rules and regulation with statistical provisions, the Thirteenth Plan 2070/71 – 2072/73 of Nepal has great importance in incorporating some crucial steps for the development of statistical data dissemination system in Nepal. The Section 8.4: Statistical System of the plan recommends programs of (1) developing a National Strategy for Development of Statistics (NSDS) with an advanced data dissemination system in the NSS, (2) implementation of Open data initiative in Nepal, (3) establishment of databases and Management Information System related to survey, census and administrative records, and (4) publication and dissemination of quality and timely data for informed-decision making and public use. In line with the provisions of the 13th Plan in statistical development, an NSDS 2016/17 - 2020/21 has been prepared by CBS[34] with specific programs for the development of the statistical data dissemination system in the NSS.

6. Data portals and MISs in National Statistics System of Nepal

Various forms of statistical databases and Management Information System can be seen in National Statistical System of developing countries. Particularly, the adoption of Millennium Development Goals (MDGs) in 2000 has led to the developing countries to open up their data for broader users and monitoring purposes (UN 2015). In that course many database platforms and sector specific Management Information Systems were developed and put in place in developing countries by the international agencies like FAO, IMF, UNICEF, UNFPA, etc. with the noble objectives of assist countries in improving data dissemination systems and monitoring the development indicators. A study of databases conducted by PARIS21 in various countries across the globe shows that each country has more than one data portals developed by the international agencies (Greenwell et all, 2014). Table 1 shows the most common Data portals and MISs existing in NSS of developing countries.

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* The NSDS is currently under the process of reviewing and receiving approval from the government.

Table 1: Existence of the most common data portals and MISs in NSS of developing countries

Data Portals and Management Information System (MIS)			
Name	**Full Name**	**Name**	**Full Name**
DevInfo	DevInfo	HMIS	Health MIS
CensusInfo	Population Census Info	EMIS	Education MIS
CountrySTAT	CountrySTAT	AMIS	Agriculture MIS
CountryData	Country Data	LMIS	Labour MIS
NADA	National Data Archive	IEMIS	Environmental MIS
IMIS	Integrated Management Information System	VERSS	Vital Event Registration and Social Security MIS
GDDS	General Data Dissemination System	TMIS	Tourism MIS
SDMX	Statistical Data and Metadata Exchange	OGD	Open Government Data Portal

The Data portals and MISs are based on Application Programme Interface (API) techniques and follow the international standards on data sharing and dissemination like DDI and DCMI (WB 2014). The data portals and MISs are found to be of great help for organizing, disseminating and sharing data within and among governmental and international partner agencies. A short description of various data dissemination platforms with their features available in major data producing agencies in developing countries and in NSS of Nepal is provided below. The Annex 1 provides a quick glimpse of the various data dissemination platforms available in NSS of Nepal with their host agency's name and web link.

DevInfo (NepalInfo)

DevInfo is a web based database for aggregate data categorized in different subgroups: Demography, Economy, Education, Environment, Health, Information and Communication, Nutrition and Women. It is a database system endorsed by the United Nations Development Group (UNDG) for monitoring human development, particularly the MDGs. It also supports user-defined indicators and allows countries to customize it as a portal with their national prioritized indicators. It provides multiple features for organizing, storing and presenting data in a uniform way to facilitate data sharing at the country level across government departments, UN agencies and development partners. It is implemented by the national statistical agencies of most of the developing countries including Nepal in the world for monitoring the MDGs. The NepalInfo is the adapted version of the DevInfo produced by CBS for public use in CD-ROM format every year since 2007. NepalInfo 2011: http://www.devinfo.org/nepalinfo/libraries/aspx/Home.aspx

CensusInfo

CensusInfo is specifically designed for online dissemination of population census data at all geographical levels. Like DevInfo the census information stored online allows users to produce a wide variety of user-friendly tables, graphs and maps. The CenusInfo 2011 has been prepared by Central Bureau of Statistics with technical and financial support from UNFPA, the United Nations Population Fund, and the Government of Switzerland. For more information see: http://www.dataforall.org/dashboard/nepalcensus/

CountrySTAT

CountrySTAT is a web-based information system for food and agriculture statistics at regional, national and sub-national levels. It is developed by Food and Agriculture Organization (FAO) and implemented

in its 57 member countries. It aims to improve access to food and agricultural statistics from multiple sources, which can support data analysis and evidence-based decision making. Generally the National Statistics Office (NSO) or Ministry of Agriculture takes lead in establishing the CountrySTAT, but Nepal does not have installed the portal yet. For information on CountrySTAT visit to: http://www.countrystat.org/default.aspx

CountryData

CountryData is a web based application developed by the United Nations Statistics Division (UNSD) to enable countries to share their national development indicators with the global user community. It aims to improve the availability and visibility of these priority indicators and facilitates their reconciliation with international datasets used to measure the Millennium Development Goals (MDGs). It has an advanced facility of using Statistical Data and Metadata eXchange (SDMX) tool to ensure standardized, efficient and more complete data and metadata exchange between the national and international level. It is normally installed in NSO, but Nepal does not have the portal yet. For further information on CountryData see: http://data.un.org/countryData

NADA (National Data Archive)

NADA is an online cataloguing and dissemination system for survey and census micro-and metadata which allows data users to browse, search, access, and download relevant survey and census materials including microdata in compliance with the data producer dissemination policy. It is developed by the International Household Survey Networks (IHSN) in 2006 with the main objectives of promoting open access to and use of data for monitoring the MDGs and has been implemented by the World Bank and PARIS21.

With the technical support of PARIS21, the CBS has published NADA in 2011 accommodating metadata, data files and related documents of important 45 surveys and censuses conducted by CBS. It has provision of providing survey microdata online to users, but it is not practiced yet in CBS due to difficulties in online payment procedure.

See: http://cbs.gov.np/nada/index.php/catalog.

Redatam/IMIS (Integrated Management Information System)

IMIS is a web based tool for disseminating microdata of various surveys and censuses conducted by NSO and other government agencies. It is based on the Redatam application and has an integrated database system and has been developed to enable users generate customized statistics in the form of frequencies, cross tabulations, indicators, etc. The data in IMIS can come from any combination of census, survey or other sources. Unlike NADA, in IMIS the user has to use the build in analysis program to generate the required outputs down to predetermined geographic levels. The IMIS has not been installed in Nepal yet. The development of this system was supported by UNFPA.

See: http://www.redatam.org/redbin/RpWebEngine.exe/Portal?lang=eng

GDDS (General Data Dissemination System)

The GDDS was established in 1997 by International Monetary Fund (IMF) for member countries with less developed statistical systems as a framework for evaluating their needs for data improvement and

setting priorities. It guides member countries in the dissemination to the public of comprehensive, timely, accessible, and reliable economic, financial, and socio-demographic statistics. The GDDS is apply to all fund member countries, but some more prescriptive standards - Special Data Dissemination Standard (SDDS), would put for those member countries having or seeking access to international capital markets.

Nepal has participated in IMF GDDS in 2001. The Nepal Rastra Bank is the key organization for coordinating and publishing the "National Summary Data Page" correspond to the data described on the IMF's Dissemination Standards Bulletin Board (DSBB) relating to the newly adopted enhanced General Data Dissemination System (e-GDDS).

See: http://dsbb.imf.org/Pages/GDDS/CtyCtgList.aspx?ctycode=NPL

SDMX (Statistical Data and Metadata Exchange)

The SDMS is an initiative for standardization and exchange of statistics data, particularly macroeconomic data and metadata among international organizations and their member countries. The SDMX initiative is supported by seven international organizations including Bank for International Settlements (BIS), the European Central Bank (ECB), UNSD, OECD, IMF, Eurostat and the World Bank. The practice of data exchange through SDMX has not been started yet in NSS of Nepal. For more information on SDMX see: https://sdmx.org/

OGD Portal (Open Government Data Portal)

The Open Government data initiative states that any information and data, except information on national security, from government ministries, department, agencies and local bodies should be available to user for freely used, re-used and redistributed by anyone. An Open Data Portal with various themes – subsectors has been developed to make the government datasets accessible for free to the public in easy reusable formats. For example, https://www.data.gov/of US, https://data.gov.uk/of UK, https://data.gov.in/ of India, etc. The OGD portal is not published yet in Nepal, but the National Information Commission of Nepal has started to prepare an official Open Government Data Portal of Nepal.

HMIS (Health Management Information System)

The HMIS is a web based monitoring system of health sector. It collects and manages the health service delivery information for all level of health service delivery outlets and routinely generates quality health information that provides specific information support to the decision-making process at each level of the health system. The HMIS is also used to share health information from country to WHO and related UN agencies.

In Nepal, the HMIS was established in 1994 in Department of Health Services (DoHS) with the support from UNFPA. It collects health service delivery information from health service delivery outlets in districts to the DoHS through predefined process and procedure and draws indicators and relevant information to support to the program management. It is not directly accessible to public use, but the information collected in HMIS has been using to publish a comprehensive Annual Report of Department of Health Services. Apart from the HMIS, the other management information systems established in DoHS are Health Infrastructure Management Information System (HIIS), Logistic Management Information System (LMIS), Ayurved Information System (AIS), etc. For more information visit to DoHS website: http://dohs.gov.np/information-systems/

EMIS (Education Management Information System)

The EMIS is designed to collect and report data on schools, students, teachers and staff. The system is supported by UNESCO to implement in developing countries. The data and information in EMIS is collected through annual school census, routine educational administrative records and from population census. The portal is generally governed and managed by education ministry and the information from EMIS is used by government education agencies, researchers, development partners and other education stakeholders for monitoring and policy planning.

Since 2004 the Department of Education (DoE) in Nepal has adopted the "Flash Report System" under EMIS to collect and analyze data with the purpose of assessing the performance and efficiency of school education. An Excel based EMIS has been implemented in Nepal since B.S. 2072/73 and the Ministry of Education (MoE) asks all 75 District Education Offices (DEOs) for a mandatory use of the Excel based EMIS for data collection of Flash II 2072 and Flash I 2073 School Census.

http://www.doe.gov.np/assets/uploads/files/fc5767ea776e140b7ce55b46e89263fc.pdf

VERSSMIP (Vital Events Registration and Social Security Management Information System)

It is an online system of vital events (Birth, Death, Marriage, Divorce and Migration) registration. The Department of Civil Registration (DoCR) has introduced the online based VERRS MIS for improving its service delivery, record management and reporting system in 2015. Some of the local registration offices at Village Development Committees (VDCs) and Municipalities are directly linked to VERRS system at DoCR. But, mostly the vital events registration units in District Development Committees (DDCs) coordinate the registration activities in district level and compile all received records from various local registration offices at VDCs and Municipalities. The units send all compiled records to MIS unit of DoCR for further analysis. For further information see: http://www.docr.gov.np/

AMIS (Agriculture Management Information System)

The AMIS is an ICT enabled web portal for disseminating relevant agro climate and weather information under early warning system and deals as agriculture decision support tools to farmers and stakeholders. It is being implemented by Ministry of Agriculture Development (MoAD) as one of the components of the Building Resilience to Climate Related Hazards (BRCH) project supported by the World Bank. For further information: http://www.namis.gov.np/index.php

LMIS (Labour Management Information System)

The LMIS is being implemented by the Department of Labour (DoL). It aims to improving the collection and dissemination of labour market information and skill indicators. For further information: http://dol.gov.np/site/cms/14. Likewise the Ministry of Labour and Employment (MoLE) has been started preparing a Foreign Employment Information Management System (**FEIMS**):http://feims.dofe.gov.np/sf/sfLogin.aspx

NDRR (Natural Disaster Risk Reduction Portal)

This is a digital data portal established in Ministry of Home Affairs (MoHA) for disseminating the deaths and losses caused by famine and other natural disasters. For more information see: http://drrportal.gov.np/home

PMIS (Prison Management Information System)

It is a web based MIS published by the Department of Prison Management (DoPM) for the organization of information on prisons and prisoners distributed across the country. For more information see: http://www.dopm.gov.np/en/content.php?id=120

IEMIS (Environment Management Information System)

This web based MIS for environment related data and information was established in the Department of Environment (DoE): http://doenv.gov.np/

HMIS (Highway Management Information System)

It is a web based MIS for the road network related database management system published on the website of the Department of Roads (DoR). For more information see: http://www.dor.gov.np/hmis/index.php

BMIS (Building Management Information System)

An online BMIS is located at the web site of Department of Urban Development and Building Construction (DoUDBC): http://dudbc.gov.np/

TMIS (Tourism Management Information System)

The Ministry of Culture, Tourism and Civil Aviation (MoCTCA) has established an online TMIS on its web page: http://tourism.gov.np/np/category/tourism/tourism_mis/

SAMARTHA MIS (Smart Management Information System)

An online MIS has been published on the website of Ministry of Industry (MoI) for the management of industrial data: http://project.focusone.com.np/samarth/auth/login. Likewise, the Department of Industry (DoI) has an online Industrial Information System: http://doind.gov.np/index.php/notice/172-industrial-information-system for disseminating information related to big industries.

WATSAN (Water and Sanitation Data Portal)

An online data portal (WATSAN) is established on its web page by the Department of Water Supply and Sewerage (DoWSS) for the organization of water supply and sanitation related data: http://dwss.wat-san.com/

WCD MIS (WCD Management Information System)

An online MIS related to women, children and social welfare is available on the web site of Department of Women and Children: http://dwd.gov.np/mis/login.php

DPMAS (District Plan, Monitoring and Analysis System)

The Ministry of Federal Affairs and Local Development (MoFALD) has established several web based MIS systems for reporting and activities tracking purposes. For example, there is the DPMAS for helping in resource allocation and monitoring the effectiveness of programs in district level. Likewise,

the **WBRS** (Web-based Reporting System) to receive online reports of all development activities in time. For further information visit to E-gov Services of MoFALD: http://www.mofald.gov.np/en

LMBIS (Line Ministry Budgetary Information System)

The Ministry of Finance (MoF) has adopted a web based information system for collecting demands and allocating budget in different activities from the various agencies in the government system. Likewise, the Financial Comptroller General Office (FCGO) has started using the **IFMIS** (Integrated Financial Management Information System) is an activity based reporting of expenditure, revenue, budget and relevant financial reports from its district offices to the center. For more information: http://lmbis.gov.np/

PPIS (Project Performance Information System)

It is a web based reporting system of the progress of a development program/project by an implementing agency to the concern high level authority (Ministry, NPC, etc.). The online portal is available on the web page of National Planning Commission. For futher information see: http://ppis.gov.np/. Further to the PPIS the NPC is also associated in the publication of the Nepal Nutrition and Food Security Portal: http://www.nnfsp.gov.np/Default.aspx

In additional to the data portals mentioned above some other agencies in the NSS also have the web based data portals, such as the Department of Cottage and Small Industry (DoCSI) has an **Industrial Data Portal** (http://dcsi.gov.np/en/site/industrialdata) for providing information on small and cottage industries; the Department of Hydrology and Meteorology (DoHM) has an online **Climate Data Portal** (http://www.dhm.gov.np/dpc/) for disseminating daily information on weather and temperature; and the Inland Revenue Department (IRD) has a web based **Taxpayer Portal** (http://it.ird.gov.np/taxpayer/app.html) for managing information on the integrated tax system. Similarly, the Election Commission has published an online **Voter list** (http://election.gov.np/election/np/bbvrs) and an **Electoral GIS Portal** (http://ems.election.gov.np/). The observation shows that many agencies in the NSS have the online data dissemination platform. However, most of them are not publicly available for external users.

7. Roles of data portals and MISs in SDGs monitoring

The data portals and MISs provide framework for data collections and reporting for national development priorities and international development indicators. Some of the data portals like DevInfo, CountryData, etc. were designed to share official national development data with the global user community for the national and international estimates of development indicators. Particularly, the DevInfo was designed to monitoring the country progress towards the Millennium Development Goals. It presents more than 80 indicators of MDGs under various themes - Population, Economy, Development Assistance, Employment, Income, Education, Environment, Pollution, Sanitation, Water, Health, Information Technology, Nutrition and Women. Country adaptation of the DevInfo has been used by many countries including Nepal for monitoring the MDGs. The NepalInfo 2015 provides 303 indicators (disaggregated into 1114 sub-indicators) compiled from various sources for different reference periods. The DevInfo can still be applicable and important for organizing data in monitoring SDGs indicators. Because the information collected for 11 sectors and 37 sub-sectors of DevInfo can be used to measure many SDG indicators. For example, many indicators under SDG1.1 – 1.4 are similar to or can be measured from the data under sub-sector Income (sector Economy) of DevInfo. Likewise, the indicators under SDG2.1 & 2.2 are measureable from the data under MaInutrition (sector Nutrition) of the DevInfo, and so on.

The new 2030 agenda for sustainable development, i.e. SDGs aim to measure even broader areas of human development than MDGs. It presents 17 Sustainable Development Goals and 169 targets and 230 indicators to be measured which require annual reporting of high-quality data from countries. This in turn will require much greater efforts in building efficient and independent national statistical capacities including a good national framework for SDGs reporting. The United Nations Statistics Division (UNSD) published a dissemination platform of the Global SDG Indicators Database[35] which provides a framework including the concepts, definitions, methodologies and sources of data for the SDGs monitoring. It is still on developing process and hopefully a country version of the SDG portal will be launched soon. Like DevInfo the country adapted version of the Global SDG Indicators Portal will be a very useful tool for organizing data and monitoring the SDG indicators.

The data needed for monitoring of the SDG indicators, however do not available from a single source. In this regard, the well-established databases and MISs in various government agencies would be of great support for compiling required data for monitoring the SDG indicators in the country. For example, the information on HMIS is useful to measure many indicators under SDG Goal 3 (SDG3); data on EMIS could be used for measuring some indicators on SDG4; the WATSAN for some indicators of SDG6, SDG11; the IEMIS is useful to measure some indicators of SDG7, SDG11, SDG12, and SDG15 related to environment. Likewise, the VERSS is directly related to measuring SDG 16.9 and SDG 17.19; the SAMARTH and Industrial data portal are helpful to measure some indicators under SDG9; the data on NDRR could be helpful to monitor SDG1.5, SDG11.5, SDG13.1 and SDG16.1. Similarly, the LMBIS and IFMIS are useful to measure SDG1.a & 1.b, and SDG16.6, and obviously the data on CensusInfo are helpful to monitor many SDG indicators of mostly all Goals and Targets.

The example above of matching the various data portals and MISs to SDG indicators are not exhaustive and complete, but it shows the importance and usefulness of the various platforms existed in NSS to measuring the SDG indicators. Furthermore, the SDG17.18 itself focuses and emphasizes on enhancing statistical capacity-building of developing countries to increase the accessibility of high-quality and timely data disaggregated by different sub-groups. In this endeavor, the various data portals and MISs which are timely updated and easily accessible to users would be of great help for the country to the monitoring and reporting of the SDG indicators.

8. Limitations and challenges of statistical data dissemination

The development in information technology and the open data initiatives are putting more demands from data users as well as opportunities for official data agencies to opening up and ensuring the availability and accessibility of quality data for public use. Although there exist repetition and duplication of data in some sectors between and among some portals, the database systems were found extremely useful in establishing a culture of data dissemination in developing countries. In contrast, Nepal remains far behind in the endeavor of openness and transparency of official data. Many government agencies either lack technical capacities or rigid to opening up data. The few data portals and MISs existing in NSS are also not running well. The limitations and challenges in statistical data dissemination in Nepal for public use can be presented as follows:

35 http://unstats.un.org/sdgs/indicators/database/

Data dissemination policy: A general dissemination of statistics is specified in the Statistical Act 2015. But, there is no separate data dissemination policy, specific to dissemination of aggregate data or microdata in machine readable formats for public use.

Dissemination culture: The traditional mentality in the government system in Nepal lacks a culture of sharing and transparency. Therefore most of the agencies are rigid to opening up data.

Statistical capacities: The data compilation and dissemination activities have been conducting by non-statisticians in most of the agencies in the NSS, therefore the government agencies have limited human resource, statistical capacities and expertise in compiling and disseminating quality data.

IT and internet facilities: Although Nepal is gradually exposing to the facilities of modern information technologies and internet, the present limited accessibility and performance speed of internet is hindering a maximum use of modern online technologies in data dissemination.

National framework of data dissemination: There is no any *central data portal nor a statistical framework of monitoring development progress, inform policy and ensure accountability of all stakeholders.*

Bunch of portals: Numerous data portals and MISs are existed in different agencies in NSS of Nepal. Most of them are designed to comply and monitor sector specific data and indicators. They are not integrated in sharing data. So there is no any one stop shop to monitoring all indicators of national and global indicators.

Numerous indicators: The new SDG offers more targets and indicators to monitor compared to MDG. Official sources may not be enough to produce all the indicators and there is no any specific procedure in practice in using non-official data to ensure data harmonization and to fill data gaps.

Disaggregated statistics: The limited availability of disaggregated data restricts the wider dissemination of statistics.

User demands: The weaker user demands of statistics inside the country, especially the demands of data in machine readable format has been providing less pressure to the producers for opening of data to public.

Coordination: The lack of an effective coordination mechanism among major data producers in NSS leads to provide either limited or no statistics of users' demands. Duplication and conflicting statistics from the NSS is one of the major causes of the poor coordination in the NSS of Nepal.

NSDS: The national statistical system in Nepal lacks a comprehensive legal framework in statistics, i.e., National Strategy for Development of Statistics including improvements and modernization of statistical data dissemination in CBS and other members of NSS.

9. Policy recommendations and way forwards

The national and global monitoring of SDGs calls for growing demands of data and a culture of shared responsibility within the national statistical system (SDSN 2015). The experience of last 15 years in reporting MDGs demonstrated the usefulness of the organized data portals and MISs in data

dissemination. However, the adoption of such dissemination platforms associated with extra efforts, indirect cost and hidden problems to the implementing agencies. Therefore, the improvement of data dissemination system in the country should be based on a legal national framework of dissemination and it worth considering the following points.

The statistical dissemination culture in Nepal should be moved to digital and web based formats from the traditional paper-based practices along with the new innovations in IT and user demands, especially the needs of local policy makers and researchers.

The statistical data dissemination strategies in NSS should be guided by national data dissemination policy with provisions of opening up more data of different types (disaggregated, administrative and microdata) to users.

The development or adoption of any data dissemination platform should be based on national data dissemination framework - compatible with international standards of concepts, definitions and methodologies of data collections and dissemination.

The Central Bureau of Statistics should offer more web-based dissemination platforms for different type of data to users.

Every data producing agency in NSS should have a web-based data dissemination platform of their discipline for public access.

The existing data portals and MISs in different agencies of the government should be running and easily accessible to users.

An effective coordination and integration mechanism within major data producers in NSS is needed to reduce duplication and conflicting statistics and for dissemination of more data to broader users.

The NSS should adapt an automation system such as SDMX to horizontal exchange of data within the NSS and vertical exchange and sharing of data with international agencies which helps to reduce workload and establish a coherent framework of transmitting data and metadata.

Official sources may not be enough to produce all the indicators of SDGs, therefore, a mechanism should be developed for using non-official data to ensure economy of scale in data collection and harmonization and to fill data gaps.

The global reporting should be channeled from a single platform of standardized data obtained through well-established reporting mechanisms from different agencies in the NSS.

Users-producers dialogues should be regularized to reduce data gaps, increase transparency and strengthen timely data production and dissemination system.

The sustainability of an improved data dissemination system in various government agencies is associated with a continuous process of strengthening of national statistical capacity and should be confirmed with allocating regular budget through national funding.

10. Conclusion

The major data producing agencies in national statistical system of Nepal are still mostly relied on the traditional paper based dissemination. The statistical data found in electronic formats are merely soft copies of statistical tables and figures in pdf formats. The Central Bureau of Statistics - the principal agency for statistical data production and dissemination in Nepal itself lacks some important web based data dissemination platforms normally found in NSOs of other developing countries. The web based data portals or management information systems published in the websites of some of the government agencies in NSS are either not running or not open to public use.

The past experiences of monitoring MDGs show that an organized data compilation and dissemination platform, either data portal or MIS are very useful to monitoring national and international development indicators. The open data initiatives and the new agenda for sustainable development goals lead to further demands of data as well as opportunities to strengthen the statistical capacities for data compilation and dissemination in the country. In this endeavor, the web-based data dissemination platforms would be of a great help to the national statistical system for improving the data dissemination system in the country and to open up more data to a broader public as well as monitoring national priority agenda and international development indicators like SDGs.

However, the majority of the data portals and MISs are developed and put in place by international agencies for monitoring international development indicators and sharing data to partner agencies and UN bodies. Manual updating of information, duplication of statistics and overlapping in functionalities are some of the problems in such platforms which cause extra effort and cost to the data producing agencies and confusion for users. Therefore, any development or selection and adoption of web based data dissemination platform should be based on a national framework of statistical data dissemination system.

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Annex 1: Data portals and management information systems available in NSS of Nepal

Databases/ Data portals			Management Information System (MIS)		
Name	**Full Name & web link**	**Holding Agency**	**Name**	**Full Name & Web link**	**Holding Agency**
NepalInfo	Nepal Info http://cbs.gov.np/	Central Bureau of Statistics (CBS)	HMIS	Health MIS http://dohs.gov.np/information-systems/health-management-information-section/	Department of Health Services (DoHS)
CensusInfo	Population Census Info http://dataforall.org/dashboard/nepalcensus/	Central Bureau of Statistics (CBS)	EMIS	Education MIS http://www.doe.gov.np/content/search.html	Department of Education (DoE)
NADA	National Data Archive http://cbs.gov.np/nada/index.php/	Central Bureau of Statistics (CBS)	VERSS	Vital Event Registration and Social Security MIS http://docr.gov.np/	Department of Civil Registration (DoCR)
GDDS	General Data Dissemination System http://nrb.org.np/red/gdds/gdds.php	Nepal Rastra Bank (NRB)	AMIS	Agriculture MIS http://www.namis.gov.np/ne/	Ministry of Agriculture Development (MoAD)
OGD	Open Government Data Portal http://nic.gov.np/en	National Information Commission (NIC)	LMIS	Labour MIS http://www.dol.gov.np/site/cms/14	Department of Labour (DoL)
NDRR	Natural Disaster Risk Reduction Portal http://drrportal.gov.np/	Ministry of Home Affairs (MoHA)	HMIS	Highway MIS http://www.dor.gov.np/hmis/index.php	Department of Roads (DoR)
WATSAN	Water and Sanitation Portal http://dwss.wat-san.com/	Department of Water Suppy and Sewerage	IEMIS	Environmental MIS http://doenv.gov.np/	Department of Environment (DoE)
Industrial Data	Industrial Data http://dcsi.gov.np/en/site/industrialdata	Department of Cottage and Small Industries (DoCSI)	PMIS	Prison MIS http://www.dopm.gov.np/en/content.php?id=120	Department of Prison Management (DoPM)
Climate Portal	Climate Data Portal http://www.dhm.gov.np/dpc/	Department of Hydrology and Meteorology (DoHM)	WCD MIS	WCD MIS http://dwd.gov.np/mis/login.php	Department of Women and Children (DoWC)
Taxpayer Portal	Taxpayer Portal http://it.ird.gov.np/taxpayer/app.html	Inland Revenue Department (IRD)	BMIS	Building MIS http://dudbc.gov.np/	Department of Urban Development and Buildings
IIS	Industrial Information System http://doind.gov.np/index.php/notice/172-industrial-information-system	Department of Industry (DoI)	Tourism MIS	Tourism MIS http://tourism.gov.np/np/category/tourism/tourism_mis	Ministry of Culture, Tourism and Civil Aviation (MOCTCA)
NNFSP	Nepal Nutrition and Food Security Portal http://www.nnfsp.gov.np /NNPMap/DataDV.html	National Planning Commission (NPC)	SAMARTH MIS	SAMARTHA MIS http://project.focusone.com.np/samarth/auth/login	Ministry of Industry (MoI)
DIS_DEV	Visualizing Development Portal http://www.npc.gov.np/en/page/visualizing_development	National Planning Commission (NPC)	PPIS	Project Performance Information System http://ppis.gov.np/	National Planning Commission (NPC)
LMBIS	Line Ministry Budgetary Information System http://lmbis.gov.np/	Ministry of Finance (MoF)	DPMAS	District Planning Monitoring and Analysis System http://202.45.144.173/DPMAS/Account/Login.aspx	Ministry of Federal Affairs and Local Development (MoFALD)

SOURCES OF POPULATION STATISTICS IN NEPAL

Gyanendra Bajracharya*

Abstract

This paper reviews various sources of official statistics related to population in Nepal. The major sources of Population Statistics (PS) are Population and Housing Censuses (PHC), Demographic Sample Surveys including the Nepal Living Standards Surveys, Nepal Labour Force Surveys and the administrative data. Though PHC provides major population indicators, a number of social and demographic surveys are conducted to fulfill the demand of the timely sectoral population statistics. CRVS (Civil registration and vital statistics) system and population register are also considered as other sources of PS though the data from those system are rarely used in planning purposes in Nepal because of the lower coverage and lack of analysis of the data from the civil registration system. The system of population register has not yet practiced in Nepal. However, the administrative data from various government agencies particularly of the Ministry of Health and Population Ministry of Education and Department of Foreign Employment provides a wide range of population data relating to health, education and employment. The major challenges relating to producing current PS timely and economically includes (i) the re-scheduling of the census/surveys year so that PS could be produced and updated regularly and (ii) strengthening the Management Information System (MIS) for the optimum use and analysis of available administrative data.

1. Introduction

Population Statistics (PS) refers to the information pertaining to the measurement of both dynamic and static perspective of population particularly related to **Population size**, **fertility**, **mortality** and **migration**. This article provides the overview of the official process (census, survey, administrative data or other means) to generate major dimensions of population change in Nepal which are (i) Natural population change and (ii) Net migration. Natural population change takes account of **live births (fertility)** and **deaths (mortality)** during a specified time period (usually a year) and Net **migration** takes account of emigrants (person leaving country) and immigrants (person coming to country).

In Nepal, the official production of population dates back to 1911 A.D. with the conduction of the first Population Census of the country. However, the historic record reveals that the head counting of the adult males was conducted for estimating the military strength during 1806 – 1838 A.D. (CBS 2014).

* Director, CBS

Population censuses and demographic surveys are the major sources of PS. In addition, various statistical surveys including Nepal Labour Force Survey (NLFS), Nepal Living Standards Survey (NLSS) and Multiple Indicator Cluster Survey (MICS) are considered as other sources of PS in Nepal.

2. Objectives

The main objective of this chapter is to discuss on various sources of population Statistics in Nepal. The specific objectives are:

- To assess the main sources of PS in Nepal
- To present in brief the methodology of producing the PS in Nepal
- To discuss on major issues of various sources of the PS
- To identify the gaps and challenges in fulfilling the demand of PS.

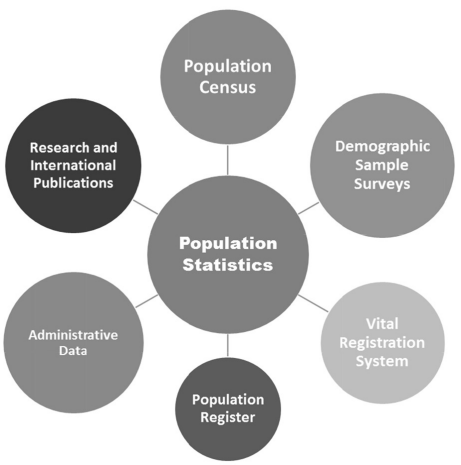
3. Methodology

The methodology adopted in this chapter is based on the revision of various literatures related to the practices and the production of the official PS in Nepal. In this regard, various statistical reports of censuses and surveys were reviewed. Also, the process and methods, production and management of the administrative data including the MIS system and civil registration system were also reviewed. Likewise, the practices of Population registration abroad and International Publications were also referred.

4. Results and analysis

This section provides information on the major sources, processes and methodologies to produce PS in Nepal. As discussed earlier, even though the population censuses and demographic surveys are the main sources of PS, the sources can be categorized into six major groups as illustrated in Figure 1:

Figure 1: Major sources of population statistics



4.1 Population censuses

Population Census is a huge and complex statistical operation that needs a long term preparation for enumerating population living in a specified geographic area at a particular time. It provides the most comprehensive and reliable official picture of the country's population and its characteristics at the "Census Day". This activity provides the information on not only how many are we but also who are we.

History: Population Census in Nepal is conducted every ten years. Central Bureau of Statistics (CBS) is the authorized government agency responsible for the conduction of Population Censuses in Nepal. The first population census was conducted in 1911 and the last (11th) Census was conducted in 2011.

Purpose: Population Census is considered as the major source of PS in Nepal as it provides a wide range of PS that is indispensable for (i) studying the trend and patterns of demographic variation with reference to time, group and area, (ii) evaluating the effectiveness of policy, plan and program relating to population and health, (iii) studying the reason and patterns of migration within and outside the country and (iv) studying the status of economically active population.

Questionnaires: The population census questionnaires adopted in Nepal were developed in following the UN Principles, Recommendations and methodologies for Population and Housing Census. Two types of questionnaires were used to collect the information in 2001 and 2011 censuses. The long or main questionnaire was for collecting information from each households (census) whereas the short questionnaire administered was to collect the information related particularly to economic status and migration from the systematically sampled households in the ratio of 1:8 (CBS, 2014).

Population capturing methodology: The methodology adopted in the Population Census in Nepal for capturing "*the population usually living within the country*" is termed as "modified de-juire". It means population is counted from the place where he/she **usually** resides irrespective of his/her place of birth. The method of "usual place of residence" is followed to capture the population which is considered useful for planning and management of services to the people usually residing in that particular area. Hence, the population number in census for a particular area may vary from the number in the voters list published by the Election Commission as the latter figure is largely based on the permanent address of the voters. There is another method of capturing population in Population Censuses which is termed as "de-facto" in which a person is counted from the place where the person spends the night at the day of reference (irrespective of his usual and permanent place of residence).

Management of human resource: Population Census consists of a huge and complex field operation of large number of human resources. More than 30,000 enumerators and 8000 supervisors were mobilized in the 2011 population census to administer the information from more than 5.4 million households within 11 days (CBS 2012).

The overall activities of Population Census can be grouped into three parts: (a) preparatory or pre-census activities (ii) census activities and (iii) post-census activities

Pre-census activities: Pre-census or preparatory activities begins from about 5 years in advance of the year of census. The major preparatory census activities include (a) Preparation of detail census plan including the fund mobilization, (b) Interaction with stakeholders for drafting the census schedules and manuals, (c) Preparation of enumeration area maps, (d) Sensitization workshop with the stakeholders, (e) Preparation of Information, Education and Communication (IEC) materials for media campaign, (f)

Determining data capturing mechanism, (g) modality of human resource management, (h) Training, (i) Pilot census, (j) Printing of questionnaires, manuals, (k) Preparation of final field operation plan, (k) Transportation and courier of goods.

Census activities: (a) Execution of census (Data collection), (b) Monitoring and supervision, (c) Sensitization program or Media Campaign, and (d) Collection of the filled up questionnaires.

Post-Census activities: (a) Processing of the collecting data, (b) Publication of Preliminary results, (b) Post-Enumeration Survey, (c) Publication of Final results, (d) Dissemination program (e) Publication of further reports including monograph.

Major issues in census taking

During the 2011 population census, the data collection activity was carried out in 11 days from June 17 – 27, 2011 and the mid-day of the period, i.e. June 22, 2011 was considered as the "Census Day". The total population of Nepal 2,64,94,504 was considered as the population of Nepal on that day. The enumerators recorded the population living in the households based on the status of the usual place of residence of the household members on the previous day of the enumeration.

The preliminary result of the census was published about three months after the completion of the data collection and it took more than 14 months to publish the final result of the census. The longer time taken for publishing the final result was seemingly due to (i) the adoption of traditional method of data processing, i.e. manual key entry, (ii) lack of appropriate mechanism for executing the large scale data processing activities in the bureau, and (iii) longer administrative procedures for outsourcing the data processing activity

4.2 Demographic and other surveys

Though the Population Census is the major source of official PS, it can hardly fulfill the demand of timely and adequately socio-demographic indicators. A census-operation is very costly and hence cannot be conducted frequently. Secondly, the information usually sought from the census is limited as the number of questions in the census is directly related not only to the cost but also to the quality of the information collected. In such a situation, a sample survey is the best solution to generate in-depth information on particular theme related to population because sample surveys are relatively cheaper and can usually be done more frequently. Currently various government agencies conduct demographic sample surveys to fulfill their data needs.

Nepal Demographic and Health Survey (NDHS)

Ministry of Health and Population (MoHP) conducts NDHS every five years. The first NDHS was conducted in 1996 and the last one was conducted in 2011.

Methodology: The NDHS 2011 applied two stage sampling method firstly to select 289 clusters (enumeration areas) from the sample frame which was developed based on the 2001 PHC and secondly the 10,826 households from 289 clusters or enumeration areas (MoHP, 2011). The selected households were visited and interviewed all women aged 15-49 years and men aged 15-49 in every second household. The TAPI (Tablet Aided Personal Interview) method was used for the first time for collecting the NDHS 2011 data.

Questionnaire: Three types of questionnaires were administered for data collection in NDHS 2011. The "Household Questionnaire" was meant to collecting information relating to usual members and basic characteristics of each person in the household, housing characteristics, height and weight of all children under age 6 years and hemoglobin testing in every second household. The "Woman's Questionnaire" was used to collect information on basic characteristics, reproductive history, knowledge and use of family planning, antenatal, delivery, postnatal, newborn care, breastfeeding and infant feeding practices, vaccination, marriage and fertility preferences, awareness of AIDS and STIs and domestic violence. The "Man's Questionnaire" was used to collect information on basic characteristics such as age, education, literacy, employment, marriage, fertility preferences and awareness of AIDS and STIs.

Nepal Living Standards Survey (NLSS)

CBS has conducted three series of Nepal Living Standards Surveys- NLSS-I in 1995/56, NLSS-II in 2003/04 and NLSS-II in 2010/11 that followed the methodology of Living Standards Measurement Survey (LSMS) with the technical support from the World Bank (CBS 2011). The main objective of the survey is to assess the impact of various government policies and programs on socio-economic changes by furnishing the updated data on living standards of the Nepalese people.

NLSS followed two-stage sampling with the selection of wards/sub-wards as the primary sampling unit using PPS and the selection of households from the selected wards/sub-wards in the second stage. In NLSS-III, 500 ward/s or sub-wards were selected as primary sampling unit using PPS and 7,200 households were selected as the secondary sampling unit with the systematic sampling. Among the total sample of 7,020 households, 5,988 households were from the cross-section sample (of 500 PSUs) and 1,032 households were from the panel sample (of 100 PSU).

Two types of questionnaires were used. The 80-pages "Household Questionnaire" was the main questionnaire that contains 21 sections and 9 appendices. Two separate "Community Questionnaires", for rural and urban, were also administered for collecting information.

The key issues in the NLSS are: (i) though it is presumed the regular conduction of NLSS in every five years, there was an irregularity in carrying out this survey in Nepal, (ii) the 80-pages longer questionnaire needs hours of interview that might impact on the quality of the response, (iii) the last NLSS-2010/11 was carried out a year advance of the Population Census and both the survey and census have similar demographic questionnaires that duplicates the work and resources, and (iv) data are available disaggregated up to 12 analytical domains including urban-Kathmandu valley.

Nepal Labour Force Survey (NLFS)

CBS has conducted two series of the NLFS in 1998/99 and 2008. The main objective of the survey is to provide necessary indicators to monitor the status and changes in employment and labour market of the country. Both surveys followed strictly the international definitions and concepts followed in Labour Force Surveys, as recommended by the International Labour Organization which in turn are based on the United Nations 1993 System of National Accounts (CBS, 2009). The third series of NLFS will adopt the refined definition employment based on work for pay or profit.

Both the NLFS in 1998/99 and 2008 adopted two stage stratified sampling. In the first stage, 800 (799) PSUs were selected with equal number (400) of PSUs from urban and rural areas. In the second stage, 20 HHs each from the PSUs were selected, totaling 16000 (15976) households to be surveyed.

The entire country was stratified into six strata – 3 strata from urban (Kathmandu Urban, Other Hill Urban and Terai Urban) and 3 from rural areas (Mountain, Rural Hill and Rural Terai). The survey was conducted throughout the year to mitigate the seasonal effect on the survey data.

The major issues and limitations in NLFS are: (i) Like NLSS, the NLFS has not been carried out regularly. (ii) Although the content and format of questionnaire in NLFS-II are similar to NLFS-I, the number of questions in NLFS-II was significantly increased from 77 questions in NLFS-I to 130 questions in NLFS-II, the addition of new questions produced the isolated figures that are not comparable to the previous survey. (iii) The changing definition of employment in NLFS-II created difficulty in comparing the results between the surveys

Nepal Multiple Indicator Cluster Survey (NMICS)

NMICS was a national-level household survey under the global MICS program which was carried out in 2014 by the CBS under the technical support of UNICEF and the financial support jointly from the Government of Nepal (GoN) and UNICEF. The main objective of the survey is to collect internationally comparable data on a wide range of indicators on the status and situation of children and women that facilitates the monitoring of the progress towards more than 18 MDGs related to children and women (CBS 2015).

Two stage cluster sampling design was followed with the use of sampling frame based on National Population and Housing Census 2011. In the first stage, 520 PSUs (clusters i.e. wards) were selected based on PPS (probability Proportion to Size) and 25 households were selected from each PSU totaling 13000 sample households. The sample was selected from 15 sub-regional areas based on five development and three ecological regions which was further disaggregated into rural and urban.

The information was collected using four types of questionnaires (a) Household questionnaire (b) Women (15 - 49 years) questionnaire (c) Children under five years questionnaire (d) Water quality testing questionnaire.

Annual Household Survey (AHS)

AHS is a national-level household survey that aimed to measure the changes in the structure and the level of household consumption and current labour force statistics along with socio-demographic information in an annual basis (CBS, 2016).

The AHS followed the concepts and definitions as per the international practices in capturing level of consumption whereas the recommendations of International Labour Organization (older version) were followed to capture the economic activities of individuals.

The 2014 AHS which is the 3rd survey in the series followed multi-stage random sampling with the selection of 300 (it was only 200 in AHS 2012) primary sampling units (PSUs mostly wards or sub-wards) based on probability proportion to size (PPS). Equal number of PSUs (i.e. 150) were drawn from rural and urban areas from the sampling frame based on National Population and Housing Census 2011. In the second stage, 15 households were selected from each of the PSUs using systematic sampling totaling 4500 sample households for interview. However, the total number of PSUs and the sample households were reduced to 288 and 4320 respectively because of the major earthquake occurred during the survey period, in April of 2015.

A household questionnaire with five sections was administered in the AHS 2014 covering information largely of the demographic characteristics, migration, literacy, household consumption expenditure and economic activities of individuals.

4.3 Civil Registration and Vital System (CRVS)

In Nepal, the vital events such as live birth, death, marriage, divorce, migration are registered as per the prevailing "Birth, death and other vital events registration Act 2033" and "Birth, Death and other vital events registration Regulation 2034" which was started from the 10 districts from Baisakh 1, 2034 BS. The registration program was extended to 17 districts in 2035 BS, 28 districts in 2036, 34 districts in 2037, 40 districts in 2038 BS and all 75 districts in 2047 BS (MoFALD 2015).

The PS accumulated from vital registration program seems hard to use because of its lower coverage and lack of adequate analysis of the registered data. Though the Department of Civil Registration (DoCR) produces number of registration of births, deaths, divorce and migration annually, it does not produce any figures related to the coverage of the statistics and birth figures by the year of birth that makes it difficult to estimate the live birth in that particular year.

4.4 Population register

Population registration and civil registration seems synonymous but they differ in the type of information collected. Civil registration is mainly carried out largely for providing legal documents and generating PS and the activities are confined to the collection and registration of vital events such as live births, fetal deaths, marriages, divorces, adoptions, legal changes of name and recognition of children. The population registration in the other hand includes some (or all) of the vital events with addition to the registration of the establishment of a place of residence and change of address. Hence, a system of population registration that maintains up-to-date information can provide a snapshot of specific population-related information to concern authority at any point in time. However, Nepal has not yet developed the system of population register.

4.5 Administrative records, MIS and publications

Administrative data are considered a potentially rich and can be an alternative source of information compared to the survey data because of its frequency and the low cost of collection. Even though problems such as under-coverage, misreporting, lack of coordination between the line agencies for sharing the data may arise, some of the administrative records are considered very useful in assessing the effectiveness of the services and deliveries (ADB 2006). The use of voter's list and their characteristics may be useful to assess the basic demographic characteristics of the populace in a particular area. Similarly, management information system (MIS) in health, education and some other sectors in Nepal also produce important population data for some specific variables. .

Health Management/System Information System (HMIS/HSIS)

HMIS was established in 1994 with the support from UNFPA (MoHP, 2011). It aims to collect data from public, private and NGO health facilities. All health facilities across Nepal, including police and army hospitals, mission hospitals, teaching hospitals and all non-public facilities, are required to report to the MIS Section, Department of Health Services (DoHS) on more than 200 indicators each month which are disaggregated by the district health offices (MoH 2016). Currently, the DoHS has launched

the web-based online reporting system of HMIS. The HMIS data is used largely to monitor the progress in the health sector.

Education Management Information System (EMIS)

The Department of Education (DoE) publishes Flash Report I & II under EMIS. The main purpose of the report is to furnish a national, ecological and district-level current educational status with their brief analyses in terms of access and equity, efficiency and quality indicators of the School Sector Reform Plan (DOE, 2011). Flash I "Beginning of the school year census" is conducted from May 21- 24 each year. The forms are collected at the resource centers and then District Education Office (DEO) from June 15th and the DEOs submits the District Flash Data to Department of Education by July 15th. Likewise, the Flash II "End of the school year census" begins from April 5-8 and the forms are collected in Resource Centers from April 8 then to DEO by May 15th. The district Flash data are submitted to DOE by June 15th.

Migration data from Department of Foreign Employment (DoFE)

Ministry of Labour and Employment produces an annual report on the number of labour migrants to various countries. The department also published a comprehensive report "Labour Migration for Employment: A Status Report for Nepal" that provides details of the labour migrants outside the country. However the report does not provide any information on labour migrants to India (DoFE, 2014). The major PS that produces by the administrative data of DoFE are the number and trend of labour migrants by countries of destination.

4.6 Research and international publications

Publications from international organizations provides important population statistics under different themes. For example, UNDP publishes a wide range of publications and Nepal Human Development Report is one of the key publications that provides detail analysis of socio-economic variables of varied groups of people to measure the HDI (Human Development Index). Likewise UNFPA publishes State of World Population that provides analytical and quantitative information on population statistics.

5. Linkage with SDGs

Seemingly, most of the 17 goals in SDG needs some kind of population statistics to measure the progress in achieving the goals. The Table below shows the major sources of PS for monitoring the progress in SDGs.

Table 1: Sources of monitoring population related SDGs

SDGs	Sources of data for monitoring the progress
Goal 1: End poverty in all its forms everywhere	➲ Population and Housing Census for total population by sex ➲ NLSS - Survey for poverty related information
Goal 2: End hunger, achieve food security and improved nutrition and promote sustainable agriculture	➲ PHC - total population by sex and geographical region ➲ NLSS - Analyzing consumption and hunger ➲ NMICS – Malnutrition, Stunting, wasting in children

SDGs	Sources of data for monitoring the progress
Goal 3: Ensure healthy lives and promote well-being for all at all ages	➲ PHC and NDHS- Maternal mortality ratio ➲ NDHS – neonatal mortality, epidemics of aids, tuberculosis, malaria, universal access to sexual and reproductive health-care services, health coverage ➲ Administrative data – number of deaths and injuries by road accident
Goal 4: Ensure inclusive and equitable quality education and promote lifelong learning opportunities for all	➲ PHC – Number of school going children by sex, proportion of adult literacy rate ➲ EMIS- gender disparities in education mortality ratio, level of education facilities and learning environment, number of qualified teacher
Goal 5: Achieve gender equality and empower all women and girls	➲ NDHS/ NMICS – Violence against women and girl ➲ PHC – Child or early marriage, unpaid care and domestic workers, equal right and access to ownership and control over land and other forms of property ➲ Administrative data – participation and equal opportunities for leadership at all levels of decision making in political, economic and public life. ➲ HMIS/ NDHS – access to sexual and reproductive health
Goal 6: Ensure availability and sustainable management of water and sanitation for all	➲ PHC/NDHS/NLSS/NLFS – Access to safe drinking water and sanitation ➲ NMICS – Water quality
Goal 7: Ensure access to affordable, reliable, sustainable and modern energy for all	➲ PHC/NDHS/NLSS/NLFS – Access to modern, reliable energy services, renewable energy
Goal 8: Promote sustained, inclusive and sustainable economic growth, full and productive employment and decent work for all	➲ PHC/NLSS/NLFS – Employment, proportion of small and medium sized enterprise, decent work, equal pay for work of equal value, proportion of youth not in employment and education, child labour,
Goal 9: Build resilient infrastructure, promote inclusive and sustainable industrialization and foster innovation	➲ PHC/NLSS/NLFS – Number of houses with types of structure, Economically active population by industries, access to internet and computer
Goal 10: Reduce inequality within and among countries	➲ NLSS – income data ➲ PHC/NLSS/NLFS/ NDHS – social, economic inclusion of all irrespective of age, sex, disability, race/ethnicity, religion, migration and mobility of people
Goal 11: Make cities and human settlements inclusive, safe, resilient and sustainable	➲ PHC/NLSS/NLFS – Proportion of families owning house with types of structure, number of families by urban and rural
Goal 12: Ensure sustainable consumption and production pattern	➲ PHC/NLSS/NLFS – Number of households by major sources of fuel, light and drinking water.
Goal 16: Promote peaceful and inclusive societies for sustainable development, provide access to justice for all and build effective, accountable and inclusive institutions at all levels	➲ PHC/CRVS: Legal identity for all including birth registration

6. Major issues and challenges

- Unlike censuses and surveys, the use of administrative sources for producing current PS demands more consolidated effort from the stakeholders in Nepal.
- Most of the demographic surveys produce the data disaggregated up to the eco-development regions that limits in using the survey data for evaluating the district or Municipality/VDC level programs.

- There is a lack of the study that uses the data from various surveys and censuses which facilitates not only monitoring the development program but also evaluating development policies.
- Often delays were observed in time between the census/survey completion and data dissemination.
- The results of census/surveys are largely confined to the conventional and stereotyped way of publishing a set of frequency tables and cross-tabulation.
- The year of conducting census and survey need to be rescheduled to avoid the duplication of the efforts and misuse of the resources.

7. Policy recommendations

1. Based on the year of population census, the year of carrying out various demographic surveys need to be re-scheduled to produce the population data regularly with minimizing the cost of data production.
2. The set of demographic questions including the categories of responses in the surveys need to be standardized to enable comparison and produce uniformity in the data.
3. The system of managing the administrative data needs to be strengthened to enhance the usability of the data that would support the generation of current data economically and frequently.
4. The further in-depth analysis of the survey and census data is necessary to maximize the utility of the available data. Also, the integrated use of survey and censuses data, as did in the small areas poverty estimation, will help to uncover the relationship between various socio-economic and demographic variables.
5. The sample design of statistical surveys need to be revised to enable the dissemination of survey results disaggregated up to lower administrative units, at least district levels.
6. The time between the completion and the dissemination of the final result of the census and surveys need to be narrowed down by adopting the modern information technology such as CAPI/ TAPI (Computer or Tablet Aided Personal Interview) for data collection. Also, the use of OMR (Optical Mark Recognition) or ICR (Intelligent Character Reader) system for processing the data collected from the survey would significantly reduce both the time and error associated in the processing.

8. Conclusion

In conclusion, the major sources of PS in Nepal are (i) Population and Housing Censuses, (ii) Demographic and other social surveys, and (iii) Administrative data and MIS system such as HMIS, EMIS and other MIS. Vital registration system, though have a long history of collecting the information on birth, death and marriage, the system still is not capable to produce the usable PS due to various reasons including the lower coverage of the vital events.

The population and housing census in Nepal has been carried out with almost regularity for the last 100 years. Likewise, the NDHS has been carried out regularly by the Ministry of Health and Population for the last 20 years. However, there was an irregularity in the conduction of other statistical surveys such as NLSS, NLFS which might have caused the conduction of multiple surveys and census around a year. Hence, the time for carrying out the census and surveys need to be re-scheduled so that the population and other statistics will be updated regularly with the optimum use of scarce resources. The re-scheduling of the survey and census year should be guided by the principle of generating the current population and other statistics economically. Furthermore, the adoption of information

technology such as CAPI/TAPI or the system of OMR/ICR need to be adopted in order to narrow down the processing time of the census and survey data.

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HEALTH STATISTICS

Paban Ghimire*

Abstract

Human centric attribute of health services promote the role of health statistics as well in all aspects of the development. Health statistics bring forth the health situation of the people as well as visualize the health transition in the country and performance of the health sector. This chapter explains health statistics to familiarize them in public domain and summarizes various dimensions of health statistics, its development, stakeholders and major issues. Having major contribution to health system, development efforts and local planning, it has leverage to monitor and evaluate regional and global efforts including sustainable development goals. Harnessing the potential offered by global, regional and national efforts and infrastructure development, it continues to cope the contextual challenges and come out with a robust, empowered, competent and collaborative statistical sub-system of Nepal.

1. Introduction

As health is most important concern of human life, the information related to it is major development agenda. The Constitution of WHO (1946) states that *good health is a state of complete physical, social and mental well-being, and not merely the absence of disease or infirmity*. Health is a fundamental human right, recognized in the Universal Declaration of Human Rights (1948) and Constitution of Nepal. WHO further point as "*health is determined by both intrinsic forces, such as genetics, behavior, culture, habits and lifestyles, and extrinsic forces such as preventative, curative and promotional aspects of the health sector.*

Health Statistics is defined as "Numerical data that characterize the health of a population and the influence that affects its health" (*Parrish et.al.2005*). Health statistics include both empirical data and estimates related to health, such as mortality, morbidity, risk factors, health service coverage, and health systems.

WHO has described six pillars of health including health information one of them. Beyond that, it has further cross cutting value to other pillars of health system for measurement and evidence generating responsibility.

The history of modern health statistics began with family planning and mother and child health campaign started. Later on malaria elimination program took advantage of health data. Gradual expansion in other health programs resulted in various vertical information system until all the

* Director, Ministry of Health

information systems integrated in 1993. Now a days, various sources enriching health sector by supplementing diverse health and demography related information.

2. Objectives

This chapter on health statistics has a broader objective of introducing Nepal's health sector statistical activities, its structure and dimensions.

3. Methodology

Literature review of information systems and health statistics were done to enter into the matter. Population Census procedure and reports, household survey reports, health facility survey reports and Nepal Health Sector Strategy were observed. Other relevant documents to national statistical system, health systems and demand side of health data were also briefly searched. SDG and MDG related documents were reviewed in view of statistical enquiry. Health information systems and procedures observed thoroughly. Key informants were interviewed involved in health systems. Similarly, annual report of the Department of Health Services and other administrative data reports were reviewed.

4. Results and analysis

On the basis of methodology adopted and specific experience of health data, health statistical system found operated in complex environment with overall architecture built on internal and external influencing factors. The minimum set of blocks that built a system are summarized as follows.

- Statistical Governance and Legislation
- Health Data and their Sources
- Institutional Arrangement and Human Resource
- Data Management and Technology
- Statistical Standard and Quality Assurance
- Information Dissemination and Access
- Data Use and Sharing
- Partnership in Statistics

The health statistical system of Nepal are described under these different components.

4.1 Statistical governance and legislation

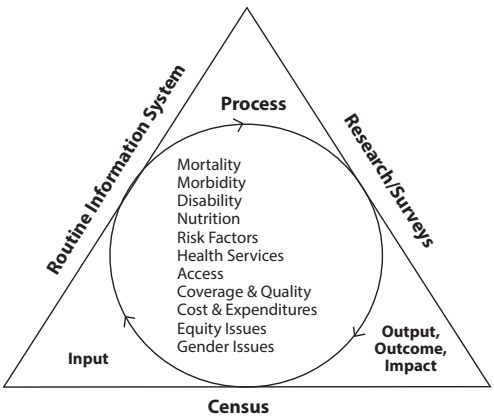
The major source of governance for health statistics comes through health issues mentioned in the Constitution of Nepal 2072 BS due to its measurement role and the Statistical Act 1958 as being an important social sector role. Major statistical activities in health relate to the constitutional provision mentioned as; right to free basic and emergency health services, reproductive health right as women's right, right to information on medical treatment, equal access to health services, investment in the public health and ensure easy, convenient and equal access of all to quality health services. Health related portfolio management in the lists of federal, state, local level powers and concurrent list attract health statistics.

Nepal Statistical Act 1958 is umbrella act for statistical activities that governs and designates functions among sector agencies. On the virtue of this act and Statistical Regulation 1984, health statistics is legitimized in Nepal. UN fundamental principles of official statistics, National health policy, National health strategy and, periodic plans and other health related plan, programs and procedures allow and guide statistical activities in the health sector.

4.2 Health data and their Sources

Health system uses the data from health and beyond. The major sets of health data are: Fertility, Mortality, Morbidity, Disability, Nutrition, Risk factors (genetic, behavior, alcohol and tobacco intake, environmental hazards, etc.), Health services (package, access, coverage and quality), Cost (budget, expenditure, service cost and subsidies, financial risk, etc.).

Health sector statistics comprises of information from different regular sources as census, survey, service statistics, official records and sometimes sporadic sources. Different sources and major types of information is given in the figure below.



Major sources of health data are discussed briefly below.

Population census

Decennial population census provide basic data to the health sector. Population and spatial distribution, age-sex composition, social and economic status, birth and death, household structure and amenities are major information used by health sector. Census data provides denominator and supplementary information for using against health sector goal, outcome and outputs as well as planning, monitoring and evaluation of health plan, policies and programs. It also provides sample frame for surveys.

Surveys

Many current and vital statistics are needed in time which are supplied through periodic and ad-hoc surveys. The surveys discussed below are globally or nationally practiced from long time back.

Health survey in Nepal was initiated in 1964 with *Nepal health Survey*. The survey operations progressed with family planning and mother and child issues. Later on surveys became cross sectional comprehending various health issues gradually.

Nepal Demographic Health Survey (NDHS) conducted four times in Nepal at five years interval as global program. Fifth round is in progress. This is cross sectional household survey providing detailed information to measure development efforts as well as planning, monitoring and evaluation of health programs. NDHS is conducted through Ministry of Health.

Nepal Multiple Indicator Survey (NMIS) provides information on thematic issues in different rounds. It is basically concerned with women and children related health, nutrition and other contemporary issues. It is aimed to provide updates on health indicators at inter-census period. This survey is conducted through Central Bureau of Statistics.

Nepal Living Standards Survey (NLSS) is a living standards measurement survey aimed to provide information on expenditure based living standards and well-being. Health sector is benefited from this survey by getting valuable information on health expenditure, health financing, living standards of people and well-being. This survey is conducted through Central Bureau of Statistics at five years interval.

Other household, facility and exit surveys are also in practice to understand the issues and the areas of concern not addressed by census and regular surveys. Disease prevalence survey, service provision survey, service tracking survey, health facility mapping survey, user satisfaction survey, knowledge, attitude and practice (KAP) survey, and other qualitative and small scale survey and study operations are in practice. The important surveys in health are:

- Nepal health Survey 1964
- Demographic Sample Survey 1974-1978, 1986/87
- Nepal Fertility Survey 1976
- Demographic health survey 1996, 2001, 2006, 2011, 2016
- Service tracking survey 2012
- FCHV survey 2014 etc.

The household surveys are good source of information on individual beliefs, behaviors and practices that are critical determinants of health care use and of health status.

Health sector MIS based on administrative records

There are information systems supporting routine decision making, increasing management efficiency and effectiveness in the health sector. These systems are based on service delivery records, administrative processes, inventory management and other office records and health intervention performance reports.

- Health Management Information System (HMIS)
- Logistic Management Information System (LMIS)
- Human Resource Development Information System (HuRDIS)
- Assets and Equipment Inventory System (InvSys)
- Health Infrastructure Management Information System (HIIS)
- Drug Information Network (DIN)
- Ayurved Information System (AIS)

A brief description of above systems that make available routine data is given below.

Health Management Information System (HMIS)

HMIS is leading information system established as integrated reporting of preventive, curative and laboratory services. It is based on monthly health facility reporting across the country. Community based health institutions and hospitals are major origin of health data where health services are recorded when delivered. These institutions send monthly reports to District Public/Health Offices. DPHO then send compiled data to upper relevant authorities.

Altogether 102 public hospitals, 208 Primary Health Care Centres (PHCCs), 3806 Health Posts (HPs) are reporting to HMIS till date. Service coverage by 12,618 Primary Health Care/outreach Clinics (PHC/ORC), 16,840 Expanded Program of Immunization (EPI) clinics are also reported. Private and NGO sector health institution reporting is in increasing manner. Reports collected from all the health facilities including hospitals are collected monthly through District Public/Health Offices and loaded to web-based portal which further processed and analyzed at the central HMIS in Department of Health Services. Around 50 information tools are used as registers, cards, slips, charts, certificates, reports and other utility.

Total numbers of indicators developed to monitor through HMIS is 303. These indicators mainly facilitate to monitor the service delivery and utilization, outputs and continuum of care. HMIS is aimed at supporting routine decision making, thus involve micro to core indicators applicable to different levels of health system and program planning, monitoring and evaluation.

Logistics Management Information System (LMIS)

This system is aimed at resource prediction, inventory management, supply chain management and maintenance of equipment. Paper based Logistic reporting was started in health system in 1994 and expanded to 75 districts in 1997. It is now turned into web based reporting format from around 4000 health entities. Information generated from this system is also used for forecasting needs of procurement and distribution planning. HMIS produced health statistics are examined against LMIS reports to observe the performances of service delivery against availability of logistics and equipment.

Human Resource Development Information System (HuRDIS)

Human Resource Development Information System (HuRDIS) started operation since 1994 which is located at Ministry of Health. HuRDIS deals with health workforce employed in the government sector. The system keeps personal records, appointments, transfers, promotion, and retirements of all employees of the MoH and its constituent organizations.

The information is very useful in examining performance of the health system and health service outlets against availability of human resources. HR information also provides information for human resource development as well as health sector planning, monitoring and evaluation.

Assets and Equipment Inventory System

Assets and Equipment Inventory Management Information System (AEIMIS), also termed as Inventory System which is being implemented under Logistics Management Division. AEIMIS maintains inventory record of Land and Building, Vehicle, Furniture, Office Equipment, and Medical Equipment and Instruments.

Health Infrastructure Information System (HIIS)

Health Infrastructure Information System, started from 2011 is an infrastructure inventory system developed to allow management of health infrastructure across the country. The system keeps record of health institution buildings, their construct, and operational status as of survey years. Photographs of building and their architectural drawings are also scanned and stored for each building record.

Drug Information Network (DIN)

Drug Information Network is data management and dissemination system of Department of Drug Administration providing information on drug policy, registered and restricted drugs, authorized drug dealers in the country. The system also aims to develop and incorporate features to monitor and coordinate drug supplies in the country made by the drug dealers.

Ayurveda Information System (AIS)

AIS is the reporting and analysis system of the performance of Ayurvedic care service delivery through 2 hospitals, 14 Zonal Dispensaries, 50 Ayurvedic Health Centres, and 211 Ayurvedic Clinics. It is developed to cover service record and resource information.

Vital events registration system (VERS)

Birth, Death and other Vital Events Registration Act, 1976 and Regulation 1977 mandated Government of Nepal to register birth, death, marriage, divorce and migration at local registrar's office located in the community. Vital statistics are bi-product of the registration system. Nepal has started the registration since 1978 from 10 districts which was expanded to 75 districts in 1991. When the system is operated in full-fledged and includes all the events timely, the system can provide detailed and updated data for demographic analysis and high use in health statistics.

Surveillance

Surveillance in health is the continuous, ongoing vigilance and systematic collection, analysis and interpretation of health data. Sentinel reporting are passive surveillance while field based explorations are active. It is conducted for any disease or public health problem considered as emergency needed immediate response. The major surveillance existing in the health system are;

- Immunization/vaccine preventable disease (IPD/VPD) surveillance

  Surveillance for Vaccine Preventable Diseases (VPDs) started in 1996 through the Early Warning Reporting System (EWARS). Now it covers polio, measles, neonatal tetanus and Japanese encephalitis (JE) and turned as IPD surveillance.

- Early Warning and reporting system (EWARS)

  Early Warning and Reporting System (EWARS) is a hospital-based sentinel surveillance system reporting weekly that is currently implemented in 81 hospitals covering all 75 districts of Nepal. EWARS is designed to complement the country's Health Management Information System (HMIS) by providing timely reporting for early detection of selected vector-borne, water and food borne diseases with outbreak potential.

- Maternal and perinatal death surveillance and response (MPDSR)

MPDSR is a continuous surveillance cycle that is designed to provide real- time, quality and actionable data on maternal and perinatal mortality, causes of death and contributing factors. It focuses on using the findings to plan appropriate and effective preventive actions. It aims to identify, notify and review all maternal deaths in communities as well as facilities and perinatal deaths in facilities, thus providing information to develop effective interventions based on data that will reduce maternal and perinatal mortality and permit the measurement of their impact.

Research and studies

There are many governmental and non-governmental organizations conducting research on regular and ad-hoc intervals. National Health Research Council conduct research according to priority list that is updated yearly. Clinical trials and other experimental studies are also conducted by different organizations and individuals and submitted to NHRC for documentation. The data produced in the course of research work make an addition to the health data base.

Some of the health related estimates come from international research organizations and UN agencies mainly for burden of disease, MMR, NCD estimates etc.

4.3 Institutional framework

Health statistics are compiled and generated in the leadership of Ministry of Health. MoH identifies required data and gather from its departments, CBS, EDPs, UN agencies, NHRC and other stakeholders. MoH provide listed information to National Planning Commission, Ministry of Finance, PM Office and other authorities. A well-established service statistics reporting system is in function from community to central level. Team and groups are formed at central level to develop and implement the M and E framework under which core statistical products are designed and facilitated for production, analysis and synthesis, dissemination and use and documentation.

4.4 Human resources

Human resource plays critical to build health statistics set up. Health sector has nicely equipped with required human resources for data management, MISs and related technical issues up to district. Personnel from Nepal Economic Planning and Statistics service are deployed in departments and district level. Hospital data is managed by Medical Record Professionals. Community level data is managed by health workers.

There are Class second officers in almost all divisions and centres under MoH. Class third officers or supervisor level staffs are deployed at district level.

Medical record professionals are recruited through health service act thus have good knowledge for hospital data management. Other general statisticians at central and district offices are provided with orientation on health statistics. Health workers at community level manage service records and prepare monthly progress reports.

4.5 Data management and technology

Health related data management for census and survey data is done through respective agencies which carry out those. The data set and Meta data are made available through such agencies free of

cost or paid. HMIS and LMIS are web-based information systems where DPHO makes data entry which is further processed and analyzed by central HMIS and LMIS. Raw and Analyzed tables are generated from the HMIS computing all major indicators and LMIS produces many tables on inventories. Servers are located in Department of Health. HuRDIS is also planned for web-based operation with central unit located in MoH.

HIIS has GIS embedded desktop application that is managed by data manager in DoHS. Other information systems are in the process of standardization and technology adoption is in progress. All the DPHO, hospitals and departments are connected through internet. Computer and software made available up to district and PHCC level with required training to operate.

4.6 Statistical standard and quality assurance

Statistical standard in health mainly refers to following certain guidelines and protocols in data collection, dissemination and management.

UN fundamental principles of official statistics are kept in centre for statistical operations. Census and surveys have their own standardization process improving time and quality. All these operations begin with enumerator orientation, manuals and guideline developed for collection to management of the data. Standard codes for geographic locations, commodities and activities followed. International classification of disease (ICD 10) is followed for disease coding. HMIS has developed code for health institutions. Health information systems have manuals for data capturing. Standard indicators are developed on the basis of internationally followed *indicator reference sheet*.

Since Nepal has joined General Data Dissemination System (GDDS), follows quality dimension set by IMF Data Quality Assessment Framework (DQAF). HMIS conduct data verification workshops with data managers to verify and validate the report developed. Health system review meetings is also important forum that enhances data quality by analyzing from different aspects.

4.7 Information dissemination and access

Health information coming from survey is immediately disseminated when survey findings come out. HMIS and LMIS reports are disseminated in periodic health system reviews and then put in public domain for use. Annual Report of DoHS is published that cover comprehensive picture of health system performance. Research and study findings are made available through NHRC. All the statistical outputs are available and accessible for statistical and professional purposes.

4.8 Data use and sharing

Health status data is widely presented by surveys and mainly used for evaluation of health programs and assessing impact of various interventions. Similarly demographic information produced by census and surveys are also used largely for impact evaluation as well as setting denominators for many indicators. Routine data is mainly used for management purposes and decision making. These are also used for comparing and triangulating with other data sources as well as filling the data gap between survey periods.

Data sharing practice is in place through government channel. CBS has started National Data Archive (NADA) that facilitates and promote data sharing. Health information system integration is in progress aimed to data sharing and inter-operability.

4.9 Partnership in health statistics

Being the cross cutting subject and holder of big share in the development agenda, health statistics has a good partnership in national and international arena. Census, survey and research undertakings are supported mainly by UN agencies, bi-lateral and multilateral agencies and other national and international organizations. Research and surveillance activities are mainly supported by WHO.

HMIS and other MIS in health works in collaboration with WHO, UNICEF, UNFPA, DFID, USAID and other partners. TB, Malaria, HIV/AIDS related information systems are supported by GFTAM. Global and regional commitments seems crucial for forging partnership in health statistics. Looking at the past, from small pox eradication to present SDG commitment, international and national health campaigns provides support to strengthen the health statistics.

The support and partnership comes in the form of technical and financial support. Implementation of the proposed NSDS is expected to enhance the partnership further.

5. Health data in relation to development agenda and SDGs concern

From the beginning of planned development exercise in Nepal, health statistics grown faster and set meaningful linkage with development plans. Various support and collaboration platforms are built to improve the health statistics. Major focus of national plans, MDG and SDG as well as regional endeavors have been put in health progress. Periodic plans of government always keep health progress on top priority mainly reduction of maternal and child mortality and family planning. Health sector plan and strategies are always prepared with result framework that showing essence of health statistics.

In the Sustainable Development Goal, health outcomes are largely focused. Out of 17 goals and 169 targets set, the health goal (SDG 3) comprises 13 targets, including four listed as "means-of-implementation" targets and total of 26 indicators. The second target of goal 2 related to nutrition also relates to health programs. The health goal has the largest number of proposed indicators among all the 17 SDGs. Being a cross cutting issue, health system make direct concern to 35 indicators altogether. A list is attached in *Annex 1*.

6. Opportunities and challenges

Nepal has a century long experience of population census taking, more than half century of health surveys operation and almost 25 years of routine information system management. Likewise, vertical reporting of disease specific services have equally long history. It has been ever improving in response to the health system reform, expanding development agenda, widening local planning and contemporary developments. Although, it has a bunch of opportunities, it encompasses inevitably challenges.

Opportunities

Health statistics, being people centric and cross cutting, has got big attention and importance by planners, development partners and users. Health system achievements are comparatively mostly

echoed. The basis of these achievements are availed by the system of health statistics. Many health indicators are developed for all levels of planning, monitoring and evaluation as well as getting knowledge on health status, transition in health and demography and epidemiology. An established data sources provide big opportunity to go ahead. Statistical personnel engaged in health data management provide strong organizational backing. Partners and stakeholders are forging strong relationship for better data. Emerging information and communication technology and other information platforms also shows ample opportunities for further improvement.

National Strategy for Development of Statistics (NSDS), National Health Sector Strategy, Result framework of NPC, SDG monitoring framework and many other documents pave ways for improvement, partnership and institutionalization of strong health statistical system.

Challenges

Although, the health statistics is improving, it has numerous challenges ahead.

- One of the obstacles to gather health sector information in absence of the law to regulate the health information management. It has mainly affected the service recording and reporting from private and NGO sector.
- Advocacy capacity for health statistical development is weak which impedes the timely development and improvement to the system.
- Reducing big burden of reporting to health workers and meeting ever increasing demand for detailed information.
- Data gap and redundancy dilemma.
- Digital divide among information managers is putting health information system less competitive.
- Individual medical record keeping is big challenge of the day to expedite universal health coverage resulting problems in health financing.
- Development of data sharing, integration and inter-operable system is dire need to bring all information system and data sets together to maximize the benefit and increasing efficiency.
- Data quality assurance is not sufficient to make users confident. Implementation of data quality framework in health sector having larger and diverse participation needs a good chain of command and big investment time and again.
- Governance of health information and analysis and synthesis seems a big challenge in federal system.

7. Policy recommendations

Nepal's health statistics has been remarkably contributing to the health system and its performance is outstanding while compared to similar setting in other countries. It can contribute more if proper attention is paid to institutionalizing well by setting better governance and organizational development. Its harmonization with e-health intervention, human resource development and enhanced use of information products in planning, monitoring and evaluation exercise improves the efficiency and effectiveness of health system. Universal health coverage and over-arching information architecture for sustainable development goals demand a robust, competent and systematic approach to health statistics. Thus a common statistical framework in the form of National Statistical System should guide the health statistical system to deliver a timely, reliable and need based statistical products.

8. Conclusion

Health statistics as part of country statistical system is serving health system needs up to satisfactory extent. Health system demands a big coverage of information that is arranged through mobilization of various sources. All the partners involved in producing health statistics have to move on harmonized way to satisfy measurement of development goals and honor peoples' right. The technological advancement is providing big opportunities but posing challenge to build matching environment. Measurement issue in sustainable goals and state restructuring indicate to reform in the current structure at organizational and functional levels. Health statistics improvement can be done by disseminating what it has and exploring more areas to cover in view of inclusiveness and universal health coverage. The partnership is strengthening in the form of overall statistical development as well as health sector.

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Annex 1: SDG indicators proposed under health and health related goals

Indicator code (Goal.Target. Indicator)	Indicator topic	Source estimates/Agency
3.1.1	Maternal mortality	Census, NDHS, MMEIG
3.1.2	Skilled birth attendance	NDHS, NMICS
3.2.1	Under-five mortality rate	NDHS, NMICS
3.2.2	Neonatal mortality rate	NDHS, NMICS
3.3.1	HIV incidence	UNAIDS, WHO estimates
3.3.2	Tuberculosis incidence	Prevalence survey, HMIS
3.3.3	Malaria incidence	Prevalence survey, HMIS
3.3.4	Hepatitis B incidence	WHO
3.3.5	People requiring interventions against NTDs	WHO
3.4.1	Mortality due to NCDs	WHO

Indicator code (Goal.Target. Indicator)	Indicator topic	Source estimates/Agency
3.4.2	Suicide mortality rate	WHO
3.5.1	Treatment substance use disorders	UNODC, WHO
3.5.2	Harmful use of alcohol	WHO
3.6.1	Road traffic injury deaths	WHO, Police report
3.7.1	Family planning	NDHS, NMICS
3.7.2	Adolescent birth rate	NDHS, NMICS
3.8.1	Coverage index UHC	WHO, World Bank
3.8.2	Financial protection	NHA
3.9.1	Mortality due to air pollution	WHO
3.9.2	Mortality due to WASH	WHO
3.9.3	Mortality due unintentional poisoning	WHO
3.a.1	Tobacco use	WHO
3.b.1	Access to medicines and vaccines	WHO
3.b.2	ODA for medical research	OECD, WHO
3.c.1	Health workers	MoH
3.d.1	IHR capacity and emergency preparedness	WHO
2.2.1	Stunting among children	NDHS, NMICS
2.2.2	Wasting and overweight among children	NDHS, NMICS
6.1.1	Drinking-water services	NPC, NDHS, Census
6.2.1	Sanitation services	NPC, NDHS, Census
7.1.1	Clean household energy	NPC, WHO
11.6.1	Air pollution	WHO
13.1.1	Mortality due to disasters	MoHA
16.1.1	Homicide	MoHA
16.1.2	Mortality due to conflicts	MoHA

Annex 2: Health goals by proposed data source in Nepal Health Sector Strategy 2015-20

Goal: Improved health status of all people through accountable and equitable health delivery system	Data source	Monitoring frequency	Responsible agency
Maternal mortality ratio (per 100,000 live births)	NDHS	5 years	MoHP
Under five mortality rate (per 1,000 live births)	NDHS NMICS	3 years	MoHP
Neonatal mortality rate (per 1,000 live births)	NDHS NMICS	3 years	MoHP
Total fertility rate	NDHS NMICS	3 years	MoHP
% of children under age 5 years who are stunted (-2SD)	NDHS NMICS	3 years	MoHP
% of women aged 15-49 years with body mass index (BMI) less than 18.5	NDHS NMICS	3 years	MoHP
Life lost due to road traffic accidents (RTA) per 100,000 population	MoPPTM	3 years	MoPPTM
Suicide rate per 100,000 population	Nepal Police	3 years	MoHA
Disability adjusted life years (DALY) lost: Communicable, maternal, neonatal & nutritional disorders; non-communicable diseases; and injuries	BoD/IHME	5 years	MoHP
Communicable, maternal, neonatal & nutritional disorders	BoD/IHME	5 years	MoHP
Non-communicable diseases	BoD/IHME	5 years	MoHP
Injuries	BoD/IHME	5 years	MoHP
Incidence of impoverishment due to OOP expenditure in health	NLSS	5 years	CBS

FOOD SECURITY STATISTICS

Hem Raj Regmi*

"A hungry man can't see right or wrong. He just sees food."
Pearl S. Buck (1892-1973)

Abstract

Food is the basic component without which we cannot imagine our life. The constitution of Nepal has assured food security as a fundamental right to its citizens. Status of food security is known through food security statistics. The short term food security situation is monitored by preparing Food Balance Sheets and acute Integrated Phase Classification (IPC) system of food security. The medium to long term food security is monitored through food consumption surveys, poverty analysis, and measure of malnutrition as well as food insecurity experience scale. This paper presents the definitions, dimensions, indicators of food security statistics focusing at global and national level indicators. In addition, it will also review the problems attaining at different levels, possible intervention, opportunities, and ways forward in preparing food security statistics.

1. Introduction

1.1 General background

Nepal is predominantly an agrarian society, as it contribute about one thirds of the national economy and livelihood of more than two third (CBS, 2014; NLFS, 2009) of its population. About 21% of the land is cultivable, of which 54 % has irrigation facilities with only 0.68 ha per household land holding. The third National Living Standard Survey (NLSS III) has shown that about 25 % of the people are still below poverty line with daily per-capita consumption of energy less than 2220 Kcal (CBS, 2012). Similarly, National Demographic and Health Survey, NDHS (2011) carried out by Ministry of Health and Population (MoHP) shows the alarming rate of Protein Energy Malnutrition (PEM) that is indicated by wasting, stunting, and underweight in respectively 41, 11, and 29 % children under five-year age, and low Body Mass Index (BMI<18.5 Kg/square meter) among the adult population, especially women (18%).

1.2 Contextual background

The concept of food security was first materialized in the form of Food Balance Sheet (FBS) by American Army during World War-II to manage the food items to its soldiers, which was later adopted

* Deputy-Director General, CBS

as the fundamental human right. Until the 1970s, the food security was understood, more generally, as the ability of a nation to meet its aggregate food need continuously (Adhikari, 2010) which is calculated by multiplying per-capita annual food requirement by total population. Food surplus or deficit were identified by comparing requirements versus availability. The area is considered secured, if it has surplus availability, and deficit, if not. There are continuous advances in the understanding and working approaches of food security issues.

The World Food Summit (1974) identified reliable supply and less fluctuating prices (in addition to sufficient food production) as essential factors for achieving the food security. With this food security, being attempted merely by technological means, attracted other factors like market, transport, supply, food prices etc. The food security until then was attempted through strengthening factors influencing 'supply' aspects. Later, Nobel laureate Amartya Sen put forward an alternative view during 1980s, emphasizing the importance of access or entitlements to food for achieving food security. Recently, development practitioners and activists are advocating and lobbying for food safety, food right, and food sovereignty.

At present, the concept of food security assumes to meet; food available at all times; all persons have means of access to food; food is nutritionally adequate in terms of quantity, quality, and variety; and it is acceptable within the given culture. When all these conditions are met a population can be considered 'food secured'.

By definition, *"food security exists when all people, at all times, have physical and economic access to sufficient, safe and nutritious food to meet their dietary needs and food preferences for an active and healthy life"* (World Food Summit, 1996).Thus, the food security focuses on four key dimensions: availability, access, utilization, and stability also known as the four pillars/dimensions of food security.

1.3 Different dimensions of Food Security Statistics (FSS)

Food Security framework is influenced by two factors, physical and temporal. The **physical factors** are related to the food flow i.e. availability, accessibility, use and utilization. The **temporal factor** refers to stability, which affects all three physical factors.

Availability refers to the physical existence of food, either from own production or from the markets. Food availability at national level is the quantity of the net available food estimated as total production minus intermediate consumption (seed, post-harvest loss, feed use, processing loss, industrial use, bio-fuels, alcoholic and other use like stock change) plus net imports. It can also be referred to as food supplies available at the household level.

Total quantity of food production and/or supply does not give a complete picture of a balance diet required for a healthy living of all population at different levels to ensure food security. Food supply and consumption is divided into different groups namely cereal grains, roots and tubers, pulses and legumes, fruits and vegetables, meat and fish, milk and milk products, fats and oils, sugar and sweeteners. In order to meet the requirements of energy, protein, fat, vitamins and minerals as per the Recommended Dietary Allowance (RDA), group-wise food production, their accessibility and utilization at different levels is essential.

Access is ensured when all households and all individuals have sufficient resources to obtain food. The adequate level of access can be achieved without households being self-sufficient in food production. The important factors are the physical, financial (households' income), cultural, religious which

together with own production can be used to meet food needs for a healthy life. Regular availability and accessibility can be hampered by natural disasters or social conflict.

In order to make food availability to all population, especially vulnerable groups, an effective public distribution system (PDS) is needed and its monitoring is very much essential. Similarly, to assure food security to the farmers, government should fix a minimum support price of at least to the major crops to maintain a minimum margin in addition to production cost. Transportation subsidy for at least staple grains to the people of the economically deprived is another tool to assure accessibility dimension. Similarly, ration card or food coupon system could be another means of making the basic foods accessible at a reasonable or subsidized price. Pension to elderly and below poverty line (BPL) population is also necessary because of the fact that they cannot earn required amount of money to purchase their required foods.

Utilization is related to the individual level. The utilization aspect of food security means biological utilization of food and refers to the ability of the human body to absorb nutrients to perform body functions: providing energy, helping growth, and maintaining other vital functions. Similarly, other prerequisites to utilization are safe drinking water, minimum sanitary facilities, proper health care, food preparation methods, etc.

In Nepal, we sometimes measure nutrients consumption data for energy, protein, fat and vitamins, and minerals on the basis of food balance sheet which is an indirect method and does not give exact data. Therefore, to make the data more precise, we need Food Consumption Survey (Dietary survey i.e., 24 hr actual weighing and 24 hr recall method on the basis of actual weighing) periodically, and analyze and compare the average dietary consumption with the RDA.

Stability or **sustainability** refers to the **temporal dimension** i.e. the time frame over which food security is being considered. Furthermore, a distinction is made between chronic food insecurity and transitory or acute food insecurity. The former is the case of inability to meet food needs on an ongoing basis, while the latter is the inability to meet food needs temporarily. There are two forms of transitory food insecurity i.e. cyclical and temporary. In cyclical food insecurity, there is a regular pattern to food insecurity during 'lean season' or 'hungry season', especially just before harvest. The temporary food insecurity is due to natural disasters: droughts, floods or civil conflict (Box 1).

Acute and chronic food insecurity

Broadly there are two different conditions of food insecurity (acute and chronic). Acute food insecurity is a snapshot of the current or projected severity of the situation, regardless of the causes, context or duration. Chronic food insecurity is the prevalence of persistent food insecurity, i.e., levels of food insecurity that continue even in the absence of hazards/shocks or high frequency of years with acute food insecurity. From a decision support perspective, with acute food insecurity it is appropriate to have short-term strategic objectives (ideally these are also linked to medium- and longer-term objectives). Chronic food insecurity, however, requires medium- and long-term strategic objectives to address underlying causes. Acute and chronic food insecurity are not mutually exclusive. An area or household can be in one of the conditions or both simultaneously, indeed, acute food insecurity is often "on top of" chronic food insecurity. It is necessary to examine the nature of, and linkages between, chronic and acute conditions in order to develop the most effective and appropriate strategies for action.

Common food security indicators

Availability

Average dietary energy supply adequacy

Average value of food production

Share of dietary energy supply derived from cereals, roots and tubers

Average protein supply

Average supply of protein of animal origin

Access

Percent of paved roads over total roads

Road density

Rail lines density

Gross domestic product per capita (in purchasing power equivalent)

Domestic food price index

Prevalence of undernourishment

Share of food expenditure of the poor

Depth of the food deficit

Prevalence of food inadequacy

Stability

Cereal import dependency ratio

Percent of arable land equipped for irrigation

Value of food imports over total merchandise exports

Political stability and absence of violence/terrorism

Domestic food price volatility

Per capita food production variability

Per capita food supply variability

Utilization

Access to improved water sources

Access to improved sanitation facilities

Percentage of children under 5 years of age affected by wasting

Percentage of children under 5 years of age who are stunted

Percentage of children under 5 years of age who are underweight

Percentage of adults who are underweight

Prevalence of anaemia among pregnant women

Prevalence of anaemia among children under 5 years of age

Prevalence of vitamin A deficiency in the population

Prevalence of school-age children (6-12 years) with insufficient iodine

Additional useful statistics

Total population

Number of people undernourished

Minimum Dietary Energy Requirement (MDER)

Average Dietary Energy Requirement (ADER)

Minimum Dietary Energy Requirement (MDER) at Physical Activity Level (PAL=1.75)

Coefficient of variation of habitual caloric consumption distribution

Skewness of habitual caloric consumption distribution

Incidence of caloric losses at retail distribution level

Dietary Energy Supply (DES)

Average fat supply

Prevalence of food over-acquisition

Maximum Dietary Energy Requirement (XDER)

2. Approaches of measuring food security/insecurity

The status of different food security (chronic as well as acute) statistics, methods and indicators at national, sub-national as well as household level are described in brief in the following heading and sub-headings.

2.1 Food balance sheets

Food balance sheets (FBS) provide a comprehensive picture of the pattern of a country's food supply and demand (usage) in aggregate terms during a specified reference period, calculated from the annual production of food, changes in stocks, imports and exports, and distribution of food over various uses within the country. The results can be used to monitor trends over time within an individual country. Supply utilization accounts (SUA) are similar balances in quantity terms of individual commodities or group of commodities data dealing with statistics on supply (production, imports and stock changes) and utilization (exports, seed, feed, waste, industrial use, food, and other use) which are presented together to allow the matching of food availability with food use. Now the concept of dynamic food balances in particular dynamic cereal balance sheets (DCBS) is emerging globally. DCBS are useful tool to view current food situation linking to the up-to-date changes overtime in various elements of the FBS. Of particular importance are the changes in availability (production, revised production estimates, stocks/inventories, import requirements/import arrivals, periodic import arrivals/cancellations/delays), and other utilization/distribution factors including population dynamics, consumption requirements/revisions, foregone consumption (undernourishment), etc. These elements can be drilled to as much as detail level as necessary for effective policy actions.

A Food Balance Sheet is a sum result of validated, aggregated food security statistics, demonstrating the **actual food availability** situation of a **defined area** in a **given time frame.**

The balancing elements are supply and utilization in the following equations:

Domestic supply = Domestic utilization:

$OSt + P + I - X = Fo + Fe + Se + T + IU + Lo + ROU + CSt$

Total supply = Total utilization:

$OSt + P + I = X + Fo + Fe + Se + T + IU + Lo + ROU + CSt$

Where, for any given product within a country,

OSt = opening stocks,
P = production,
I = imports,
X = exports,
Fo = food,
Fe = feed,
Se = seed,
T = tourist consumption,
IU = industrial use,
Lo = post-harvest/post-slaughter losses,
ROU = residual other use, and
CSt = closing stocks

Followings are the main data required for FBS and their possible sources in Nepal.

- Population- Central Bureau of Statistics
- Agriculture Production –Ministry of Agricultural Development.
- Trade – Department of Customs, Central Bureau of Statistics, and Trade and Exports Promotion Centre
- Stock changes – Marketing authorities, factories or farmer's stock surveys.
- Feed & Seeds – Production surveys or estimates by government.
- Waste – Manufacturing surveys.
- Industrial use – Manufacturing surveys

2.2 Summary results from the latest FBS

The FBS provides a wealth of information on food, agriculture and nutrition. Given space limitations, only some of the Nepal FBS data prepared by MoAD could be highlighted here. One such information is trends in aggregate food availability in terms of the major macro nutrients called calories, protein and fat to describe the topic of food availability.

Food energy in the form of Dietary Energy Supply (DES)

The latest FBS data shows steady, modest, growth in aggregate national food availability (DES) during 2008-13, from 2,772 Kcal in 2008 to 2,922 Kcal in 2013, the growth rate being 1.4% p.a. (Table 1). FBS database is highly disaggregated and permits reviewing the sources of the DES from various foods. It shows that the contribution of cereals in total DES was 65% during 2008-13 (30% by rice, 20% by maize, 12% by wheat and 3% by other cereals).

Table 1: Trends in the availability of food energy (calories/per capita/day), 2008-13

S.N.	Product group	Food energy -kcal/capita/day					2013	Avg08-13	%	cum %	% p.a.
		2008	2009	2010	2011	2012					
1	Rice	891	837	818	819	831	878	846	30	30	-0.3
2	Maize	525	535	537	604	608	507	553	20	49	1.0
3	Wheat	386	326	406	340	318	321	350	12	62	-3.4
4	Edible oils/oilseeds	217	197	242	253	254	259	237	8	70	4.8
5	Potatoes/yams	126	151	156	158	166	176	155	5	76	5.6
6	Milk/dairy products	118	122	147	142	155	158	140	5	81	6.1
7	Pulses/beans	77	79	72	89	84	134	89	3	84	9.0
8	Spices	65	79	87	88	105	86	85	3	87	6.4
9	Other cereals	90	81	81	81	80	89	84	3	90	-0.3
10	Sugar	75	75	84	82	80	92	81	3	93	3.3
11	Vegetables	64	66	69	74	77	77	71	3	95	4.2
12	Meats	60	69	61	59	59	65	62	2	97	-0.4
13	Fruits	55	57	33	34	49	48	46	2	99	-3.2
14	Nuts	7	7	27	17	11	15	14	0.5	99	12.2
15	Alcohol, Beverages	10	11	13	13	13	12	12	0.4	100	3.9
16	Fish	3	3	3	3	3	3	3	0.1	100	-1.5
17	Coffee/tea	1	1	1	0	1	1	1	0.0	100	6.8
	All total	2,772	2,698	2,837	2,855	2,894	2,922	2,830	100	-	1.4
	Cereals total	1,892	1,779	1,842	1,844	1,837	1,795	1,832	65	-	-0.5
	-cereals share %	68	66	65	65	63	61	65	-	-	-1.8
	Non-cereals total	879	919	995	1,012	1,057	1,126	998	35	-	4.8
	-non cereals share %	32	34	35	35	37	39	35	-	-	3.4

Source: Based on FBS for 2008 to 2013. (FAO/MoAD/CBS 2015)

Protein - Table2 shows similar trends as above for protein. The national average level of protein availability increased from 52 gm in 2008 to 60 gm in 2013, equivalent to a growth rate of 3.3% p.a. Eight products make up 90% of the total during 2008-13, with cereals contributing 60%.

Table 2: Trends in the availability of proteins (grams/per capita/per day), 2008-13

SN	Product groups	2008	2009	2010	2011	2012	2013	Av08-2013	%	Cum%	Grw. Rate % p.a
1	Rice	18	16	16	16	16	17	17	23	23	-0.3
2	Maize	13	13	13	15	15	12	14	19	42	1
3	Wheat	11	10	12	10	9	9	10	14	56	-3.3
4	pulses /beans	5	5	5	6	6	9	6	8	64	9
5	Meat	5	5	5	5	5	6	5	7	72	1
6	Milk / Dairy products	5	5	5	5	5	5	5	7	79	2.5
7	Vegetables	4	4	4	4	4	4	4	6	84	1.6
8	Potatoes/ yams	3	4	4	4	4	4	4	5	89	5.6
9	Spices	2	2	3	2	3	2	2	3	93	6.5
10	Other cereals	3	2	2	2	2	3	2	3	96	-0.2
11	Edible oils/oilseeds	0	0	1	2	2	2	1	1	97	65.4
12	Other 6 groups *	2	2	2	2	2	2	2	3	100	1.9
	All total	70	68	71	72	74	76	72	100	-	2
	Cereals total	44	41	43	43	42	42	43	60	-	-0.6
	-cereals share %	64	61	61	59	58	55	60	-	-	-2.5
	Non-cereals total	25	27	27	29	31	34	29	40	-	5.7
	-non-cereals share %	36	3	39	41	42	45	40	-	-	3.7

**Sum of fruits, fish, nuts, alcoholic beverages, sugar and tea/coffee.*
Source: Based on FBS for 2008 to 2013. (FAO/MoAD/CBS 2015)

Fats - There has been a marked increase in the national average supply of fats, from 52 gm in 2008 to 60 gm in 2013 (annual growth rate of 3.3%) (Table 3). Six groups of foodstuffs contributed to 90% of the total, with edible oils accounting for 46%, followed by milk/dairy (18%), maize (9%), meat (8%), rice (5%) and wheat (4%).

Table 3: Trends in availability of fats (grams/per capita/per day), 2008-13

SN	Product groups	2008	2009	2010	2011	2012	2013	Av08-2013	%	Cum%	Grw. Rate % p.a
1	Edible oils/oilseeds	24.4	22.2	26.7	27	26.8	27.4	26	46	46	3.3
2	Milk/dairy product	8.2	8.5	11.3	10.8	11.8	12	10	18	64	8
3	Maize	4.9	5.1	5	5.6	5.6	4.7	5	9	73	0.8
4	Meat	4.2	5.2	4.2	4.1	4.1	4.5	4	8	81	-1.1
5	Rice	3.2	3	2.9	2.9	3	3.1	3	5	86	-0.6
6	Wheat	2	1.8	3.5	2.1	1.8	1.8	2	4	90	-3.1
7	Spices	1.6	1.8	1.8	1.7	2.2	1.7	2	3	93	2.8
8	Nuts	0.3	0.3	2.5	1.5	1	1.2	1	2	95	28.1
9	Other cereals	0.8	0.7	0.7	0.7	0.7	0.8	1	1	96	-0.6
10	Vegetables	0.5	0.6	0.5	0.5	0.6	0.6	1	1	97	1.3
11	Pulses/beans	0.4	0.5	0.4	0.5	0.5	0.8	1	1	98	9.4
12	Sum of 6 groups*	0.6	0.6	0.6	0.6	0.7	0.7	1	1	100	5.7
	All total	52	51	60	58	59	60	57	100	-	3.3
	Cereals total	11	11	12	11	11	10	11	19	-	-0.4
	-cereals share %	21	21	20	19	19	17	20	-	-	-3.7
	Non-cereals total	41	40	48	47	48	49	46	81	-	4.1
	-non-cereals share %	79	79	80	81	81	83	81	-	-	0.9

**Sum of fruits, potatoes/yams, sugar, fish, coffee/tea and alcoholic beverages.*
Source: Based on FBS for 2008 to 2013. (FAO/MoAD/CBS 2015

2.2 Household surveys

Household consumption surveys are the very good source of analyzing food security related indicators at the household as well as sub national level. The regular household survey provides the time series analysis of the food security related indicators mainly Prevalence of Undernourishment, minimum dietary energy requirement, average dietary energy requirement, per capita per day calorie, protein, fat and many other micro nutrients. Following table mainly highlights the findings from the Nepal Living Standard Survey 2011 using ADEPT FSM software developed by World Bank and FAO.

Table 4: Household consumption Indicators at different levels using NLSS III

Region/ quintle/ deciles	Demographics				Estimates of food consumption & requirements			
	House-Holds #	Family size #	Popula-tion 000	Energy (DEC)	Protein gm/cap/ day	Fat gm/cap/ day	Min. DES require-ment	Avg. DES require-ment
Nepal all	5,988	49	28,024	2,725	73.5	47.0	1,724	2,175
Urban	2,088	4.4	5,329	2,685	73.7	57.5	1,788	2,280
Rural	3,900	5.0	22,694	2,735	73.5	44.6	1,709	2,150
Q1 (poorest)	1,044	6.1	-	2,154	55.3	26.8	1636	-

Region/ quintle/ deciles	Demographics				Estimates of food consumption & requirements			
	House-Holds #	Family size #	Popula-tion 000	Energy (DEC)	Protein gm/cap/ day	Fat gm/cap/ day	Min. DES require-ment	Avg. DES require-ment
Q2	1,068	5.5	-	2,588	68.4	36.8	1686	-
Q3	1,079	4.8	-	2,889	77.8	46.8	1736	-
Q4	1,207	4.2	-	3,019	83.0	59.2	1761	-
Q5 (richest)	1,588	3.7	-	3,332	95.1	82.2	1821	-
Eastern	1.272	4.8	6.525	2,766	73.9	45.6	1,732	2,186
Central	2,280	4.8	9,999	2,813	76.3	49.7	1,734	2,194
Western	1,152	4.6	5.367	2,654	70.6	50.2	1,727	2,180
Mid-western	756	5.2	3,653	2,608	71.8	42.6	1.695	2,123
Far-western	528	5.0	2,480	2,591	70.2	39.5	1,699	2,136
D1 -Nepal	526	6.4	3,679,102	1,948	-	-	-	-
D2-Nepal	518	5.9	3,389,366	2,377	-	-	-	-
D3-Nepal	537	5.7	3,281,933	2,485	-	-	-	-
D4-Nepal	531	5.3	3,051.084	2,698	-	-	-	-
D5-Nepal	530	4.9	2,854,001	2,785	-	-	-	-
D6-Nepal	549	4.6	2,650,725	3,001	-	-	-	-
D7-Nepal	571	4.3	2,487,375	2,982	-	-	-	-
D8-Nepal	636	4.1	2,357,639	3,057	-	-	-	-
D9-Nepal	714	3.9	2,268,348	3,111	-	-	-	-
D10-Nepal	874	3.2	2,002,976	3,582	-	-	-	-
D1-Urban	-	-	-	1,909	-	-	-	-
D2-Urban	-	-	-	2,066	-	-	-	-
D3-Urban	-	-	-	2,361	-	-	-	-
D4-Urban	-	-	-	2,308	-	-	-	-
D5-Urban	-	-	-	2,414	-	-	-	-
D6-Urban	-	-	-	2,556	-	-	-	-
D7-Urban	-	-	-	2,571	-	-	-	-
D8-Urban	-	-	-	2,532	-	-	-	-
D9-Urban	-	-	-	2,640	-	-	-	-
D10-Urban	-	-	-	3,304	-	-	-	-
D1-Rural	-	-	-	1,949	-	-	-	-
D2-Rural	-	-	-	2,399	-	-	-	-
D3-Rural	-	-	-	2,499	-	-	-	-
D4-Rural	-	-	-	2,746	-	-	-	-
D5-Rural	-	-	-	2,825	-	-	-	-
D6-Rural	-	-	-	3,086	-	-	-	-
D7-Rural	-	-	-	3,084	-	-	-	-
D8-Rural	-	-	-	3,313	-	-	-	-
D9-Rural	-	-	-	3,470	-	-	-	-
D10-Rural	-	-	-	4,151	-	-	-	-

Source: Based on Report (FAO/MoAD/CBS 2015)

The table shows that average calorie consumption per capita per day for Nepali people is quite high; which is almost equivalent to developed nations (more than 2700kcal per person per day). But there is a significant difference among the lowest decile (less than 2000kcal per capita per day) and highest decile (more than 3500 kcal per capita per day).

2.3 Integrated Food Security Phase Classification (IPC) Methodology

The Integrated Food Security Phase Classification (IPC) is a set of analytical tools, and processes, to analyse and classify the severity of food security situation. The food security situation analysis conducted through IPC standardized protocols have been used for evidence-based decision making.

The core functions of IPC include: (1) building technical consensus (2) classifying severity and causes, (3) communicating for action, and (4) quality assurance (IPC Global Partners, 2012).

Each function includes protocols to guide the work of food security analysts. By systematizing these core aspects of food security analysis, the IPC contributes to developing standards and building capacity for food security professionals. The IPC approach is designed to be applicable in any context irrespective of the type of food insecurity, hazard, socio-economic, livelihood, institutional or data context. The IPC is developed around field realities and enables this plethora of diversity to be brought together in a systematic manner for decision-makers.

NeKSAP and Food Security Phase Classification

Nepal Food Security Monitoring System (Nepal Khadya Surakshya Anugaman Pranali, NeKSAP) has been setup with the support of World Food Program (WFP) and the system is being institutionalized within the Ministry of Agriculture Development (MoAD). NeKSAP monitors the market food price, and crop and livestock situation based on the information collected by District Food Security Networks consisting of agriculture and livestock offices, Federation of Nepalese Chamber of Commerce and Industries (FNCCI), and other government and non-government organizations. Furthermore, NeKSAP uses the approach of Food Security Phase Classification (FSPC) i.e. Phase I- minimally food insecure (green color), Phase II – moderately food insecure (yellow color), Phase III – highly food insecure (orange color), Phase IV – severely food insecure (red color), and Phase V – humanitarian emergency/ famine (dark red color).

In Nepal following 17 indicators have been set under different dimensions of food security and the threshold for each indicator for respective five phases has been given.

1. Food Consumption food and dietary diversity, food groups)
2. Acute child malnutrition (6-59m), wasting as per the prevalence of Global Acute Malnutrition (GAM)
3. Coping strategies
4. Crop production situation
5. Food stock at household level
6. Stock of main staples in key markets (food availability in the market)
7. Employment opportunities within and neighboring districts

8. Income through sales: NTFP, cash/high value crops, and small enterprise
9. Income: meat, milk, egg, fish, honey
10. Market price of main staple like rice, wheat flour, and others.
11. Remittances
12. Human disease incidence, and epidemics
13. Water supply for drinking, sanitation (ODF)
14. Climatic hazards: floods, landslides, dry spell, snowfall, hailstorm , and strong wind
15. Disaster: Earthquake, fire
16. Out-migration (stress induced)
17. Civil security (social violence, and bandh/blockade)

IPC has recently developed chronic food insecurity experience scale in which there are four phases instead of five as in acute IPC. Followings are the findings from the IPC chronic analysis of 13 sub regions of Nepal using standard IPC techniques.

IPC Phase classification description

Phase I: Minimal Food Insecure: HH group is able to meet essential food and non-food needs without engaging in a typical, unsustainable strategies to access food and income, including any reliance on humanitarian assistance.

Phase II: Moderately Food Insecure or stressed: HH group has minimally adequate food consumption but is unable to afford some essential nonfood expenditures without engaging in irreversible coping strategies.

Phase III: Highly food insecure or crisis: HH group has food consumption gaps with high or above usual acute malnutrition;

Phase IV: Severely Food Insecure or Emergency: HH group has large Food consumption gaps resulting in very high acute malnutrition and Excess mortality;

Phase V: Humanitarian Emergency or declared famine: HH group has an extreme lack of food and/or other basic needs even with full employment of coping strategies. Starvation, death, and destitution are evident.

Table 5: Food insecurity prevalence rates for 13 sub-regions as per the IPC classification, 2014

Sub-region	Total Population in 000	% of population falling under Levels 1 to 4 of Chronic Food Insecurity (CFI)				Under-5 Mortality rate %	# years of Phase 3 or higher in 10 years
		level 1 %	level 2 %	level 3 %	level 4 %		
Central Hill	4,894	48	35	13	5	60	<3
Central Mountain	512	38	35	20	8	60	<3
Central Tarai	5,056	45	38	10	8	60	<3
Eastern Hill	1,621	50	33	13	5	55	<3
Eastern Mountain	393	25	35	28	13	55	<3
Eastern Tarai	4,000	55	28	10	8	55	<3
Far-Western Hill	885	33	33	22	13	82	<3
Far- Western Tarai	1,298	45	38	13	5	82	<3
Mid- Western Hill	1,801	35	35	18	13	73	<3
Mid- Western Tarai	1,571	50	31	14	5	73	<3
Western Hill	2,857	45	36	13	7	57	<3
Western Mountain	937	30	25	25	20	73	3
Western Tarai	2,218	55	30	10	5	57	<3
Total	28,045	46	33	13	7	-	-

Source: IPC study for Nepal (IPC 2014).

Note that the prevalence rate for CFI as a whole would be the sum of the prevalence rates for Levels 2 to 4 as Level 1 implies no CFI (thus for Nepal as a whole, total CFI is 54%).

3. Global and regional overview; SDG indicators

UN Statistical Commission for the global reporting effort with reference to Target 2.1. ("By 2030, end hunger and ensure access by all people, in particular the poor and people in vulnerable situations, including infants, to safe, nutritious and sufficient food all year round.")

Specifically, Food Security Statistics (FSS) focuses on the two indicators for monitoring Target 2.1:

2.1.1 – **Prevalence of Undernourishment;**

The results on **PoU** are estimated using the World Bank and FAO developed food security module called ADePT FSM and input data are from NLSS III at national as well as sub national level. The results are presented in the following table.

Table 6: Prevalence of Undernourishment using mainly survey data

	Population ('000s)	Average dietary energy consumption (kcal/person/day)	Coefficient of variation of dietary energy consumption (%)	Skewness of dietary energy consumption	Minimum dietary energy requirement (kcal/person/day)	Prevalence of undernourish-ment (%)	Average dietary energy requirement (kcal/person/day)	Depth of Food Deficit (kcal/person/day)
Total	28,023.7	2,725.3	24.58	0.75	1,724.0	3.1	2,175.0	18.0
Area of residence of the household								
Urban	5,329.4	2,685.2	24.46	0.75	1,788.0	5.0	2,280.0	32.5
Rural	22,694.3	2,734.7	26.16	0.80	1,709.0	3.4	2,150.4	19.6
Region								
Eastern	6,524.6	2,766.0	24.91	0.76	1,732.3	2.9	2,186.1	17.2
Central	9,999.2	2,812.9	24.06	0.74	1,733.9	2.1	2,193.8	12.6
Western	5,366.8	2,654.5	23.10	0.71	1,726.9	3.2	2,180.0	19.0
Mid-western	3,653.3	2,607.9	26.99	0.83	1,694.6	5.6	2,122.5	31.8
Far-western	2,479.8	2,591.4	27.63	0.85	1,699.3	6.6	2,136.4	38.1

Source: *calculated from NLSS III data set using ADePT Food security module*

Similarly, PoU can be estimated using the data available from Food Balance Sheet using parametric approach in which 3 parameters are Average Dietary Energy Requirement (ADER), variance and skewness. The model is the positively skewed log normal. The results are explained in the following table.

Table 7: Prevalence of Undernourishment using mainly external sources

	Population ('000s)	Dietary energy supply adjusted for losses (kcal/ person/day)	Coefficient of variation of dietary energy consumption (%)	Skewness of dietary energy consumption	Minimum dietary energy requirement (kcal/person/day)	Prevalence of undernourish-ment (%)	Average dietary energy requirement (kcal/ person/day)	Depth of Food Deficit (kcal/ person/day)
Indicator MDG 1.9 (SOFI)		2,409.0	30.89	0.76	1,724.0	17.6	2,175.0	122.1
Total	28,023.7	2,409.0	24.58	0.75	1,724.0	9.8	2,175.0	59.9
Area of residence of the household								
Urban	5,329.4	2,373.5	24.46	0.75	1,788.0	14.4	2,280.0	96.8
Rural	22,694.3	2,417.3	26.16	0.80	1,709.0	10.5	2,150.4	63.6
Region								
Eastern	6,524.6	2,444.9	24.91	0.76	1,732.3	9.4	2,186.1	57.4
Central	9,999.2	2,486.5	24.06	0.74	1,733.9	7.4	2,193.8	45.1
Western	5,366.8	2,346.4	23.10	0.71	1,726.9	10.4	2,180.0	64.0
Mid-western	3,653.3	2,305.2	26.99	0.83	1,694.6	15.3	2,122.5	92.0
Far-western	2,479.8	2,290.6	27.63	0.85	1,699.3	17.1	2,136.4	105.9

Source: *Calculated from NLSS III data set using ADePT Food security module*

Similarly, the indicator on **Target 12, Indicator 12.3.1 Global food loss index**

This indicator can also be indirectly estimated by using the difference of food availability obtained from Food Balance Sheet and actual food consumption data obtained from Household income and expenditure survey like NLSS in Nepal.

2.1.2 – **Prevalence of moderate or severe food insecurity** in the population, based on the **Food Insecurity Experience Scale (FIES);** Can be estimated by applying new set of 8 simple questions dichotomous (yes/no) in the survey which deal with the experience of the people about food insecurity during last 12 months.

1. You were worried you would run out of food?
2. You were unable to eat healthy and nutritious food?
3. You ate only a few kinds of foods?
4. You had to skip a meal?
5. You ate less than you thought you should?
6. Your household ran out of food?
7. You were hungry but did not eat?
8. You went without eating for a whole day?

Global Hunger Index (GHI) and food self sufficiency

The GHI captures three interrelated dimensions of hunger:

1. Insufficient availability of food, measured in percentage of population undernourished (PUN)
2. Shortfalls in the nutritional status of children, measured in prevalence of underweight in children under the age of five (CUW), and
3. Child mortality, measured as the mortality rate of children under the age of five (CM).

GHI can be calculated as:

GHI = (PUN + CUW + CM)/3

Hunger is most directly caused by inadequate food intake. Over the time, it manifests itself in stunted and underweight children, especially in combination with low birth weights and high rates of infections. The most extreme manifestation of continued hunger and malnutrition is mortality. The GHI recognizes the interconnectedness of these dimensions. The GHI for Nepal as reported by International Food Policy Research Institute (IFPRI) in 2011 is 19.9 [≤ 4.9 low; 5.0–9.9 moderate; 10.0–19.9 Serious; 20.0–29.9 alarming; ≥ 30.0 extremely alarming]. It is noted that a lower rank indicates better food security conditions. The sub-regional hunger index of Nepal shows a very precarious condition.

4. Policy recommendations/way forward

The food security interventions to improve availability, access and utilization are cross-cutting in nature and they require reliable timely and up to date statistics which would involve multiple stakeholders. Therefore, coordination and partnerships need to be forged between the government, bilateral and multilateral donors, academia, private sector, civil society bodies, and the communities themselves.

Better data and estimation techniques are required firstly to identify food deficit regions and secondly to improve the targeting and delivery of food based interventions. The functioning of the food management policies and systems also needs to be assessed through better food security statistics with regard to the pricing, procurement, stocking and distribution and the roles of the private sector.

The role of trade policies and trade statistics in Nepal and in other countries in general also comes into question. In particular, the possible effects of data on regional trading and food stocking arrangements need to be evaluated to ensure national level food security.

Periodic conduction of Food Consumption Surveys to monitor per-capita consumption of energy, proteins, vitamins, minerals as well as availability of foods from different groups should be conducted.

5. Conclusion

Food security is a broad area with at least four dimensions of availability, access, utilization and stability. These dimensions themselves are broad topics which cannot be specified with few indicators. For this reason, it would not be appropriate for this paper to try to offer a comprehensive set of recommendations on such diverse topics as the four dimensions of food security.

An FBS is a crucial source of information for many food and nutrition indicators and therefore it is important that a regularly updated FBS is maintained and used for this and other purposes.

The value of household surveys is being increasingly recognized for food security analysis but also in making the national FBS more accurate. The NLSS III results show large disparities in aggregate food intake and consumption patterns by income. This means that while more food production in Nepal may be desirable, especially cereals could be absorbed only if the production itself contributes to effective demand, i.e., it takes place in areas where the poor and food insecure people are located.

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EDUCATIONAL STATISTICS

Manohar Ghimire*

Abstract

Educational statistics has great importance in social development of the country. It describes the level, trends and status of educational condition of the country. On the basis of educational statistics, policy makers or planners make plans, policies and programmes of education in the country as well as monitoring and evaluation of such plans, policies and programmes are also conducted. Mainly there are three sources of educational statistics in Nepal: Censuses, Surveys and Administrative records. Ministry of Education (MoE) and Central Bureau of Statistics (CBS) has been producing educational statistics based on administrative records and census and surveys respectively. Education is one of the major dimension of Sustainable Development Goals (SDGs). Goal 4 of SDGs is related with education with various targets and indicators. For fulfilling the need of SDGs it is necessary to produce more disaggregated educational indicators. For this, it is necessary to develop strong coordination between data producing agencies and focal agency of SDGs. The gaps and problems related to timely production of the educational statistics are to be addressed by appropriate policies and strategies.

1. Introduction

Educational statistics has great importance in social development of the country. It describes the level, trends and status of educational condition of the country in reference period. On the basis of educational statistics, policy makers or planners make plans, policies and programmes of education in the country as well as proper monitoring and evaluation of such plans, policies and programmes are done.

Education has been considered as a fundamental right of the people (article 31) by the Constitution of Nepal 2015 (See Box 1). Education is one of the priority area of government. Many governmental and non- governmental agencies are working in this area to eradicate illiteracy and enhance the quality of education in the country. Government has several plans and policies on education such as: 14th three Year plan (Approach Paper), School Sector Develop Plan (SSDP), Education for all National Plan of Action (2001-2015), etc.

* Director, CBS

Box 1: Fundamental right related to education

Right Relating to education:

(1) Every citizen shall have the right of access to basic education.

(2) Every citizen shall have the right to get compulsory and free education up to the basic level and free education up to the secondary level from the State.

(3) The citizens with disabilities and the economically indigent citizens shall have the right to get free higher education in accordance with law.

(4) The visually impaired citizens shall have the right to get free education through brail script and the citizens with hearing or speaking impairment, to get free education through sign language, in accordance with law.

(5) Every Nepalese community residing in Nepal shall have the right to get education in its mother tongue and, for that purpose, to open and operate schools and educational institutes, in accordance with law.

Source: *The constitution of Nepal 2015, www.lawcommission.gov.np*

Education is one of the dimension of Human development Index (HDI). Mean years of schooling for adults aged 25 years and more and expected years of schooling for children of school entering age are the two indicators used for calculating HDI. Similarly, for calculating Multi-Dimensional Poverty Index (MPI), the years of schooling and children enrolled are used.

2. Objectives

The objective of this article is to give the idea about the system and practices of producing educational statistics in Nepal. This paper describes about the concept, objectives, sources, educational indicators, practices of producing educational statistics in Nepal. It reviews the major constraints on producing educational statistics and finally provides some recommendations for producing reliable better educational statistics.

3. Methodology

The article is mainly based on the literature review of the published articles. The documents related with educational statistics published from governmental organizations, and the manual and guidelines published from UNESCO and other concerned agencies are reviewed. Journals, National newspaper are also reviewed while preparing the article.

4. Results and analysis

4.1 Educational history of Nepal

Nepal has a long history of traditional Gurukul educational system. After origin of Buddhism; in Bihar, Gumba and in other center education was started on the basis of Buddhism religion. During Rana regime general citizens had very limited access to educational institutions. Establishment of Durbar

School in 1910 B.S. is considered as the milestone of educational development in Nepal as public got access to education after its establishment. Higher education system started in 1975 B.S. after the establishment of Tri- Chandra College in 1975 B.S. Approximately 2 percent people were literate in Nepal in 2007 B.S. The number of Primary School was 321, High school was 11 and College was 1 at that time in the country. After the establishment of Democracy in 2007 B.S., education has become one of the major development issues and received priority from government sector. Ministry of Education was established in 2007 B.S. The first university in Nepal namely Tribhuvan University was established in 2016 B.S. Education Act was promulgated in 2019 B.S. At present (2072 B.S.) there are 34806 schools, 9 universities and 66 percent people are literate.

4.2 Sources of educational statistics

Mainly there are three sources of educational statistics in Nepal.

1. Censuses
2. Surveys, and
3. Administrative records and Management Information System (MIS)

4.2.1 Census

Population Census is one of the major sources of social statistics including education. Since sixth census, 2009/11 B.S. in each census questions related to education has been including with the aim of providing literacy rate, educational attainment, educational area and subject, etc. In census of 2058 B.S. questions related with education was administered in Lagat 2 (Sample form) and it was collected for 6 years and above population. Due to high demand of educational data in lower administrative level, in census of 2068 B.S. questions related education were included in Lagat 1 (Complete enumeration form) and it was collected for 5 years and above population. The major advantage of census is that educational data is available up to lower administrative level viz., Village Development Committee. There are 3 questions in census of 2068 B.S. for education.

Table 1: Question on education in population census 2068

For persons 5 years and above		
Can (Name) read and write?	Is (Name) currently attending school / college?	What is the level of Education of (Name)
Read and write Read Only Can't Read and Write	1.Yes 2. No	1. Pass level ..... 2. Major Subject

4.4.2 Surveys

Educational statistics are also obtained from different household surveys. In Nepal, mostly the household surveys are conducted by Central Bureau of Statistics (CBS). The major household surveys conducted by CBS are Nepal Living Standards Survey (NLSS), Nepal Labour Force Survey (NLFS), Nepal Multiple Indicator Cluster Survey (NMICS), Annual Household Survey (AHS), and Urban Population survey (UPS). In all the above mentioned surveys there are few questions related to education. Some other surveys such as Demographic and Health Survey (DHS) conducted by Ministry of Health, Household Budget Survey (HBS) conducted by Nepal Rastra Bank also provide educational statistics.

The major limitations of these surveys are that the indicators obtained from these surveys are available only for national and regional level and most of the surveys are not conducted on regular interval.

4.4.3 Administrative record and management information system

Administrative records are also the major source of Education statistics in Nepal. Ministry of Education (MoE) and its different agencies: Department of Education (DoE), Office of the controller of examination, School Teacher's Record Office, Regional Education Directorates, and District Education Offices produce educational statistics on the basis of administrative records. MoE publishes "Nepal Education in Figures" every year. Besides MoE, University Grant Commission (UGC), Universities, Center for Educational and Vocational Training (CTEVT), and Higher Secondary Education Board (HSEB)[36] are also involved in collection, compilation and publication of educational statistics based on administrative records.

The DoE collects data of education statistics from District Education Offices and publishes three (Vol I, Vol II and Consolidated report) volume of Flash Report annually. The Education Management Information System (EMIS) has been used to publish the Flash reports since school year 2004/05 AD.

The DOE started publishing of Flash report from the school year 2004/05 (2061 B.S.) under its Education Management Information System (EMIS). For this purpose DOE collects school level educational data from all schools across the country twice a year i.e. beginning and end of the school year. Based upon the collected data, the DOE produces three reports annually namely Flash I Report, Flash II report and Consolidated Flash Report. Flash I report is an assessment of the educational inputs and processes based on the school census data at the beginning of the school year, the Flash II report is an assessment of the educational output and outcomes based on data at the end of the school year and finally the consolidated report analyzes trends on key indicators over a number of years based on data from both Flash I and II report. The main information collected on Flash I and Flash II are given in Table 2.

Table 2: Information collected in Flash I and Flash II report

Flash I	Flash II
Early Childhood Development (ECD) and pre-primary classes (PPCs)	Students currently in school by grade, gender, Dalit, Janjati and disabilities
Alternative Schooling Programme: School outreach /Flexible schooling programme (SOP/FSP)	Number of participants enrolled in women literacy classes
Number of Schools by types of Schools (Community, institutional and religious)	Enrollment in adult literacy classes by gender
Student participation by gender, Dalit, Janjati, disadvantaged Janjati and disabilities	Percentage of schools receiving funds within two months of the first and second trimesters
Number of teachers and their training status by types of schools	Percentage of schools with School improvement plans (SIPs)

36 After the eighth amendment of the Education Act 2028, Higher Secondary Education Board (HSEB) and Office of the Controller of Examination has been changed into National Examination Board (NEB).

Flash I	Flash II
GIR/NIR in Grade One and GER/NER by gender and level of education	Percentage of Schools disclosing statements of accounts publicly
Internal efficiency by grade, gender and level	School operational calendar (including school opening days)
Student–teacher ratios by level of School education	Percentage of schools that completed social audit
Student-school and teacher-school ratios by level of school	Number of maintenance scholarships received by students
Delivery of free textbooks to schools within two weeks of the beginning of the school year	Number of new classrooms constructed and rehabilitated
Number of Schools with transitional language support at primary level	Number of schools environment improved
	Number of schools that received grants
	Number of Schools completing SIP for the first time
	Teacher training information
	VDC/District level information Number of new ECD/PPCs open and running, Number of women's literacy classes delivered, Number of adult literacy classes delivered and others

Source: Flash I and Flash II, DOE

4.3 International Standard Classification of Education Statistics (ISCED)

The structure of Education Systems varies widely between countries. In order to produce internationally-comparable education statistics and indicators, it is therefore necessary to have a framework to collect and report data on education programmes with a similar level of educational content. For the purpose United Nations Educational, Scientific and Cultural Organization (UNESCO) developed the ISCED, as an official classification used to categorize and report cross-nationally comparable education statistics.

- ISCED 2011 has nine levels of education, from level 0 to 8.[37]
- ISCED 0 : Early childhood education
- ISCED 1 : Primary education
- ISCED 2 : Lower secondary education
- ISCED 3 : Upper secondary education
- ISCED 4 : Post-Secondary non-tertiary education
- ISCED 5 : Short-Cycle tertiary education
- ISCED 6 : Bachelor or equivalent level
- ISCED 7 : Master's or equivalent level
- ISCED 8 : Doctoral or equivalent level

37 OSCED (2011), ISCED 2011 operational manual

4.4 Some important educational indicators[38]

Literacy rate

A person is considered as literate who is able to both read and write a simple statement on his everyday life. The opposite ability is termed as illiteracy. Literacy rate is mainly obtained from population census, but it could be also generated from household surveys.

Table 3: Literacy rate of population 6 years and above in different census.

Sex	1971	1981	1991	2001	2011	2011*
Male	23.6	34	54.5	65.5	76	75.2
Female	3.9	12	25	42.8	57.8	57.4
Total	13.9	23.3	39.6	54.1	66.6	66

** Literacy rate of populations 5 years and above*

Source: *Population Monograph Vol. I, 2001 & Vol. II, 2013*

Adult literacy rate

Adult literacy rate is defined as the percentage of the population aged 15 years and over who can both read and write with understanding a short simple statement on his/her everyday life. According to the census of 2011, adult literacy rate of Nepal is 59.6 percent whereas it is 71.7 and 48.8 percent for male and female respectively.

Youth literacy rate

Youth literacy rate is defined as the percentage of the population of aged 15 to 24 years who can both read and write with understanding a short simple statement on their everyday life. According to the population census of 2011, youth literacy rate of Nepal is 84.72 percent whereas for male it is 89.9 percent and for female it is 80.2 percent.

Gross enrolment rate (GER)

Gross Enrolment Rate (GER) is an indicator related to total enrolment at a specific level of education, regardless of age. It is expressed as a percentage of the eligible official school-age population corresponding to the same level of education in a given school year. This indicator is widely used to show the general level of education in a given level of education. It indicates the capacity of the education system to enroll students of a particular age group. It can also be a complementary indicator to net enrolment rate (NER) by indicating the extent of over-aged and under-aged enrolment.

A high GER generally indicates a higher degree of participation, whether the pupils belong to the official age group or not. A GER value approaching or exceeding 100% indicates that a country is, in principle, able to accommodate all of its school-age population, but it does not indicate the proportion already enrolled. The achievement of a GER of 100% is therefore a necessary but not sufficient condition for enrolling all eligible children in school.

38 UNESCO(2009), Educational Indicators technical guidelines, Paris

Table 4: Gross Enrolment Ratio (GER) in different levels in different years

Year	GER			
	Primary (1-5)	Lower Secondary (6-8)	Secondary (9-10)	Higher Secondary (11-12)
2010/11	139.5	94.5	66.3	26
2011/12	135.9	100	70.1	28.9
2012/13	130.1	100.6	71.7	31.6
2013/14	136.8	84.3	68.7	32
2014/15	134.4	89.7	70.1	32.9

Source: *Flash Report, 2010/11, 2011/12, 2012/13, 2013/14, 2014/15, Department of Education*

Net enrolment rate (NER)

Net Enrolment Rate (NER) is also an indicator to total enrolment at a specific level of education. It indicates the enrolment of the official age group for a given level of education expressed as a percentage of the corresponding population. This indicator is used to show the extent of coverage in a given level of education of children and youths belonging to the official school age group corresponding to the given level of education.

A high NER denotes a higher degree of coverage for the official school-age population. The theoretical maximum value is 100%. Increasing trends can be considered as reflecting improving coverage at the specified level of education. When the NER is compared with the GER, the difference between the two highlights the incidence of under-aged and over-aged enrolment. If the NER is below 100%, then the complement, i.e., the difference with 100%, provides a measure of the proportion of children not enrolled at the specified level of education.

Table 5: Net Enrolment Ratio (NER) in different levels in different years

Year	GER			
	Primary (1-5)	Lower Secondary (6-8)	Secondary (9-10)	Higher Secondary (11-12)
2010/11	94.5	69.3	46.5	7.8
2011/12	95.1	70	52.1	9.4
2012/13	95.3	72.2	54.3	10.4
2013/14	95.6	72.6	54.9	11.5
2014/15	96.2	74.6	56.1	13.1

Source: *Flash Reports 2010/11, 2011/12, 2012/13, 2013/14, 2014/15, Department of Education*

Gross intake ratio (GIR) in the first grade of primary education

Gross Intake Ratio (GIR) in the first grade of Primary is the total number of new entrants in the first grade of primary education, regardless of age, expressed as a percentage of the population at the official primary school-entrance age. This indicator is used to show the general level of access to primary education. It also indicates the capacity of the education system to provide access to grade 1 for the official school-entrance age population.

Net intake ratio (NIR) in the first grade of primary education

Net Intake Ratio (NIR) in the first grade of Primary is the total number of new entrants in the first grade of primary education who are of the official primary school-entrance age, expressed as a percentage of the population of the same age. This indicator is used to precisely measure access to primary education by the eligible population of primary school-entrance.

Gender parity index (GPI)

Gender Parity Index (GPI) is simply the ratio of female to male values of a given indicator. The main purpose of GPI is to measure the progress towards gender parity in education participation and/or learning opportunities available for women in relation to those available to men. It also reflects the level of women's empowerment in society.

A GPI equal to 1 indicates parity between females and males. In general, a value less than 1indicates disparity in favour of boys/men and a value greater than 1 indicates disparity in favour of girls/women. Apart from the above mentioned indicators there are many other educational indicators which are shown in Box 2:

Box 2: Educational indicators

Adult literacy rate / Illiteracy rate
Number of Adult Illiterates
Gross Intake Ratio (GIR) in the first grade of Primary
Net Intake Ratio (NIR) in the first grade of Primary
School-life expectancy (SLE)
Transition Rate (TR)
Gross Enrolment Ratio (GER)
Net Enrolment Rate (NER)
Age Specific Enrolment Rate (ASER)
Repetition Rate by Grade (RR)
Survival Rate by Grade (SR)
Coefficient of Efficiency
Years-Input per Graduate
Percentage of Repeaters
Pupil-Teacher Ratio
Percentage of Female Teachers
Promotion Rate by Grade (PR)
Dropout Rate by Grade (DR)
Gender Parity Index (GPI)
Youth literacy Rate

5. Sustainable Development Goals and educational indicators

Among the 17 Sustainable Development Goals, the Goal 4 is directly related to education.

Goal 4: Ensure inclusive and equitable quality education and promote lifelong learning opportunities for all.

Target 4.1 By 2030, ensure that all girls and boys complete free, equitable and quality primary and secondary education leading to relevant and effective learning outcomes

Target 4.2 By 2030, ensure that all girls and boys have access to quality early childhood development, care and pre-primary education so that they are ready for primary education

Target 4.3 By 2030, ensure equal access for all woman and men to affordable and quality technical, vocational and tertiary education, including university

Target 4.4 By 2030, substantially increase the number of youth and adults who have relevant skills, including technical and vocational skills, for employment, decent jobs and entrepreneurship

Target 4.5 By 2030 eliminate gender disparities in education and ensure equal access to all levels of education and vocational training for the vulnerable, including persons with disabilities, indigenous peoples and children in vulnerable situations

Target 4.6 By 2030, ensure that all youth and a substantial proportion of adults, both men and women, achieve literacy and numeracy

Target 4.7 By 2030, ensure that all learners acquire the knowledge and skills needed to promote sustainable development, including, among others, through education for sustainable development and sustainable lifestyles, human rights, gender equality, promotion of a culture of peace and non-violence, global citizenship and appreciation of cultural diversity and of culture's condition to sustainable development

4.A. Build and upgrade education facilities that are child, disability and gender sensitive and provide safe, non-violent, inclusive and effective learning environments for all

4.B. By 2020, substantially expand globally the number of scholarships available to developing countries, in particular least developed countries, Small Island developing States and African countries, for enrolment in higher education, including vocational training and information and communications technology, technical, engineering and scientific programmes, in developed countries and other developing countries

4.C. By 2030, substantially increase the supply of qualified teachers, including through international cooperation for teacher training in developing countries, especially least developed countries and Small Island developing States

For the complete list of the educational related targets and indicators, refer to Goal 4 of SDG.[39]

39 Sustainable Development Goals, United Nations.

Only few education related indicators of SDGs are being produced by MoE and CBS at the time. For obtaining more and better information of education indicators of SDGs, concerned agencies have to prepare questionnaire of educational module in different survey aiming to produce SDGs indicators. An active and well-functioning EMIS could be helpful to obtaining timely and reliable educational statistics. It is better to make one manual of SDGs educational indicators for uniformity and consistency of data. For this it is necessary to make a strong co-ordination mechanism among the data producing agencies and focal agency of SDG in Nepal.

6. Issues and problems of educational statistics

The major issues and problems of educational statistics are listed below:

- Poor co-ordination between and among data producing agencies.
- Inconsistency in educational data produced by different agencies.
- Educational data are not available on time.
- Poor data sharing and dissemination culture - absence of specific data dissemination policy.
- Weak record keeping and archiving system in Government agencies.
- Insufficient disaggregated data by age, gender, socio-economic group and other variables.
- Shortage of skilled and trained manpower with statistical knowledge in Ministry of Education.

7. Recommendations and way forward

Educational statistics has great importance in discipline of official statistics. It helps to measure the social wellbeing of the country. Educational statistics of Nepal is not free from problems; to overcome these problems it is necessary to adopt the following things:

There must be strong coordination among data producing agencies.

Include more education related questions in census and surveys to capture required indicators of SDGs and other development agenda.

Develop standard guideline and manual of educational statistics which assists to collect educational statistics with standard definitions, concepts, classifications and methodology.

Improve and strengthen the EMIS.

Develop a proper dissemination policy. Maximize the use of internet and IT for the web dissemination of the educational statistics. .

Improve in the data sharing culture among different agencies.

Conduct regular training for the staff involved in the production of educational statistics.

Create sufficient positions of statisticians in MoE and other related agencies.

Fully adopt the ISCED classification and methodology to compile educational statistics.

Produce adequate disaggregated data by age, gender, socio-economic group and other variables.

Increase use of the educational statistics in planning.

8. Conclusion

Education is one of the most important components of social, human and economic development of the country. Education has been given more importance by the government and its agencies working in the sector. Similarly, many international and national non-governmental agencies are also working on this sector. To know the actual progress and monitor different plans, policies and programmers of educational sector sound data on education is needed. Ministry of Education and its different agencies and Central Bureau of Statistics are the main agencies which are producing educational statistics to fulfill the needs of policy makers, planners, analysists, researchers and the users. Education statistics is one of the strongest area of official statistics in terms of data availability. However, for the efficient monitoring and evaluation of the progress status of SDGs more reliable and timely educational data are needed.

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POVERTY MEASUREMENTS IN NEPAL

Ram Hari Gaihre*

Abstract

The scientific poverty measurement in Nepal has been initiated after the Nepal Living Standards Survey (NLSS) 1995-96 which was carried out by the Central Bureau of Statistics (CBS). The survey follows the Living Standards Measurement Survey (LSMS) methodology developed by the World Bank. Subsequent two rounds of NLSS in 2003-04 and 2010-11 has enriched the data on poverty measures both to update and enhance the use of poverty data for policy implication. The Cost of Basic Needs (CBN) approach of poverty measurement using consumption expenditure has been described with the different measures (incidence, gap and severity) of poverty. The Small Area Estimation of poverty (poverty mapping) has fulfilled the demand by the geographic disaggregation of poverty indicators with the combination of Population Census data and NLSS data to allocate the resources to pinpoint the poor at local (District, Ilaka, Municipality and VDC) level. The Multidimensional Poverty Index (MPI) recently developed by the Oxford Poverty and Human Development Initiative (OPHI) and coordinated by UNDP worldwide provided new insight in the implementation of targeted programs for different dimensions of human welfare such as living standards, education and health. The implementation of monetary and multidimensional poverty to corroborate each other using the strength of each will certainly facilitate the policy makers to target the poor with minimum leakage of resources. In this paper, an attempt has been made to introduce different methodologies adopted for poverty measurement in Nepal.

1. Introduction

There are different approaches that poverty can be defined. Poverty is the pronounced deprivation of the well-being (The World Bank, 2005). Well-being comes from a capability to function in the society. A multidimensional phenomenon of the wellbeing is measured by the deprivation of living standards, health, education, etc. Poverty is the absence of acceptable choices across a broad range of important life decisions, a severe lack of freedom to be or to do what one wants (Foster, Seth, Lokshin & Sajaia, 2009).

Poverty measurement is one of the prime agenda for most of the developing countries. With this measure, the government decides the allocation of its resources through economic planning to reach to the needy people.

* Director, CBS

2. Objectives

The main objectives of this chapter are to discuss on the various aspects of poverty measurements in Nepal including,

- household sample surveys carried out to measure the level and changes of consumption and income
- methodologies adopted in poverty measurements including deriving poverty lines and their updates over time
- various measures of poverty
- poverty measurement practices in Nepal
- the comparative results of poverty and related indicators
- poverty mapping using Small Area Estimation (SAE) technique
- brief introduction to major human development indices
- Sustainable Development Goals (SDGs) related to poverty and hunger
- policy recommendations for the utilization of the poverty indices
- poor households identification, support and coordination mechanism in Nepal

3. Methodology of measuring poverty

3.1 Measuring poverty

There are number of methodologies developed to measure the level of poverty in a society. The World Bank is pioneering on the monetary aspect of welfare more objectively. The economic variables for the measurement may be either income or consumption. Both the income and the consumption has pros and cons. Income is a good measure of poverty; however the information of income is more challenging to collect accurately in the developing countries. On the other hand, consumption, as proxy of income, provides the stable status of welfare and this information can be collected more reliably.

Key steps in measuring poverty involves defining an indicator of welfare, establishing a poverty line on minimum acceptable standard to distinguish the poor from the non-poor and to generate a summary statistic that aggregates the welfare indicator relative to minimum acceptable standards.

3.2 Deriving poverty lines

There are absolute and relative measures of poverty. Absolute poverty measures the status of people living below a certain welfare threshold (minimum subsistence) unable to afford certain basic goods and services. The relative poverty uses a cut-off level measured by income or consumption as a proportion of the mean or median standard of living of the overall population.

The absolute poverty line focuses on the measurement of wellbeing with certain standard of living that is considered to be minimally acceptable in a given society. The common method used to measure poverty is based on income or consumption levels. This minimum level of income or consumption is usually referred to as the "poverty line" or "poverty threshold". Commonly, the poverty line is derived using the Cost of Basic Needs (CBN) method with nutrition based anchor. The food poverty line is

defined as the expenditure required for a person to be able to meet a minimal nutritional intake generally measured by caloric intake with macronutrients (proteins, carbohydrates and fats) and micronutrients (vitamins, minerals, etc.). The additional non-food component including expenditure of housing constitute the total poverty line. For international comparison, a dollar-a-day (1985 PPPs), later updated to 1.08 dollars (1993 PPPs), 1.25 dollars (2005 PPPs) and 1.90 dollars (2011 PPPs) where poverty lines are used in Purchasing Power Parity (PPP) values of goods and services collected for international comparison of price. In any method, if a person's consumption or income level falls below the level of minimum basic needs, the person is considered as poor.

3.3 Different measures of poverty

There are different measures of poverty and inequality. Poverty measures the status of individual against certain level of welfare threshold whereas inequality refers to the distribution of welfare over entire population. These measurements are the Poverty Headcount Index, Poverty Gap Index, Squared Poverty Gap Index based on the Foster-Greer-Thorbecke Index (FGT Index, 1984). Sen Index, Sen-Shorrocks-Thon index, and Watts Index are other measures of poverty.

Headcount Ratio of Poverty (HRP) measurement

The simplest and most widely used poverty measure is the headcount ratio of poverty. This measure is defined as the proportion of population whose per capita income or consumption is less than the poverty line.

$$HRP = \frac{q}{n}$$

where, "n" is total population of the country or the community and "q" is the number of people below the poverty line

Poverty Gap Index (PGI)

The head count poverty tells us only what proportion of the population is poor but it cannot indicate the extent of the poverty depth of the people who are below the poverty line, i.e., the head count cannot tell us how poor are the poor in the community. The PGI measures the depth of poverty among poor individuals. Since PGI measures the depth of poverty, it can indicate how much money we need to bring all the poor individuals in the community or in the country exactly above the poverty line.

Squared Poverty Gap Index (SPGI)

The degree of poverty measured by PGI assumes that the welfare implications of the poverty gap are proportional to the gap, irrespective of the depth of poverty. It treats different levels of poor differently weighing their level of welfare by their distance from the poverty line.

By squaring the poverty gaps, individuals in poorer households receive greater weight in computing the index than do those in less poor households, resulting in a better measure of welfare loss associated with the increasing severity of poverty than the poverty measure based on adding poverty gaps only.

This is a member of the FGT (Foster, Greer, Thorbecke) family of poverty measures. All of the poverty measures can be combined into one mathematical framework as indicated by Foster-Greer-Thorbecke (Econometrica, 1984).

$$P_\alpha = \frac{1}{n}\sum_{i=1}^{q}\left[\frac{z - y_i}{z}\right]^\alpha$$

where P_α is incidence, gap or severity of poverty depending on the value of α=0, 1 or 2 respectively.

3.4 Small area estimation of poverty

The term "small area" denotes any subpopulation for which direct estimates with adequate precision cannot be produced. Small Area Estimation (SAE) provides a comprehensive account of methods and theory of Small Area Estimation, particularly indirect estimation based on explicit small area linking models (Rao, 2003). According to Lanjouw (2007), small area estimation is defined as any of the several statistical techniques involving the estimation of parameters for small sub-populations. The term "small area" in this context generally refers to a small geographical area, such as village. But in a guide to small area estimation manual the SAE is defined as the methods of producing sufficiently reliable estimates for geographic areas that are too fine to obtain with precision, using direct survey estimation method (ABS, 2006). This definition indicates that there are many Small Area Estimation techniques.

The widely used Small Area Estimation technique promoted by the World Bank poverty group is based on regression model (multiple linear regression technique). This estimation makes use of the rich source of information in the sample survey with the power of coverage in the census to produce poverty estimates for small area in all parts of the country (World Bank 2005). Even though this is one of the major methods for the estimation of poverty, there are some advantages and disadvantages in the method. SAE methodologies are particularly beneficial for the policy makers and researchers because they are interested in the estimates of small domains and for those who have no adequate funds for a large scale survey. There is a growing demand for small area estimates among government policy makers because this gives benchmark information for their resource allocation. However, this method suffices from the substantial data requirements and high technicality in the implementation.

The practice of Small Area Estimation (Poverty Mapping) in Nepal has been initiated with the combination of NLSS 2003-04 and Population Census 2001 data to provide incidence, gap and severity of poverty at district (75) and Ilaka (962) level from the existing 6 geographic groups provided by NLSS 2003-04 alone (CBS, 2006). It has been further expanded for the "Small Area Estimation of Caloric- intake and Undernourishment in Nepal". Based on the information of NLSS 2010-11 and the Population Census 2011, the poverty indicators for 75 districts, 902 Ilakas, 58 municipalities and some larger VDCs were estimated providing the comparability of the indicators at the geographically disaggregated level in the second attempt (CBS, 2013).

3.5 Multidimensional Poverty Index

The multidimensional poverty index (MPI) is an index of acute multidimensional poverty. It complements traditional monetary poverty measures by capturing the deprivations that each person faces at the same

time with respect to different dimensions of welfare viz: education, health and living standards.

One deprivation alone may not represent poverty. The MPI requires a household to be deprived in multiple indicators at the same time. A person is multidimensional poor if he or she is deprived in some levels of weighted indicators.

The MPI reflects both the incidence (H) of poverty – the proportion of the population that is multidimensional poor – and the average intensity (A) of their deprivation – the average proportion of indicators in which they are deprived. The MPI is calculated by multiplying the incidence of poverty by the average intensity across the poor. A person is identified as poor if he or she is deprived in at least one-third of the weighted indicators. Mathematically,

Multidimensional Poverty Index (MPI = H×A)

The Alkire Foster (AF) method is a way of measuring multidimensional poverty developed by OPHI's Sabina Alkire and James Foster. Building on the Foster-Greer-Thorbecke poverty measures, it involves counting the different types of deprivation that individuals experience at the same time, such as a lack of education or employment, or poor health or living standards. These deprivation profiles are analyzed to identify who is poor, and then used to construct a multidimensional index of poverty.

Dimensions, indicators and cutoffs of MPI poverty

The MPI has been derived using the three standard dimensions and 10 indicators Alkire, S. and Foster, J. (2009). Each dimension is equally weighted; each indicator within a dimension is also equally weighted. These weights are shown in the following table.

Table 1: Dimension weight and indicators of MPI

Dimensions	Weight	Indicators	Weight
Education	(1/3)	Years of Schooling	(1/6)
		School Attendance	(1/6)
Health	(1/3)	Child Mortality	(1/6)
		Nutrition	(1/6)
Living Standards	(1/3)	Electricity	(1/18)
		Sanitation	(1/18)
		Drinking Water	(1/18)
		Quality of Dwelling	(1/18)
		Cooking Fuel	(1/18)
		Asset Ownership	(1/18)

Table 2: Deprivation cut-offs of MPI indicators

Indicators	Deprived if
Years of Schooling	no member of the household has completed five years of schooling
School Attendance	any children of school age for grades 1 to 8 are not attending school
Child Mortality	any child has died in the family
Child Nutrition	any children less than 5 years old is underweight: weight-for-age<-2SD
Electricity	the household has no electricity
Sanitation	the household does not have any type of flush toilet, non-flush composting toilet, and they are not shared
Drinking Water	the water source is other than piped water, public tap, borehole or pump, protected well, protected spring or rainwater, and the access to clean drinking water is more than a round-trip distance of 30 minutes' walk
Dwelling Quality	the construction materials of outside wall is other than cement-bonded bricks or stones and foundation is not pillar or cement-bonded (the household has a dirt, sand or dung floor)
Cooking Fuel	the household cooks with dung, wood or charcoal
Asset Ownership	a household does not own more than one radio, TV, telephone, bike, motorbike or refrigerator, and does not own a car or tractor

The indicators mentioned above are utilized to infer the situation of deprivation at the household level. The deprivation cut-offs are defined as follows.

Based on the indicator cut-off and poverty cut-off, the poverty headcounts are calculated. The raw headcounts are deprivation at individual indicator whereas the censored poverty headcounts are calculated based on the threshold of weighted indicators. This means a person is identified as poor if the household is deprived in 33 percent of all weighted indicators. This is the deprivation on one-third of the dimensions, education, health or living standards; one indicator each from education and health or three indicators deprived in living standards coupled with one from others.

It can be broken down by geographic area, ethnicity, or other sub-groups of a population, to show the composition of poverty within and among these groups. It can be broken down to show which types of deprivation are contributing to poverty within groups. It can complement monetary measures of poverty.

3.6 Human Development Index (HDI)

The first global Human Development Report was published in 1990 focusing mainly on the capability approach. Several Human Development Reports have been prepared at national and at some levels of disaggregation since 1998 in Nepal. Due to some advancement in the methodological aspects of measuring HDI, the indicators have been changed. The main indicators of human development are HDI, IHDI, GDI and GII[40].

40 Human Development Report 2015 Technical Notes on Calculating the HDI and Related Indexes

The HDI is a composite index (the geometric mean of normalized indices) measuring average achievement in three basic dimensions of human development: a long and healthy life, knowledge and a decent standard of living.

The Gender Development Index (GDI) measures gender inequalities in achievement in three basic dimensions of human development: health, measured by female and male life expectancy at birth; education, measured by female and male expected years of schooling for children and female and male mean years of schooling for adults ages 25 and older; and command over economic resources, measured by female and male estimated earned income.

The Gender Inequality Index (GII) reflects gender-based disadvantage in three dimensions-reproductive health, empowerment and the labour market-for as many countries as data of reasonable quality allow. It shows the loss in potential human development due to inequality between female and male achievements in these dimensions. It ranges between 0, where women and men fare equal, and 1, where one gender fares as poor as possible in all measured dimensions.

3.7 Poor households' identification, support and coordination program

The government of Nepal has established Poor Households Support Coordination Board in 2011 to identify the poor households using household survey, distribute identity cards to the poor households and recommend programs related to social security and services targeted to the poor. For the first phase, 25 poor districts were selected to implement the identification program based on the small area estimation results combined with NLSS 2010-11 and population and housing census 2011.

The Proxy Means Test (PMT) methodology has been adopted to assess the level of poverty to individual household. The PMT is a statistical model that estimates the consumption level of households using the proxy variables with characteristics of being available in household questionnaires, country specific, easily observable and verifiable and not being easily manipulated.

There are 18 indicators identified as the determinants of poverty through statistically significant regression coefficients derived from NLSS 2010-11 data. They are:

Demographic/Human capital characteristics (4): household size, education of household head, enrolment of children in private school and absentee member (potential remittance sender) at household

Physical housing characteristics (4): housing ownership, type of roof, floor and foundation

Household amenities (4): source of drinking water, type of lighting fuel, cooking fuel and toilet

Household facilities (3): access to landline phone, cable television and internet

Ethnic/Geographic group (3): caste/ethnic group, development region, ecological belt

The household survey was carried out by the Poor Households Support Coordination Board Secretariat, Ministry of Cooperatives and Poverty Alleviation through District Development Committees using social mobilizers for the PAPI (Paper and Pencil Interviewing) data collection method. Collecting filled-in questionnaires at the secretariat, the data entry was done and PMT scoring was implemented using the district headcount poverty rates provided by 2011 SAE estimates to identify the poor households. After validation and grievance handling of the preliminary list of the poor households at the VDC

and Municipal ward level, the poor households will get identity cards, which will be the basis of the implementation of targeted programs for the government.

4. Implementation of poverty measurement in Nepal

There have been practices to measure the level of poverty in Nepal since long. Adequacy of food sufficiency (number of months food sufficient for household consumption), area of the land owned by the household, involvement of job employment, etc. were the indicators of the poverty measurement. The Employment, Income Distribution and Consumption Pattern Survey 1976-77 and Multipurpose Household Budget Survey 1984-85 were used for the measurement of poverty in the past. However; the scientific measurement of poverty started after the successful implementation of Nepal Living Standards Survey, 1995-96.

4.1 Poverty measurement in NLSS 1995-96

The first step of the poverty measurement is the preparation of consumption aggregates based on the items collected in the survey. The determination of the poverty line provides ground to infer the situation of poverty below which the population is termed as poor. The nutritional anchor of the calorie requirement at the household level is based on demographic composition of the household. Based on individual's age, sex and physical activities, the minimum requirement of calorie is calculated at 2124 kilocalorie per person per day. The cost of food basket collected in the survey provides the consumption of the calorie whose monetary value was calculated with the bandwidth of the households of 2nd to 5th consumption deciles which consumed 2124 kcal/person/day. The median value of these households was considered as the food poverty line. The non-food poverty line was calculated from the non-food component of the consumption aggregates of these households. The sum of food and non-food poverty lines provided the total poverty line. The spatial price adjustment is made based on the 6 groups created by the set-up of urban/rural, ecological belt and development region considering the price differences of the food and non-food items. Finally, the comparison of per capita consumption against the poverty line provided the different measures of the poverty.

The poverty line for 1995-96 NLSS was derived using the Cost-of-Basic-Needs (CBN) method. In short, the method entailed 5 main steps[41]:

- First, a nutrition norm of per capita 2,124 kcal per day was determined based on the minimum caloric requirements for different age and gender groups and the composition of an “average” Nepali household.
- Second, 37 food items for which units and prices were available were selected and their quantities consumed by the households in the second to fifth decile of per-capita consumption distribution were determined. Expenditure on these 37 goods represented, on average, 85 percent of all food expenditures of households, so it was assumed that these foods provided 85 percent of all requisite caloric requirements. The average actual caloric content of this food bundle was found to be 1,736 kcal. To ensure that the food basket yielded the requisite calories, all quantities were scaled up uniformly by the ratio of 1,805/1,736 (1,805 is 85 percent of 2,124 kcal).

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- Third, the cost of this bundle was determined using mean unit values for these goods in rural Eastern Terai region. Unit values were calculated as "plutocratic" averages across the entire population of rural Eastern Terai. This basket turned out to cost Rs. 2,647 per person per annum.
- Fourth, assuming that all other foods have the same price per calorie, the food basket that would provide 100 percent caloric requirement would cost 15 percent more or Rs 3,114.1per person per annum.
- Fifth, the final step was to determine the share of non-food consumption of the households whose food consumption was around the requisite food poverty line (i.e. the upper poverty line in the terminology of Ravallion 2000). Adding the average amount for non-food items (Rs. 1,540.5), the final poverty line was calculated as Rs 4,654.6 per person per annum in rural Eastern Terai prices.

4.2 Poverty measurement in NLSS 2003-04

First, the recommended per capita calorie consumption was calculated based on the changes on the demographic composition of average Nepali households which turned out to be 2144 kilo-calorie (KCal) per person per day. To update the poverty lines for 2003-04, the above mentioned process was carried out by following three main steps[42]:

Step 1: Derive the spatial and inter-temporal food price indices to ascertain the corresponding food poverty line components of each of the 12 main domains of interest.

Step 2: Derive the spatial and inter-temporal non-food price indices for the corresponding non-food poverty line components of each of the 12 main domains of interest.

Step 3: Aggregate the food and non-food poverty line components to obtain the respective P_{ij} i.e. the 12 overall poverty lines of interest.

Having thus determined the overall total poverty lines in prices of the six regions-of-interest in 1995-96 and 2003-04, it was compared with nominal consumption aggregates derived from the survey data to categorize the population into poor and non-poor group.

4.3 Poverty measurement in NLSS 2010-11

The following steps were applied to update the poverty lines for NLSS 2010-11[43].

Step 1: Identifying the minimum caloric requirement

A typical Nepali household of 4.85 members require a total of 10,770 KCal per day. This gives the average daily per-capita caloric requirement of 2,220 KCal. This value is used to anchor our preferred food poverty line.

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Step 2: Estimating the food poverty line

Assign a caloric content to each of the food items whose consumption has been captured in the food consumption aggregate and obtain the cost per kilocalorie of each food item.

Estimate the food basket consumed by the relatively poor, i.e. of the population that falls within second to fifth deciles of per-capita consumption, and we scale up this basket so that it provides the required 2,220 kilocalorie of energy.

Price the basket in each of the 12 survey's analytical domains to get the value of the food poverty lines. The ratio of the food poverty lines in different domains would give us the relative cost of food in these domains (food price index).

Step 3: Estimating the non-food allowance

The approach followed is to estimate the non-food allowance for the subset of households whose per capita food expenditure is relatively close to the poverty line in each of the 12 analytical domains. In particular, for each domain, we take the average of the (average) share of non-food expenditure (over total expenditure) for two intervals around the food poverty line, namely +/- 5 and +/- 10 percent of its value. The per-capita value of the non-food allowance so obtained is the value of the non-food poverty line.

Step 4: Poverty line for Nepal, 2010-11

The overall poverty line is the sum of the food poverty line and the non-food allowance. A household is defined as poor if the total value of (annual) per capita consumption is less than the poverty line.

The following tables present the summary results of poverty measurements in Nepal.

Table 3: Poverty results based on different surveys

Household Survey	Survey Implementing Agency	Required KCal/person/ day	Poverty Line (Rs./person/ year	Headcount Poverty (Percent)	Inequality (Gini Coefficient)
Employment, Income Distribution and Consumption Pattern survey, 1976-77	National Planning Commission	2256*	720	36.1	NA
Multipurpose Household Budget Survey, 1984-85	Nepal Rastra Bank	2250*	1741	41.4	NA
Nepal Living Standards Survey, 1995-96	Central Bureau of Statistics	2124**	5089	41.8	0.34
Nepal Living Standards Survey, 2003-04	Central Bureau of Statistics	2144**	7696	30.8	0.41
Nepal Living Standards Survey, 2003-04 & Nepal Labour Force Survey, 2008	Central Bureau of Statistics	Multivariate Analysis		25.4	0.46
Nepal Living Standards Survey, 2010-11	Central Bureau of Statistics	2220**	19261	25.2	0.30

**Estimated **Calculated from Survey Data*

Table 4: Multidimensional poverty indicators based on different survey

Survey	Institution Result	Multidimensional Poverty Index (MPI = H×A)	Percentage of Poor People (H) (k = 33.3%)	Average Intensity Across Poor (A) (Percent)
Nepal Demographic Health Survey, 2006	OPHI 2010	0.350	64.7	54.0
Nepal Demographic Health Survey, 2011	OPHI 2014	0.217	49.0	44.2
Nepal Multiple Indicator Cluster Survey, 2014	OPHI 2015	0.126	28.6	44.2

5. Sustainable Development Goals related to poverty

The following goal, targets and indicators are set for 2015-2030 by the UN Statistics Division to alleviate poverty from the world. The goal and targets are to be achieved by 2030 with the measure of indicators tied up with the targets as identified below.

Goal 1. End poverty in all its forms everywhere

Target 1.1 By 2030, eradicate extreme poverty for all people everywhere, currently measured as people living on less than $1.25 a day

Target 1.2 By 2030, reduce at least by half the proportion of men, women and children of all ages living in poverty in all its dimensions according to national definitions

Target 1.3 Implement nationally appropriate social protection systems and measures for all, including floors, and by 2030 achieve substantial coverage of the poor and the vulnerable

Target 1.4 By 2030, ensure that all men and women, in particular the poor and the vulnerable, have equal rights to economic resources, as well as access to basic services, ownership and control over land and other forms of property, inheritance, natural resources, appropriate new technology and financial services, including microfinance

Target 1.5 By 2030, build the resilience of the poor and those in vulnerable situations and reduce their exposure and vulnerability to climate-related extreme events and other economic, social and environmental shocks and disasters

The absolute poverty measures can be obtained from Nepal Living Standards Surveys (NLSSs), small area estimation of NLSSs and population censuses, and poor households identification programs launched by the Poor Households Support Coordination Board (PHSCB). The indicators of poverty for different groups of population can be assessed from the results of MPI, the data source is any of the Nepal Demographic and Health Survey) (NDHS), Nepal Multiple Indicator Survey (NMICS), NLSS, Annual Household Survey (AHS), etc. The social protection programs are recommended by the PHSCB based on the characteristics of the identified poor households.

6. Policy recommendations

Since Ninth Five-Year Development Plan (1997-2002), alleviation of poverty has been the main agenda of the Government of Nepal. The practice of poverty measurement has shown that the

poverty has been declined after the restoration of democracy in Nepal (1990). Three rounds of Nepal Living Standards Surveys are the main sources of scientific poverty measurements in Nepal. These data could provide the monitoring indicators only at the broader range of disaggregation such as at Urban/Rural set up, ecological belt, development region, and some combinations (group) of these geographic areas. A multivariate analysis on the determinants of poverty is needed for policy implication.

The NLSS, poverty measurements survey needs to be carried out in a regular interval at least of 5 years duration. There is a demand for poverty status at local level so that the government could focus its resources to pinpoint the needy people with a minimum leakage of the budget. These indicators suffice of disaggregation. The small area estimation technique which combines the information of living standards survey with census to provide the reliable estimates at district, municipality and even larger VDCs with acceptable standard errors. This has the limitation of frequent large sample surveys or censuses with comparable information with NLSS and technicality of implementation of Small Area Estimation (poverty mapping). The proper care should be taken while using the indicators of Small Area Estimation as the reliability of the indicators diminishes as one goes to the lower level of geographic disaggregation.

Since 2010, the Oxford Poverty and Human Development Initiative (OPHI) with the backup of UNDP has introduced the measurement of multidimensional poverty. It has advantages of coverage of the multiple aspects of the human life to overcome the one-dimensional measure of income or consumption. The choice of the variables for multidimensional poverty index needs more justification for the objective measurement. However, it has the strong asset of decomposability by dimensions of deprivation. The contributing factors for the poverty can be decomposed at the different dimensions of living standards, education or health. The government should utilize its resources not only at the choice of the locality but also at the choice of the sectors (education, health, etc.) which are the determinants of the poverty.

7. Conclusion

The government of Nepal has accepted poverty reduction strategy paper (PRSP) proposed by the World Bank for the alleviation of the poverty as the document of the tenth periodic plan. The National Planning Commission has developed a Poverty Monitoring and Analysis System (PMAS) which provides an integrated set of instruments for effectively monitoring poverty, together with intermediate and final indicators. A model of District Plan Monitoring and Analysis System (DPMAS) has been designed, along with an implementation strategy, following an assessment of existing monitoring systems[44]. These systems can function only when a continuous flow of updated poverty indicators are available at the disaggregated level.

The poverty measurement practices have crossed long steps since the first scientific poverty measurement based on NLSS 1995-96. Inter-temporal and spatial adjustments have been made to the second round of poverty measurement based on NLSS 2003-04 comparable to NLSS 1995-

44 Poverty Monitoring and Analysis System, National Planning Commission, Nepal, May 2004

96. The food basket has been revised and poverty lines have been smoothed using better price indices in 2010-11 NLSS data. The shift of the benchmark of poverty lines makes the poverty results more challenging for the comparability. All those efforts have indicated the trends of poverty decline in Nepal though some vulnerability issues have not been addressed by these magnificent reduction. A holistic approach of intervention is needed to improve the human development indices of Nepal.

MPI measure of poverty is useful to intervene on the lagged dimensions of the human welfare where the government should pay more attention. This indicator should be used to corroborate the monetary poverty results though the poverty incidence differs in two measures. The demand for the disaggregated level of poverty indicators derived by the small area technique with the use of poverty map has provided better picture for the policy makers. The direct targeting of the poor households with their identification will be instrumental for launching the pro-poor programs streamlining the programs of line ministries, and other stakeholders. This facilitates to uplift vulnerable poor through the transfer of incentive package and the insurance of social security.

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CIVIL REGISTRATION AND VITAL STATISTICS

Yadunath Acharya*

Abstract

Legal and systematized history of civil registration is about four decades old in Nepal. Civil registration and vital statistics (CRVS) system has been functioning under the legal platform with well-established organizational set-up and designated human resources. In practical sense, Government of Nepal (GoN) has laid more emphasis on event registration system but generating vital statistics is negligibly addressed. Even though various efforts have been continued till very beginning of the system, under-coverage of event registration is universal in every sphere of institutions involved-central to local. Hence for systematic and timely generation of vital statistics, issues of under-coverage of event registration need to be addressed and emphasis must be given in analyzing the registration data statistically. Vital events registration system (VERS) provides two outputs simultaneously; one being legal document and another is statistics on demography. Vital indicators produced through civil registration may be useful for monitoring the socio-economic targets including post 2015 global agenda of Sustainable Development Goals (SDGs). They are equally important for the national/local/sectoral planning and policy processes. In this regard, this chapter attempts to examine the existing system of civil registration and vital statistics (CRVS) in Nepal. Also, some policy recommendations for strengthening the system has been proposed including the legal reform, mobilization of alternative human resource, tie-up the certificate with service delivery and designated statistical system in the context of state restructuring.

1. Introduction

1.1 Concept and definition

Various types of events take place in human life after womb to before tomb. Events like births, deaths, marriages, divorces affect the life of individual; structure and well-being of family and the society as a whole. Such events should be registered and recorded systematically by the concerned public entity to preserve citizens' identification and rights as well as for generating timely statistics. Civil Registration is the system by which the government records and manages the vital events of its citizens and residents. United Nations Statistical Division (UNSD) has defined civil registration as the continuous, permanent, compulsory and universal recording of the occurrence and characteristics of vital events pertaining to the population as provided through decree or regulation in accordance with the legal requirements of a country (http://unstats.un.org/unsd).The designated office and personnel

* Director, CBS

responsible for receiving registrations is often called the registrar, the resulting repository or database is called civil register or registry.

Vital statistics is one of the sources of population statistics. The proximate output of registration is legal certificate and the ultimate is statistics. Complete coverage, accuracy and timeliness of civil registration are essential for quality vital statistics. The basic features of the vital statistics are universality, timeliness, lower disaggregation, continuity (periodicity) and permanency (safekeeping of records). Basic components of civil registration and vital statistics are legal provision, institutional set-up, human resource, physical and information resources. Other components are beneficiary's participation, designed forms and certificates, record keeping scheme, regular updating and correction system, data management and analysis system and publication/dissemination of the produced vital statistics.

1.2 Uses of CRVS

Primary purpose of civil registration is to register the events as per the existing legal provision which provides certificate of registered events with individual identity. CRVS can be used in many perspectives – few of them are as follows:

a) CRVS can be used as the legal basis for citizen's right to identity, citizenship and public service
b) It can be used as a basis to compile the vital statistics that are instrumental for demographic analysis of population
c) It can provide the basis for research needs of public health and migration.
d) Vital statistics produced from CRVS is useful for socio-economic planning process. It also aids for public health and medical programs, particularly family planning and population management.
e) Vital statistics can be used as an input for the sectoral policy process such as population and housing policy, health policy, migration and displacement policies, etc.
f) Vital indicators are useful for setting, monitoring and evaluating SDGs and other national goals/ targets.
g) CRVS also provides basic information for the social security program such as old age allowance, allowance for single women etc.
h) Vital statistics are mostly disaggregated form of statistics up to very lower spatial level which is much more useful in local level planning process.

2. Objectives

The prime objective of this chapter is to analyze the existing system of CRVS adopted by the Government of Nepal (GoN) including legal provision, institutional set up, strength, challenges and opportunities. This chapter also analyzes the existing system of vital statistics, use and challenges in the vital statistical system and recommendation for reforms. Evaluating the application status of vital statistics in target setting, monitoring and evaluation of the SDGs is also a specific objective.

3. Methodology

Basic methodology adopted for preparing this chapter is review of available literatures and web-based articles. National and international publications, experts' opinion and field visit to the

concerned agencies also added the value in preparing this chapter. Some grey literatures as books and their relevant chapters, public agencies' reports, plan/policy documents were reviewed. Intensive observation of the existing management information system (MIS) in DOCR also helped for this task which has provided the ground for data to review the coverage of registration.

4. Civil registration and vital statistics system in Nepal

4.1 History of civil registration in Nepal

The history of civil registration in Nepal goes back to the Panchyat Era. Registration activity was regulated initially by the Panchyat Act 1962. In 1964, CBS started vital events pilot project covering three panchyats of Kathmandu Valley. Family planning and Mother and Child Health project was started in Banke and Nuwakot district in 1972 covering the vital events registration. The system took a defined shape after promulgation of 'Birth, Death and Other Personal Events Registration Act 2033' and 'Birth, Death and Other Personal Events Registration Regulation 2034'. The registration was executed in some districts at very beginning (2034) and fully implemented (all districts) in 2047. Previously, civil registration system was operated under the Ministry of Home Panchayat that established the Registrar General Office for CRVS in central level. Later on, this responsibility was transferred to MoFALD and to DOCR in 2015.

4.2 Legal provision

Civil registration system in Nepal is regulated through well-established legal provisions whereas the vital statistics is negligibly addressed by laws/regulations. The constitution of Nepal 2015 has included birth registration as the fundamental right of every child in its Article 39 mentioning 'Every child shall have the right to name and birth registration along with his or her identity'. It has also addressed the CRVS issue in its Schedule 9: List of Concurrent Powers of Federation, State and Local Level as 'Personal events, births, deaths, marriages and statistics'.

The Local Self Governance Act 2055 and Local Self Governance Regulation 2056 have also addressed civil registration as the function, obligation and right of local bodies and their elected representatives or designated personnel (secretaries). The principal regulating act and regulation for the CRVS activities are 'Birth, Death and Other Personal Events Registration Act 2033' and 'Birth, Death and Other Personal Events Registration Regulation 2034'. The act has the mandatory registration of five types of events (birth, death, migration, marriage and divorce) to the local registrar within 35 days of occurrence. The act and regulation include the provision of informant, national and local registrar, pre-designed forms, registration process, certification, providing copy of certificates, correcting information and registered name, inspection of register book etc. The regulation includes the sample form for family inventory, event notice form, register books and registration certificates. Other acts and regulations such as Citizenship Act 2063, Civil Service Act 2049, Children Act 2048, Child Labor (Protection and Control) Act 2056, Voters List Act 2063, Civil Service Regulation 2050, Voters List Regulation 2063 etc., also have addressed the civil registration.

4.3 Institutional arrangement

For regulating CRVS, government has established authorized agencies from local level to the central. Local authorized agencies for the system are Office of the Village Development Committees (VDCs) and

Municipalities and wards in some municipalities. Office of the District Development Committee (DDC) is also responsible for the processing of CRVS system. In central level, Department of Civil Registration (DOCR) under MoFALD was established in March 2015. Three tiers of administrative structure for CRVS system are working simultaneously under legally established coordination mechanism-VDC/ municipalities, DDCs and DOCR.

4.4 Human resource

A huge portion of human resource for CRVS activities are mobilized under the MoFALD. In local registrar offices (VDCs and municipalities), most of the personnel working as local registrars belong to the Nepal Administrative Service. Ward secretaries have been assigned the duty of local registrar in some municipalities. Each DDC have mandatory provision to posting personnel for the CRVS activities, basically for compilation and recording/reporting. Centrally in DOCR, overall function is carried out under the leadership of Director General as the national registrar. The Director General has obliged to report the annual activities of registration system including statistics. Three personnel from Nepal Economic Planning and Statistics Service/Statistics Group and some IT specialists from *Bibidh Sewa* have been working.

4.5 Current delivery system

Local registrars under MoFALD have right and obligation to register the noticed events from the informant as per their request. The concerned informant informs certain event (birth, death, migration etc.) by filling up the pre-designed notice form to the local registrar, and the registrar should register the events without any fee within the specified period (35 days). In case of delay to inform, certain late fee is imposed. Notice forms are designed to capture the necessary individual information for legal and statistical purpose. As and when the events are registered, local registrar provides registration certificate to the concerned client and he/she is obliged to manage family inventory (*Pariwar Lagat*). Local registrar is also authorized to manage all records created through the event registration. Provision of providing copy of record and their correction as per the request from informants is also addressed by the existing law.

By local registrars, all the registered and recorded events are sent to the Office of District Development Committee (DDC) after filling up the reporting form (*Pratibedan Pharam*) monthly/annually. The unit in the Office of the DDC is authorized to coordinate the registration activities and it also compiles all received records from various local registration offices (VDC/Municipality). The unit sends all compiled records to DOCR. Some of the local registration offices are linked to the management information system (MIS) named Vital Events Registration System (VERS) of DOCR. They send registered events directly to the MIS system for further analysis.

Vital statistics is generated only in central level. DOCR compiles all recorded/reported events in its MIS unit. After necessary processing and analysis, DOCR publishes data annually in its publication which includes total number of registered events by sex and geographic regions. Nevertheless, publication is not regular. The latest Annual Report 2072 has compiled the registered events of 2070 and 2071.

4.6 Confidentiality

Confidentiality in personal registered events is ensured in the Constitution of Nepal under Part 3: Fundamental Rights and Duties, Serial Number 28: Right to Privacy. It states that ' Except in circumstances

provided by law, privacy in relation to the person, and their residence, property, documents, records, statistics and correspondence, and their reputation are inviolable'. The 'Birth, Death and Other Personal Events Registration Act 2033' and 'Birth, Death and Other Personal Events Registration Regulation 2034' are silent in this issue. Provisions of Statistical Act 2015 may be effective in case of individual information of the registered person which has restricted to publish individual information.

4.7 Use of information and communication technology in CRVS

Information and Communication Technology (ICT) has been used in recent days for CRVS activities in Nepal. The online system of event registration has been established in some of the VDCs and municipalities through which they send all registered/reported events to the central server for further processing. The central server is under the control of DOCR and it is located in Government Integrated Data Centre (GIDC). The DOCR extracts records from the server through its mirror maintained in its Management Information System (MIS) unit. Record management and processing activities are carried out using VERS software. Some VDCs and municipalities also have mandate to send the summary report using offline reporting software. Offices of the local registrar can use downloaded forms to register the events. An appreciable volume of computers and related devices have been using in CRVS purposes. The official website of DOCR has been managed as https://www.docr.gov.np.

4.8 Coordination

There are two types of coordination in CRVS activities; horizontal and vertical. Vertical coordination is there with the concerned institutions under MoFALD from centre to the local agencies for their assigned routine jobs. Each Office of the DDC has crucial role in coordination with centre (DOCR) as well as with VDCs/Municipalities. In policy decisions, DOCR coordinates with MoFALD. Horizontal coordination exists with other concerned departments and agencies having same working status (For example DOCR and CBS, Ministry of Home Affairs, Election Commission etc.). Furthermore, MoFALD and DOCR coordinate with the concerned international agencies including United Nations (UN) system for the technical and international best practices of CRVS.

4.9 Co-operation through international arena

International cooperation in CRVS is essential from the technical, financial and human resource development aspect. MoFALD and DOCR have established international relationship with the bilateral and multilateral development partners. In recent days, various international agencies are cooperating with MoFALD and DOCR for the area of civil registration. The cooperation is basically concentrated in strengthening registration system. Some of the assistance is also related to the human resource development. Support on strengthening vital statistics system is negligible. However, technical and system development assistance for information technology in terms of MIS is noticeable. A project under DOCR supported by World Bank is under execution for establishing family inventory (*Paribar Lagat*) of Nepalese households. Other organizations like WHO, UNICEF, ADB have been providing technical and financial cooperation in CRVS activities.

4.10 Statistical infrastructure

As the system of vital statistics is under-developed, there is limitation in statistical infrastructure. A separate regulatory act and a regulation are serving as the legal infrastructure. Other relevant laws and regulations can also be regarded as the supporting legal provisions. The under-coverage of registration

has resulted incompleteness of family inventory (*paribar lagat*) that will serve as an updated sample frame. There is still lack of guidelines/manuals for processing, analysis and dissemination of vital statistics; coding and classification of events (for example International Classification of Diseases-ICD code for cause of death, etc.) and metadata guidelines and repository. Scientific methods for compilation/processing and analysis of CRVS are available in global arena but it is not used properly to compile vital statistics in Nepal. A huge mass of database is managed in DOCR but that is not carried under compilation, further processing and analysis. A software named VERS has been using in DOCR for compiling vital statistics.

4.11 Budget/financing

Government financing in CRVS has been managed in annual budget of the MOFALD. By decision of their council, local institutions (DDCs/VDCs/municipalities) can allocate some budget for this activity to be financed from their own source of revenue. The budget allocation/financing from the central government is spent mostly for the central level CRVS activities. The local institutions manage their budget needs through their own revenue mobilization and also from the grants received from central government treasury. The overall budget allocation and financing is satisfactory, even it is low for registration activities. No separate budget is allocated for vital statistics and actual expenditure for this activity is unseen/out of separate account.

4.12 Statistical output/indicators

4.12.1 Expected vital indicators from civil registration system

Civil registration system provides the ground for generating a huge mass of demographic indicators. From the current system of registration, it is expected to produce a bulk of vital indicators disaggregated by gender, age and geographical variables from the information collected through the notice form filled up by informants for registration request. The strong property of vital statistics is its frequency of publication to the lowest geographical regions. One can produce fertility/birth related indicators like Child-woman ratio, Sex ratio at birth, Crude Birth Rate (CBR), General Fertility Rate (GFR), Age-specific Fertility Rate (ASFR), Total Fertility Rate (TFR), Gross Reproduction Rate (GRR), Net Reproduction Rate (NRR), etc. So on, mortality related Indicators including Crude Death Rate (CDR), Age-specific Death Rate (ASDR), Infant Mortality Rate (IMR), Child Mortality Rate (CMR), Under-mortality Rate, Maternal Mortality Ratio (MMR), and Life Expectancy at Birth can be produced. Accordingly, marriage, divorce and migration related indicators are also expected to produce from the existing system.

4.12.2 Produced Output/Indicators

Two types of output are expected from the CRVS system; one is legal document and the next is statistics. In practice of Nepal, the former output is managed in local registrar office but the latter is less prioritized. The statistical output is published partially and infrequently. DOCR has legal mandate to publish regularly the data of vital registration after compilation, processing and analysis, but it has not published any statistical report after its establishment. The latest publication was published in 2072 by then Population and Registration Section of the MOFALD.

The published report includes only total number of registered events by sex and geographic regions. No any vital rates, ratios and relevant indicators are generated from the registered events. No gender disaggregated and age specific indicators are published. Using reporting form (*pratibedan pharam*)

submitted by local registrars, one cannot generate any indicators due to absence of time duration of event occurrence i.e. when the event was occurred-within 35 days previous to the registration or before.

Table 1: Registration of vital events -2071

Events	2070			2071		
	Male	Female	Total	Male	Female	Total
Birth	540879	488802	1029681	421,503	454,690	876,193
Death	74,087	48,270	121,849	47,707	66,645	114,352
Marriage			3,17,316			224,826
Divorce			1,104			1,355
Migration			94,613			121,429
Total			15,64,563			13,38,155

Data quality

Major quality attributes in statistics are validity, accessibility, transparency, timelines, consistency, periodicity and comparability. All these quality attributes are essential in vital statistics as they are equally applied to other branch of statistics. In vital statistics, there is problem in completeness, timeliness and disaggregation. In fact, partial set of data due to under-coverage is available which cannot be used to generate vital rates/ratios and other indicators. The statistics is infrequently published that results the lack of periodicity and timeliness.

5. Strengths, weaknesses, opportunities and threats of CRVS

5.1 Strengths

CRVS system in Nepal is regulated by legal provisions. Separate law and regulation are promulgated to regulate the registration system. Timely directives have been issued by the Government of Nepal to address the changing scenario of events. There exists wide spread institutional set up from center to the local level. National registrar, local registrars in significant number and the district level personnel are designated as human resource for this activity. A systematic work flow from central department to the local registrar office has been established. Regular budgeting/financing, publicity of registration activities, use of information and communication technology and establishment of separate department are some notable strengths.

5.2 Weaknesses

The CRVS system in Nepal has more weaknesses than the strengths. Registration system suffers from under-coverage, which leads to the deficiency in generating vital statistics. Registration of events is ad-hoc, i.e., events are registered as and when people feel necessity of registration certificate. Due to absence of timeliness and completeness in event registration, compilation of vital statistics seems to be impractical. Most of the local registrar offices lack physical infrastructure, materials and financial resources. Significant number of local institutions is running with the vacant post of secretary

(local registrar). Local registrars, even posted are bearing multiple burdens of duties. They have to do all administrative, developmental and registration activities. Application of modern technology (including information technology) in CRVS activities is negligible in most of the local registrar offices.

The system is running through the old law and regulation. Both are silent in application of information technology. The law is unable to include all vital events except birth, death, marriage, divorce and migration. Both law and regulation are silent in system of vital statistics. The system, till now is unable to produce quality vital statistics. One cannot produce any types of demographic indicators from the registration system as of current delivery system. There is scarcity of statistical manpower to manage the vital statistics.

5.3 Opportunities/possibilities

One of the remarkable opportunities in registration system is raising people's awareness and government's ownership regarding the CRVS. Rapid development in information technology would also assist the system. Linkage of registration with the public services through various policies, directives and laws will grasp opportunity to make the system better off. Government of Nepal has declared to celebrate Registration Decade for 2015 to 2024 which shall contribute to enhance registration coverage. State restructuring will also add substantial opportunity. After restructuring local institutions, there is possibility of recruiting the statistical manpower and information technicians as a CRVS designated personnel. Inclusion of registration provision in recently promulgated constitution, establishment of separate department to operate CRVS system and increasing international cooperation are some of the opportunities that will help to reform the existing system. One of the milestones in this field is the CRVS Survey conducted by the CBS in 2015/16 with collaboration to DOCR which will provide the coverage status of registration by types of events, sex, geographical regions and other social disaggregation.

5.4 Threats

One of the major threats attached with CRVS is divergence of priority and resources to other sources of population statistics from production of vital statistics. State restructuring may also affect the system, when the provinces have mandate to regulate it. There shall be inconsistency in registration system, data management and transfer mechanism in between state by state. Possibility of government's policy change and reduction in budget allocation can also threat the system.

6. Sustainable Development Goals and CRVS

Sustainable Development Goals (SDGs) globally accepted for post 2015 development agenda are accompanied by targets and they are further elaborated through indicators focused on measurable outcomes. Altogether 230 indicators are tied up with the 169 targets and 17 goals. Government of Nepal has also prepared the SDGs related base indicators relevant to the national context in SDGs Preliminary Report (National Planning Commission, 2015). Among them, some indicators related to SDG 3, 5 and 16 are relevant to and by-product of the CRVS system. A significant mass of indicators that are possible to generate from the CRVS system are indirectly related to the SDG targets; this is because mid-year population being denominator in most of the derived indicators. Some of the relevant SDG targets and Indicators are as follow:

SDG 3: Attain healthy lives for all

3.1) by 2030 reduce the global maternal mortality ratio to less than 70 per 100,000 live births

3.2) by 2030 end preventable newborn, infant and under-five deaths

3.3) by 2030 end the epidemics of HIV/AIDS, tuberculosis, malaria, and neglected tropical diseases

3.4) by 2030 reduce substantially morbidity and mortality from non-communicable diseases (NCDs) through prevention and treatment, promote mental health and wellbeing, and strengthen prevention and treatment of narcotic drug, alcohol, and substance abuse.

3.5) by 2030 halve deaths from road traffic accidents

SDG 5: Attain gender equality, empower women and girls everywhere

5.1) end all forms of discrimination against all women and girls everywhere.

5.3) eliminate all harmful practices, such as child, early and forced marriage.

5.4) ensure universal access to sexual and re-productive health and reproductive rights.

SDG 16 - Promote peaceful and inclusive societies for sustainable development, provide access to justice for all and build effective and capable institution

16.4) 100 percent birth registration.

From existing CRVS system, almost all the SDGs indicators mentioned above cannot be produced due to incompleteness of event registration. Any of the indicators have not been produced yet from the system using direct or indirect technique of demographic analysis. For production of SDGs indicators, civil registration system should be improved as such its coverage might be completed (full). The existing reporting system of registered vital events from local registrars can be improved with inclusion of at least one necessary component as 'event occurred within previous 35 days of registered or before that period". Whenever the reporting format provides this information, we can make indirect estimate to generate demographic indicators in sufficient numbers using weight from the CRVS sample survey conducted by Central Bureau of Statistics. For long-run, it is essential to enhance the coverage of registration, so that one can easily create SDGs indicators regularly for monitoring and evaluating the targets.

7. Recommendations/way forward

For improvement in current CRVS system, following policy measures are recommended:

a) Legal reform: Amendment of existing law/regulation addressing the new development of information technology, global movement of population and diversely emerging trend of new events such as adoption, legal separation, etc.

b) Reliable system: Issue of national identity card to all citizens as a benchmark can be launched from a campaign and regular updating would expand the coverage of registration.

c) Door to door service: Monthly visit to all wards for registration by the office of the Local Registrar.

d) Mobilization of alternative human resource: Alternative man power, basically Female Community Health Workers (FCHWs) should be mobilized to obtain information of event and to collect the events' notice forms filled up by the informants.

e) Online registration and IT use: Provision of online request/notice to the registration of events and certification through online would assist to function the system effectively.

f) Funding/Budget: mobilizing the budget/funding for CRVS efficiently and adequately would greatly increase the coverage of CRVS.

g) Capacity building: The capacity of all concerned agencies should be enhanced through supply of adequate infrastructure/materials. Skill/capacity of designated human resources should be build up through training and other capacity building schemes.

h) Tie-up with service delivery: Registration should be tied-up with the citizen's right and public service (for example: compulsion of registration number in related service delivery). Late fee (penalty) for delayed registration notice should be increased.

i) Publicity: A massive scheme of publicity through mass media at local level and public awareness programs through governmental and non-governmental sectors are essential to stimulate the registration system.

j) Enhanced a smooth coordination: Coordination between and among the concerned agencies is essential for the smooth functioning of CRVS.

k) Designated statistical system: Responsibility of civil registration should be designated to the MOFALD/DOCR and vital statistics related task should be assigned to the CBS.

l) Generation of statistics by indirect technique: Whatever records are obtained from the current registration system, it provides a large sample and vital rates/ratios can be generated in a significant volume using indirect technique of demographic analysis using weights from the CRVS coverage survey by CBS.

m) Recruiting statistical human resource: Restructure of local institution should include appropriate number of human resource from statistical discipline for the designated job of producing vital statistics.

n) Registration decade: United Nations' decision to celebrate CRVS Decade from 2015 to 2024 can be used as an opportunity to enhance the coverage of registration and generation of vital statistics.

8. Conclusion

CRVS system in Nepal suffers from the incompleteness in coverage; thereby production of vital statistics is almost impractical. Priority is given in promoting registration but generation of vital statistics is neglected. Only five vital events are mandatory to register under the provision of existing act and

regulation, whereas some newly emerged events are out of registration coverage. However, a well-structured institutional set up from central to local level is maintained and necessary human resource has been supplied, a systematic working procedure is managed and IT application is increasing; the system is not still functioning effectively. Even though a huge mass of resources has been applied for the registration activity, vital indicators cannot be generated from the current registration and reporting system that ultimately creates scarcity of indicators for monitoring SDGs and other national program. The major causes behind this are (i) the delay in registering the events by the informants due to limited awareness and somewhat negligence (ii) incomplete reporting to capture the time of event occurrence (iii) insufficient effort at the part of analyzing the data statistically using demographic techniques.

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CRIME STATISTICS

Tirtha Raj Chaulagain*

"Better data, deeper analysis, improved policies, less crime" – UNODC

Abstract

Crime statistics has prime importance in maintaining and promoting peaceful and inclusive societies for sustainable development, provide access to justice for all and build effective, accountable and inclusive institutions at all levels. The main objectives of crime statistics are to identify nature of crime and areas where crime is a threat to citizen security, development, stability. Nepal has a long practice of keeping crime statistics, however the administrative records collected and published by Department of Police and Office of the Attorney General are not presented in detail on the one hand, and are not classified and internationally made comparable on the other hand. Nepal needs to record crime statistics by using the internationally agreed concepts, definitions, analyzing techniques & methods and also adopt the internationally agreed classification system (i.e., International Classification of Crime for Statistical Purposes (ICCS). Strengthening crime associated administrative data by the use of ICT from data capturing stage to data dissemination is prime essential. Validation of the administrative data by conducting a victimization survey is also inevitable.

1. Introduction

Crime is an action or omission which constitutes an offence and is punishable by law of a country or territory. So, an act that is prohibited by law and can be punished by an authority charged with the enforcement of that law is termed as crime. The dimensions of crime are established by the criminal legal system of each nation. It is the criminal legal system that defines crimes and consequently designates individuals as offenders. The statistics related to it is crime statistics. The four main players of crime statistics in Nepal are Courts, Office of Attorney General, Police and offenders. Transnational differences in definitions of such widely- used terms as crime, offender, victim, suspect, charge or conviction are inevitable. Similar observations apply to data from the administrative records of the Police, Courts, Office of the Attorney General and Prisons. The range of data is wide, including not only data produced by the criminal justice system, but also data produced by other agencies necessary for understanding crime and criminal justice. Broadly, the uses of criminal justice statistics can be divided into three interdependent areas: administration, planning, and policy research & analysis. Obtaining and maintaining the commitment of stakeholders is a matter of concern.

* Director, CBS

"A stakeholder is a person or group of people who have a share or a personal or financial involvement in an enterprise or undertaking. In the case of a criminal justice statistics system, stakeholders are many and may include government officials, criminal justice personnel, the media, researchers, scholars and the public."[45]

The International Classification of crime for statistical purposes (ICCS) has classified crime data broadly into 11 sections and then divisions, groups, classes and finally crime activities. Nepal has not adopted this ICCS classification system to record crime statistics yet.

Various Acts are related to crime, one of them is Domestic Violence (Crime and Punishment) Act, 2008, which provides legal basis to collect crime statistics. Crime statistics for Nepal are compiled and published by the Nepal Police on quarterly basis as Crime Reports which include all offenses that have been reported to the police. The Nepal Police classifies major crimes into two main categories:

- Violent crime, including murder and criminal homicide, forcible rape, aggravated assault and robbery; and
- Property crime, including burglary, arson, larceny/theft, and motor-vehicle theft.

Besides Nepal Police, Office of the Attorney General and Courts also keep crime linked administrative records in Nepal. Central Bureau of Statistics publishes the crime related data in its regular publications each year that is obtained specially from Nepal Police.

Another form of crime that has surfaced in the last decade is Internet or Cyber-crime like software piracy and/or hacking etc. To control those criminal activities, the Electronic Transaction Act, 2006 and the Electronic Transactions Rules, 2007 are declared by Ministry of Information and Communication in Nepal. These statistics have also been public concern.

2. Objectives

This paper is envisioned to introduce crime statistics in Nepal. The major objectives of the paper in gunshots are as follows:

- To briefly describe crime related terms, data collection methods and crime statistics,
- To introduce internationally agreed classification system to record crime related activities in Nepal,
- To present the crime related data that can be made comparable crime levels and trends both within country and across countries,
- To highlight crime related SDGs indicators that are useful for monitoring and evaluating crime associated programs and activities,
- To illuminate challenges faced on compiling crime statistics,
- To shed light on the way forward to strengthen collection and compilation of crime statistics in Nepal.

45 UNSD, Manual for the Development of a System of Criminal Justice Statistics, p.3

Crime statistics are much helpful for policymakers, business societies, experts, police personnel, teachers and students as well as the persons who are associated in monitoring and evaluation of development plans, programs and projects.

3. Methodology

This paper is based on the study and analysing information or administrative data as well as review of relevant literature. The criminal justice statistics is closely associated to criminal justice system of a nation and itself develops and generates the criminal justice statistics. Generally, the players of the criminal justice mechanism are poised of five major justice constituents are police, prosecutors, courts, prisons and non-custodial measures. Individual constituents further can be broken down into sub-constituents resulting in a complex network of agencies concerned with crime, offenders and / or victims.

In the case of Nepal, four main players of crime statistics are Courts, Office of Attorney General, Police and Offenders.

4. Results and analysis

4.1 Classification system to record crime statistics

The International Classification of Crime for Statistical Purposes (ICCS) has been designed to record crime activities / data categorically by United Nations (UN). The system of classification of crime statistics is broadly grouped into 11 sections. These sections further divided into divisions; divisions into groups; groups into classes; classes into Crime Activities. The 11 sections are as follows:

1. Acts leading to death or intending to cause death
2. Acts leading to harm or intending to cause harm to the person
3. Injurious acts of a sexual nature
4. Acts against property involving violence or threat against a person
5. Acts against property only
6. Acts involving controlled psychoactive substances or other drugs
7. Acts involving fraud, deception or corruption
8. Acts against public order, authority and provisions of the State
9. Acts against public safety and state security
10. Acts against the natural environment
11. Other criminal acts not elsewhere classified

The broad and detailed structure of the International Classification of Crime for Statistical Purposes (ICCS) is listed below as an example:

Section 01 (Two digits)				Acts leading to death or intending to cause death
DIVISION (Four digits)	GROUP (Five digits)	CLASS (Six digits)	CRIME (Activities)	
0101				Intentional homicide
0102				Attempted intentional homicide
0103				Non-intentional homicide
	01031			Non-negligent manslaughter
	01032			Negligent manslaughter
		010321		Vehicular homicide
		010322		Non-vehicular homicide
0104				Assisting or instigating suicide
	01041			Assisting suicide
	01049			Other acts of assisting or instigating suicide
0105				Euthanasia
0106				Illegal feticide
0107				Unlawful killing associated with armed conflict
0109				Other acts leading to death or intending to cause death

The administrative data collected by Criminal Investigation Department (CID) of Nepal Police as well as Office of the Attorney General both have not followed this classification system to record crime related data yet.

4.2 Data collection, processing and analysis

Data collection methods for crime statistics

There are three main methods to collect crime statistics. They are as listed below:

I. Census Method – Full or complete count of the population e.g. Population Census
II. Survey Method – Count of only the representative part of the population. For example: Public Survey (to estimate amount of crime not reported to police), Victimization Survey, Self-report survey, Cause of death statistics and household surveys, etc.
III. Administrative Records – Official records or information in the form of data.

Nepal has a practice of collecting, processing and publishing administrative data on crime from two government organizations: Nepal Police and Office of the Attorney General.

Analysis of crime data[46]

Data Analysis should be usually limited to statistical presentation and technical explanation of the data. Whereas users repeatedly want explanatory details of the policy implications of statistical outcomes; an agency of criminal justice statistics may threaten its credibility and perceived neutrality

46 Ibid, p.33-34

by performing this type of analysis. Thus, policy analysis and data interpretation may be more suitably done by subject-matter specialists under the guidance of statistical experts.

A few basic questions that are helpful on analyzing statistical data and its presentation are as follows:

- Is crime really decreasing?
- How many homes are being broken into?
- How many people are victimized by strangers?
- Who is victimizing the children?
- Is the public satisfied with police services? Are courts "softer" on youth?
- Who is in prison?

Answers of the above questions will help in data analysis as well as presenting the actual data.

4.3 The basic terms used in crime data analysis

Descriptive statistics

Most of statistical analysis performed in Nepal is in the form of simple descriptive statistics, for example frequencies, percentages, rates and rates of change. These common statistics, as elucidated in this article below, can answer many elementary questions. For example:

- How many crimes were reported in a given year?
- What percentage of the total crimes reported were property offences?
- How many crimes were reported for every 100,000 adults in the population?
- What was the rate of increase in the number of crimes from one year to the next?

Counts and frequencies

Key outputs of criminal justice statistics system is expressed in a simple unit count i.e., number of crimes by types/urban or rural as well as classification of these units from simple to complex in nature i.e. theft to murder. Counts will represents just summing up of the cases in each category. The number of cases in each category represents the frequencies of the particular category.

Percentage representation is the most common form of reporting any data and so this is also equally applicable to crime data as well by being simple to calculate and are equally useful for representing the relative proportions of each category within a given class e.g. violent crime: 20% and non-violent crime: 80% out of total crime: 100%. But care should be taken while calculating percentage is that the denominator from which we are going to calculate percentage should be large enough (i.e., 50 or more depending upon the nature of study). To avoid ambiguous interpretation, the actual number of cases is also normally described along with percentages.

Crime rates

Crime rates are much usable for easy comparison of units across groups and / or over time. So, it is much useful for describing unit count of data. Crime rate is calculated with the ratio total number of crimes to total population expressed in lakh.

Crime rate = Total number of crimes / Total population **X** 100,000

There is much dilemma on calculation of rates on which unit of count to use as numerator and which to use as the denominator. These decisions must be taken by the intention of uses of data and are also shaped by the data that are available.

Change of crime rates

Change of crime rates or rate of growth of crime can be calculated by the following relation:

Growth rate = (Current period data – Base period data) / Base period data. It may be expressed in percentage as well by multiplying growth rate by 100. The following example will illustrate it better. Suppose, Nepal police had recorded 10,000 crimes in a year and the next year it has recorded 12,000; then rate of growth of crime will be equals to (12,000 – 10,000) / 10,000 = 0.20 or 20% growth per year.

4.4 Tabulation plan

Tabulation Plan is based on the decision of what type of data series to be used or demanded, variables classified or cross-classified requirements, classification system and values adoption, etc. The tabulation is accomplished based on these plans exclusively.

4.5 Other analytical techniques

More sophisticated analytical statistical techniques can be used for data analysis, for example correlation and regression analysis, derived indices etc. with the help of the experts from National Statistical Offices (Central Bureau of Statistics in case of Nepal) or from experts from universities.

5. Collection and dissemination of crime statistics in Nepal

The nature of the crime and the different fiscal year administrative data obtained from Nepal Police has been presented in absolute figures as well as in percentages in the Table 1.

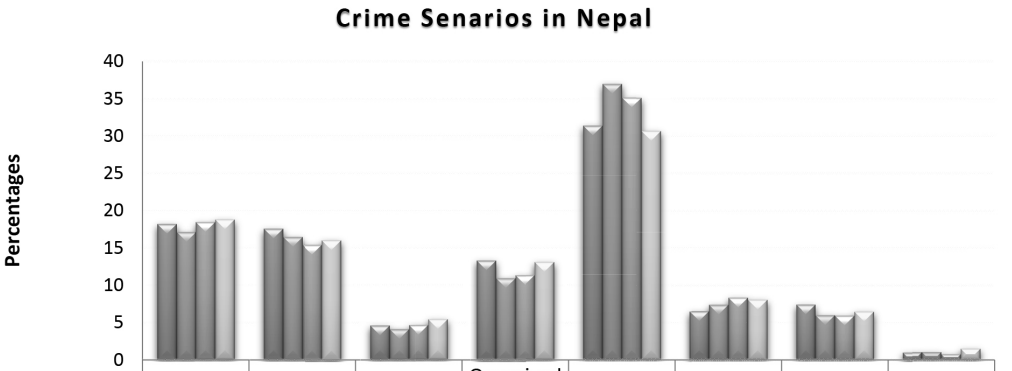
Table 1: Nature of crime in figures from FY 2069/70 to 2072/73 in Nepal

S.N.	Nature of Crime	FY 2069/70		FY 2070/71		FY 2071/72		FY 2072/73*	
		(No)	(% share)	(No)	(% share)	(No)	(% share)	(No)	(% share)
1	Life related	4117	18.19	4687	17.11	5172	18.43	4799	18.77
2	Suicide related	3974	17.56	4504	16.45	4332	15.43	4100	16.04
3	Theft related	1042	4.60	1128	4.12	1309	4.66	1391	5.44
4	Organized and economic crime related	3019	13.34	3002	10.96	3189	11.36	3351	13.11
5	Social crime related	7109	31.41	10133	37.00	9868	35.15	7850	30.70
6	Women and children related	1468	6.49	2016	7.36	2331	8.30	2051	8.02
7	Vehicle related	1678	7.41	1641	5.99	1667	5.94	1651	6.46
8	Miscellaneous	225	0.99	275	1.00	202	0.72	373	1.46
	Total	22632	100.00	27386	100.00	28070	100.00	25566	100.00

** Data based on dated from 2072 Shrawan to 2073 Jeshtha*

The graph shows that social crime is highest and is followed by life related crime. Suicide related crime is the third highest among the crimes in Nepal during mentioned fiscal year.

Figure 1: Crime scenarios from fiscal year 2069/70 to 2072/73 in Nepal



	Life related	Suicide related	Theft related	Organized and economic crime related	Social crime related	Women and child related	Vehicle related	Miscellaneous
FY 2069/70	18.19	17.56	4.60	13.34	31.41	6.49	7.41	0.99
FY 2070/71	17.11	16.45	4.12	10.96	37.00	7.36	5.99	1.00
FY 2071/72	18.43	15.43	4.66	11.36	35.15	8.30	5.94	0.72
FY 2072/73	18.77	16.04	5.44	13.11	30.70	8.02	6.46	1.46

Central Bureau of Statistics publishes crime related data each year in its Statistical Year Book and Statistical Pocket Book alternately.

Criminal Investigation Department of Nepal Police publishes crime related administrative data recorded in the Nepal Police on E-bulletin quarterly.

Similarly, Office of the Attorney General publishes crime related administrative data recorded in their offices / departments on yearly report which they submit to president of our country.

Besides it, Ministry of Law, Justice and Parliamentary Affairs has conducted Baseline Survey on Crime and published a book once in the year 2072.

6. Crime statistics related SDGs indicators

Sustainable Development Goal 16 is directly related to crime and crime statistics. The goal 16 deals with promote peaceful and inclusive societies for sustainable development, provide access to justice for all and build effective, accountable and inclusive institutions at all levels[47].

47 UN, Sustainable Development Goals Report, 2016

The indicators of the SDG 16 that are related to crime and crime statistics are as follows:

Indicator: 16.1.1 - Number of victims of intentional homicide per 100,000 population, by sex and age

Indicator: 16.2.1 - Proportion of children aged 1-17 years who experienced any physical punishment and/or psychological aggression by caregivers in the past month

Indicator: 16.2.3 - Proportion of young women and men aged 18-29 years who experienced sexual violence by age 18.

Indicator: 16.3.2 - Un-sentenced detainees as a proportion of overall prison population.

Indicator: 16.5.2 - Proportion of businesses that had at least one contact with a public official and that paid a bribe to a public official, or were asked for a bribe by those public officials during the previous 12 months.

Indicator: 16.8.1 - Proportion of members and voting rights of developing countries in international organizations.

Indicator: 16.9.1 - Proportion of children under 5 years of age whose births have been registered with a civil authority, by age.

Indicator: 16.10.1 - Number of verified cases of killing, kidnapping, enforced disappearance, arbitrary detention and torture of journalists, associated media personnel, trade unionists and human rights advocates in the previous 12 months.

Indicator: 16.a.1 - Existence of independent national human rights institutions in compliance with the Paris Principles.

7. Challenges of crime statistics

Internal as well as external challenges of crime statistics which are faced in Nepal are as follows:

- To produce reliable crime statistics of the country is the principal challenge in Nepal.
- It is because of measuring hidden phenomena: what is measurable is only what comes to light[48].
- Strengthening crime related administrative data by making it Information and Communication Technology (i.e., ICT) friendly is the second challenge.
- Complete reporting of the crime activities by citizens & recording exactly the same (without distorting the nature and quality of the crime) by concerned authorities (keeping administrative records) by following internationally agreed concept, definitions & classification system is the third challenge of it.
- Conducting victimization surveys and violence against women surveys to validating administrative data is the other challenge in this regard.
- Coordination among the organizations of crime data collectors and compilers are lacking.
- Data gaps not identified properly as well as emerging areas of crime should not visualized on timely is also challenge of crime statistics.
- Engendering crime statistics is the next challenge of crime statistics.
- Lack of training for the personnel involved in it is also matter of concern related to it.

48 UNODC, International Statistics on Crime and Justice, 2010

8. Conclusion

An act that is prohibited by law and can be punished by an authority charged with the enforcement of that law is the crime and the statistics related to it is crime statistics. Nepal has a long history of recording crime data, and the government agencies associated to crime statistics are Central Bureau of Statistics (CBS), Criminal Investigation Department of Nepal Police, Office of the Attorney General, Ministry of Law, Justice and Parliamentary Affairs, Prison and Courts. Coordination among these organizations is almost lacking in the case of data management. Crime activities recording system and statistics produced from the recorded data are neither followed internationally agreed concepts, definitions, classifications, analyzed, and nor internationally comparable yet. Administrative data management system of all concerned aforementioned players of crime statistics is poor in general. To enhanced the quality of the crime statistics, the aforementioned organizations should record and publish the statistics timely and frequently based on ICCS classification system so that it will be internationally comparable too because of trans-national nature of crime as well as there should be good coordination concerning the data management. Central Bureau of Statistics may play lead role of coordination mechanism among these organizations but upgrading the status of CBS to at least Secretary Level to lead effective coordination among data collector as well as compilers is must. Identifying data gaps and fulfilling the gap is necessary. Validation of the administrative data by conducting victimization survey and emerging areas of crime visualization is the demand of the time so that concerned authorities should take necessary action timely in this concern.

9. Policy recommendations and way forward

Crime statistics has key importance to maintain and promote peaceful and inclusive societies for sustainable development, provide access to justice for all and build effective, accountable and inclusive institutions at all levels[49].

The following vital recommendations for improving crime statistics are:

- Central Bureau of Statistics (i.e. National Statistical Office) should play a vital role in the coordination and share its technical expertise with the other concern agencies who are involved in involved in crime statistics by providing internationally agreed concepts, definitions, classification as well as analyzing techniques/methods. In addition, Nepal should start recording crime statistics by using internationally agreed classification system, i.e., the International Classification of Crime for Statistical Purposes (ICCS).
- Strengthening crime related administrative data by the use of ICT from the stage of data capturing to the data dissemination deploying the personnel from the Economic Planning and Statistics Service as well as validation of those administrative data by conducting victimization survey is the next most essential.
- Maintaining commitment and motivation of the concerned government organizations to initiate a strategic methodology to collect and analyze crime data is also inevitable.

49 UN, Sustainable Development Goals Report, 2016

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LABOUR STATISTICS

Anil Sharma*

Abstract

The United Nations System of National Accounts 1993 provided guidance on the production boundary which is taken as the basis for identifying economic activity. The concepts and definitions for capturing labour statistics are changing over time. The concept of economic activity adopted by the thirteenth International conference of labour Statistics (ICLS-1982) for the measurement of the economically active population has defined in terms of the production of goods and services as set by the System of National Accounts (SNA 1968). This concept was also revised in accordance with the revision of System of National Accounts (SNA 1993). Similarly, International classification of status in employment (ICSE) also changing the definition of employment or job. Accordingly, CBS is adopting the new concepts and definitions in its surveys. The data collection and analysis of labour statistics in Nepal largely follow the United Nation's guideline for obtaining comparable indicators among countries. The main objective of this chapter is to introduce on international concepts, definitions and methodologies followed by Central Bureau of Statistics (CBS) for producing labour statistics. The sources of Labour statistics are population censuses, household surveys and administrative records. The labour indicator's in SDG can be monitored using the information collected from labour force survey, living standard survey and population censuses. Even though there is increasing demand of yearly, quarterly or monthly labour statistics, the supply is largely in the ad-hoc basis and irregular.

1. Introduction

Labour statistics gives information on ratio distribution of population and labour in an economy. It gives sufficient statistics to analyze the effectiveness of country's labour policy. Policy makers formulate several policies that requires labour statistics for monitoring the policy impact on development programs. The first development plan to thirteenth development plan put high priority on employment which requires labour statistics to monitor the progress. For example, Eighth Plan (1992-1997) had maintained main objectives: bring about a gradual reduction in full and partial unemployment, produce skilled workers and create appropriate conditions for increasing employment opportunities at home and abroad. Similarly Ninth Plan and Tenth plan has also maintained a policy for poverty alleviation by employment promotion. Other three year interim plans also demand internationally comparable labour statistics. Central Bureau of Statistics follows the UN guidelines and practices for producing internationally comparable labour data. Hence, this chapter attempts to discuss key UN guidelines, practices, concepts and definition for producing labour statistics.

* Director, CBS

2. Objectives

The main objectives of this chapter are to introduce the following aspects which are used for generating labour statistics in Nepal.

- United Nation's practice on labour related concept and definition
- Methodology of producing major labour Indicators
- Brief information on International conference of labour Statistics (ICLS) resolution
- Major surveys and censuses as the source of key labour statistics in Nepal

3. Methodology

The methodology adopted for this chapter is based on the revision of various literatures particularly related to the practices and the production of the official labour statistics in Nepal. Labour related literatures like labour force framework, the concept and definition, ILO publications are also revised. Likewise, labour-related literatures in published books, chapters, government and non-government reports, plans and policy documents were examined.

4. Findings and analysis

This section constitutes findings and analysis of various concepts, definitions followed by CBS to produce labour statistics as per the changing concepts and definitions over time. CBS follows international definitions particularly recommended by the ILO in its surveys. Similarly, the calculation methodology which is followed and updated by CBS is discussed in this chapter.

4.1 Economic activity

The SNA 1993 included in its production boundary the following activities:

(a) the production of all individuals or collective goods or services that are supplied to units other than their producers, or intended to be so supplied, including the production of goods or services used up in the process of producing such goods or services;

(b) the production of all goods that are retained by their producers for their own final consumption or gross fixed capital formation;

(c) the production of housing services for own final consumption by owner-occupiers and of domestic and personal services produced by employing paid domestic staff.

4.2 Non-Economic activity

In contrast to the production of goods, the SNA excludes all non-market services carried out within the household. Even though the production of own-account household services has been excluded from the concept of work, it is considered useful to collect information on various non-work activities such as the following activities:

- Shopping for the household, cooking and serving food for the household.
- Caring old/sick/infirm and child minding (including feeding, child care, taking to school, etc.)
- Cleaning utensils of house, minor household repairs,
- Other volunteer/community services.

4.3 The one hour criterion

To measure the number of persons employed, employment is broadly defined in the labour force framework. The 13th ICLS resolution specifies that, for operational purposes, the notion of "some work" – the involvement is necessary to be categorized either by "paid employment" or "self-employment", should be interpreted as work for at least one hour during the reference period. This means that engagement in an economic activity for at least one hour during the reference period is sufficient for a person to be classified as employed on the basis of the labour force framework.

4.4 Production unit

Economic activities can be divided into three sectors of production units for labour statistics as follows:

(i) Formal sector

Corporations (including quasi-corporate enterprises), non-profit institutions, government units, unincorporated enterprises owned by government units, and those private unincorporated enterprises producing goods or services for sale or barter which are not part of the Informal Sector.

(ii) Informal Sector

All agriculture sectors and those non agriculture which are unregistered (private company) and involvement of less than 10 worker. (Recommended by Delhi Group and 17th ICLS).

(iii) Household

Households producing goods exclusively for their own final use and households employing paid domestic workers.

4.5 Areas of labour statistics

Indicators of labour statistics are linked and analyzed in connection with types of industries and occupations.

Industry: Industry is used to refer to the activity of the establishment in which at least an employed person worked. This activity is defined in terms of the kind of goods produced or services supplied by the unit in which the person works. Industries are classified according to International Standard Industrial Classification (ISIC) or Nepal Standard Industrial Classification (NSIC) in Nepalese context.

Occupation: Occupation refers to the type of work done by the person employed. The work is defined as a set of tasks and duties which are carried out by, or can be assigned to one person. All jobs were classified according to their occupation. All occupation was classified by using International

Standard Classification of Occupations (ISCO-88) or Nepal Standard Occupation Classification (NSOC) in Nepalese context.

5. Measuring some labour indicators

The calculation methodology which is followed by CBS is described below. This calculation methodology may change over time in accordance with the recommendations of ILO.

5.1 Economically active population (EAP)

The economically active population comprises all persons who supply labour for the production of economic goods and services as defined by the United Nations System of National Accounts during a specified time reference period.

Two useful measures of the economically active population are:

- Currently active population or labour force: measured in relation to a short reference period such as one week or one day. CBS uses one week reference period.
- Usually active population: measured in relation to a long reference period such as a year. CBS uses one year reference period.

5.2 Labour force

A person of the working-age population is in labour force who is classified during the survey reference period as 'employed' (including self-employed) or 'unemployed'.

Labour force = Employed persons (Including self-employed) + Unemployed persons

$$\text{Labour force participant rate} = \frac{100^* \text{ Labour force}}{\text{Working age group}}$$

5.3 Employment

A person is counted as employed if s/he did at least one hour's of **work or economic activity** or if s/he had a job attachment during the reference period.

$$\text{Unemployment rate} = \frac{100^* \text{ Employed population}}{\text{Labour force}}$$

5.4 Unemployment

All people in the working-age population who, during the reference period were

- Without work or economic activity,
- Currently available for work, and
- Seeking work

The unemployment rate can be calculated using the below formula:

$$\text{Unemployment rate} = \frac{100^* \text{ Unemployed population}}{\text{Labour force}}$$

5.5 Time-related underemployment:

Persons may be working less than normal duration for voluntary or involuntary reasons, but only persons involuntarily working less than normal duration are considered for inclusion among the Time-related underemployed.

5.6 Labour underutilization

A person defined as underutilization if he is satisfied one of given six components

a) Unemployment
b) Involuntary part-time work (Under Employment)
c) Inadequate earnings
d) Skill mismatch
e) Inactive discouraged worker
f) Other inactive person with labour force Attachment

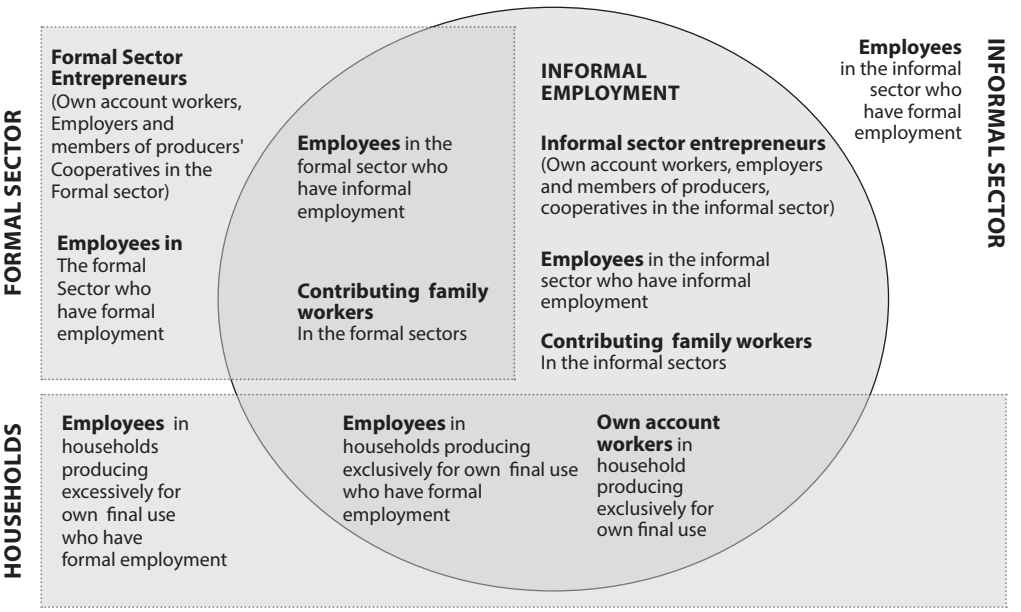
Labour underutilization rate can be calculated using the following formula:

$$\text{Labour force underutilization rate} = \frac{\text{Underutilization population}}{\text{Labour force within working age group}}$$

5.7 Informal employment

There are three sectors of industries namely household, formal and informal. All informal sectors worker are informal workers except who has a formal employment. Similarly all household sector workers are informal workers except who has a formal employment. However, formal sector workers who are working as a contributing family worker and those workers who have not formal employments are not defined as informal worker. Those employees are defined as not formal employment who has not appointment letter, not having paid annual leave or where the employer does not pay social security contributions. The detail classification of work activity on formal, informal and household is given in Figure 1.

Figure 1: Classification of work activities by form of sector



Source: Tite Habiyakare, Senior Statistician, ILO Regional Office for Asia and the Pacific, National Training Workshop on Labour Statistics Kathmandu (Nepal), 12 – 15 January 2015

6. Sources of labour statistics in Nepal

Labour statistics are collected through household surveys, establishment-based surveys or administrative records. Each methodology has separate concepts regarding coverage of workers, work situations and the control they have over the type and range of data which can be collected. Administrative records provide information registered as part of the administrative functions of an agency.

The main sources of household-based labour statistics are population censuses and sample surveys. Labour statistics were collected during the population census 1952/54 for the first time in Nepal. The indicators of labour statistics from population censuses and other surveys before 1998/99 were not internationally comparable. The details on labour statistics were collected through labour force survey in 1998/99 by CBS which was more scientific and produced internationally comparable labour statistics.

6.1 Population censuses

Population censuses in Nepal collect information on economically active or not active population and the definitions used for collecting labour related information changes over time.

Population census 1952/54 : All person who are working or job seeking (excluded unpaid family worker) are defined as economic active population during the previous 7 days from the day of enumeration .

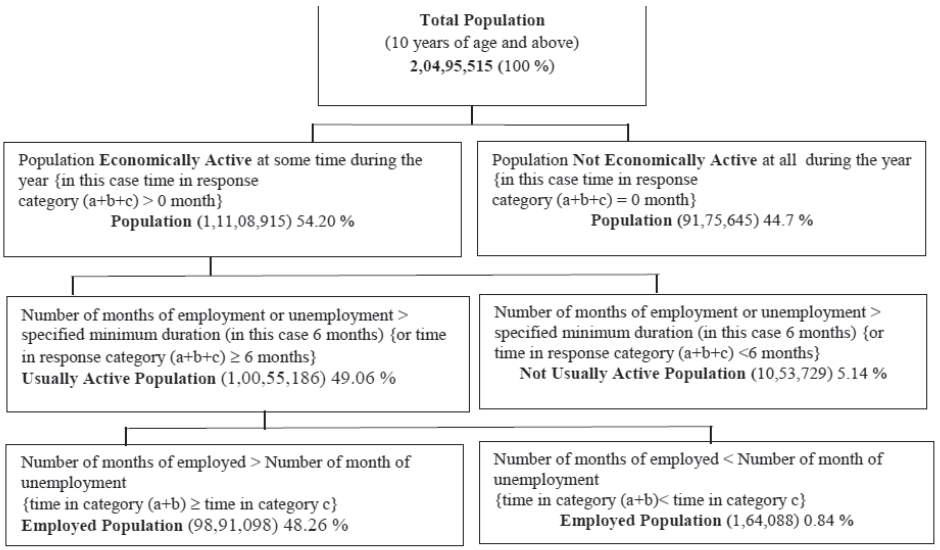
Population census 1961 to 1981 : Economic active population are those working at least 8 months with gainful work.

Population census 1991 : Economic active population are those working at least 1 month.

Population census 2001 & 2011 : Economic active population are those working or involved on usually in economic activity.

The Figure 2 provides criteria on how economically active population were derived in consistent with the ILO frame work from Population Census 2011.

Figure 2: Census 2011 data fitted in the ILO framework



Note : Population number is given in parenthesis; percentages given are per cent of the total population 10 years of age and over. To simplify the presentation response category 1,2 and 3 are denoted as 'a', 4 indicated as 'b', 5 is 'c', and 6,7 and 8 are 'd' in question of census 2011.

Question 22: What work [name] usually did during the last 12 months

1.Agriculture ; 2.Salary/wage ; 3.Own Eco. enterprises; 4.Extended Eco. ; 5.Social work; 6.Household work; 7. Study(student); 8. No work

Source: CBS. (2014).Population Monograph of Nepal Volume III, p.12. Dr. Rudra Suwal, Madhav Prasad Dahal, "Economically active population: Dimensions and dynamics"

6.2 Surveys

This section briefs about the surveys in which labour related information are collected.

Household Budget Survey

The first household budget survey was conducted by Nepal Rastra Bank in 1973/74. Since then five such surveys has been completed at regular interval of ten years. The second last and last survey was conducted in 2005/06 and 2013/14 respectively. Basically the main objective of these surveys was producing the consumer price index but indicators of employment are also produced in second last survey.

National Employment Survey, 1995/96

This survey was conducted by Central Department of Population Studies with assistance of UNFPA. This survey followed ILO's definition of employment with some modification but the definition of unemployment and inactive population in this survey was different than recommended by ILO.

Nepal Living Standards Survey

CBS conducted Nepal Living Standards Survey for the first time in 1995/96. The Second Living Standards Survey was conducted in 2003/04 which updated the poverty profile of the country prepared originally on the basis of the information provided by the first Living Standards Survey conducted in 1995/96. The third Nepal Living Standards Survey was conducted in 2010/11 which consists of multiple topics related to household welfare. All of these surveys had the component of labour statistics that collected the information on the status of labour to some extent.

Labour Force Survey

Nepal Labour Force Survey 2008 (NLFS II) is one of the important surveys in the arena of labour force statistics in Nepal. It updated various indicators of labour force statistics derived from the Nepal Labour Force Survey 1998/99 (NLFS I), which was the first of its kind in Nepal. Both surveys provided essential statistics for monitoring employment and labour market developments in Nepal. Also, the data provided by these surveys are instrumental to address various labour related issues of the country.

The NLFS II helped not only to update labour force statistics but also assisted to compare changes undergone in labour and labour market conditions in Nepal. The NLFS-I of 1998/99 survey adopted two stage stratified sampling scheme and enumerated 14,335 households from 720 PSUs which is equally allocated in Urban (360 PSUs) and rural (360 PSUs). However, NLFS II increased the number of PSUs to 800. The entire country was stratified into six strata – 3 strata from urban (Kathmandu Urban, Other Hill Urban and Terai Urban) and 3 from rural areas (Mountain, Rural Hill and Rural Terai). The PSUs were selected with equal number (400) from urban and rural areas. In the second stage, 20 HHs each from the PSUs were selected, totaling 16000 (15976) households to be surveyed. The both surveys were conducted throughout the year to mitigate the seasonal effect on the survey data.

The major labour statistics collected includes (i) economically active and inactive population (ii) labour force participant rate (iii) employed, underemployed and unemployed rate in informal or formal sector (iv) economically active rate based on 'usual' and 'current' activity. (v) Formal and informal employment rate. (vi) Labour underutilization rate (v) Hours spent in economic and non-economic activities, etc.

Annual Household Survey

Annual household survey (AHS) was conducted for the first time by CBS in 2012/13 with the assistance from UNDP. The primary focus of this household survey is updating the household consumption and current labour force statistics. After this survey, AHS has been regularly conducting every year. This survey also followed the definition of employment adopted in NLFS 2008. Some of the major indicators produced from Nepal Labour Force Survey and annual household survey are tabulated below:

Table 1: Major indicators of labour statistics of Nepal.

Indicator	NLFS 1998/99	NLFS 2008	AHS 2013/14
The current labour force participation rate (15 years and more)	85.8	83.4	81.1
Percentage of currently employed aged 15 years and above	84	81.3	78.4
Percentage of currently unemployed aged 15 years and above	1.8	2.1	2.7
Employment to population ratio (15 years and more)	84.3	81.7	Na
Time-related underemployment rate, as a percentage of currently active population aged 15	4.1	6.7	13.4
Labour underutilization rate	Na	30	27.8

Source: CBS, NLFS and AHS survey reports

6.3 Administrative data

The Labour Management Information System (LMIS) and Employment Service Center (ESC) of Department of labour are main sources of administrative data for labour statistics. The government has established three ESCs, at Labour Office Dhangadhi, Kathmandu and Biratnagar that help to maintain Labour management information system. The LMIS is supposed to provide the necessary basic information to design the program to eliminate unemployment by producing more skilled and competitive manpower in accordance with the national and international labour market with safety and healthy working environment in formal and informal sectors. Ministry of Labour and Employment published second "Labour Migration for Employment Status Report 2014/15" based mainly on the administrative labour data relating to "Obtaining labour permits", Number of labour migrant (see Table 2) etc. Similarly, Department of Foreign Employment, and Foreign Employment Promotion Board also generate and publish labour statistics. Other government agencies, for example public service commission, education service commission and other state own enterprises service commissions also keep records of vacant posts and announce for recruitment which are also a kind of labour statistics. These institutions publish their annual report that consists largely of numbers of applicants and other labour related information.

Table 2: Number of migrant worker applicants for labour permits, by destination country 2008/09–2014/15

Country Name	2008/09	2009/10	2010/11	2011/12	2012/13	2013/14	2014/15
Malaysia	29320	111366	106029	96272	157203	206327	194500
Qatar	54723	25612	35943	44883	85837	104068	105955
Saudi Arabia	45044	59549	62499	68103	86126	75010	89909
United Arab Emirates	24057	17778	24047	34503	51419	42593	43642
Kuwait	410	2286	7981	9165	7890	8971	7642
Bahrain	4326	1298	1877	3100	2535	1647	2244
Cyprus	0	0	0	41	363	1215	1306
Oman	1778	1862	1006	1884	2331	1148	1082
Macau, China	177	38	242	359	318	391	484
Jordan	12	202	130	558	520	440	385
Afghanistan	189	306	429	486	185	279	380

Country Name	2008/09	2009/10	2010/11	2011/12	2012/13	2013/14	2014/15
Republic Lebanon	1626	3008	41	2	181	447	181
Israel	1246	15	58	7	0	0	0
Libya	844	1659	291	0	0	0	0
Other country	134	221	404	667	703	735	1203
Total	163886	225200	240977	260030	395611	443271	448913

Source: MOLE, Labour Migration for Employment; A status report for Nepal: 2013/14

7. International Conference of Labour Statisticians (ICLS) Resolutions

Different units of United Nations such as International Conference of Labour Statisticians (ICLS), Delhi group, System of National Accounts Revision Group, International Classification of Status in Employment (ICSE) regularly work under different thematic areas to develop concepts and definitions, data collection methodologies and methods of producing various labour indicators. ICLS is one of the working groups of the statisticians that hold conferences time to time for updating new concepts and definitions according to SNA. Technical group headed by International Labour Organization (ILO) take decisions in accordance to the SNA concepts which is known as International Conference of Labour Statisticians (ICLS) resolution. Some Important resolution about labour statistics are given below.

- Introduced international standard by 6th ICLS (1947) and revised by 8th ICLS (1954) and 13th ICLS (1982)
- Focus on job creation as an economic challenge rather than unemployment as a social problem
- Measurement of pressure on the labour market in terms of current supply of labour (integrated measurement of employment and unemployment)
- The economically active population, employment, unemployment and underemployment are adopted by the 13th ICLS, 1982
- Resolution concerning statistics of employment in the informal sector adopted by the 15th ICLS, 1993
- Measurement of underemployment and inadequate employment situations adopted by the 16th ICLS, 1998
- Guidelines concerning a statistical definition of informal employment adopted by the 17th ICLS, 2003
- The concept of measurement of other forms of labour underutilization and decent work are adopted by 18th ICLS, 2008
- Resolution concerning statistics of Work, Employment & Labour underutilization adopted by 19th ICLS in October 2013.

The 19th ICLS adopted economic production as per 2008 SNA which clearly defines economic production as an activity carried out under the control & responsibility of an institutional unit that uses inputs of labour, capital, goods & services to produce outputs of goods or services. In this regard, ILO defined economic activity that is aligned with general production boundary as per SNA 2008 in which (i) activity must result in production of goods or services (ii) activity must fulfil 3rd person criterion and (iii) can be performed in any kind of economic unit – market, non-market or household producing goods or services for own final use.

8. Data gaps

Even though the demand of yearly, quarterly or even monthly labour statistics is increasing, CBS produces data relating to labour migration, foreign employment, forced labour, decent work, home based worker, vulnerable worker, labour indicators in an irregular basis. Other agencies also provide these indicators in an ad-hoc basis. Sample surveys do not provide reliable estimates of labour statistics at lower level of geographic disaggregation (e.g., district, municipality/VDC, wards).

9. SDGs indicators from labour statistics

In order to identify the data gaps on labour statistics, it would be better to look at the labour related indicators in Sustainable Development Goals (SDGs) which could be a guideline for designing Labour Force Surveys. The SDGs have the following labour related indicators:

SDG Indicator Target 1.3: c) Percentage of working-age persons without jobs receiving support

SDG Indicator Target 8.2: Growth rate of GDP per employed person

SDG Indicator Target 8.3: Share of informal employment in non-agriculture employment by sex.

SDG Indicator Target 8.4: Average hourly earnings of female and male employees by occupations (Wages/Gender wage gap).

SDG Indicator Target 8.5: Unemployment rate by sex, age-group and disability.

SDG Indicator Target 8.6: By 2020, substantially reduce the proportion of youth not in employment, education or training Percentage of youth (15-24) not in education, employment or training (NEET)

SDG Indicator Target 8.7: Percentage and number of children aged 5-17 years engaged in child labour, per sex and age group (disaggregated by the worst forms of child labour)

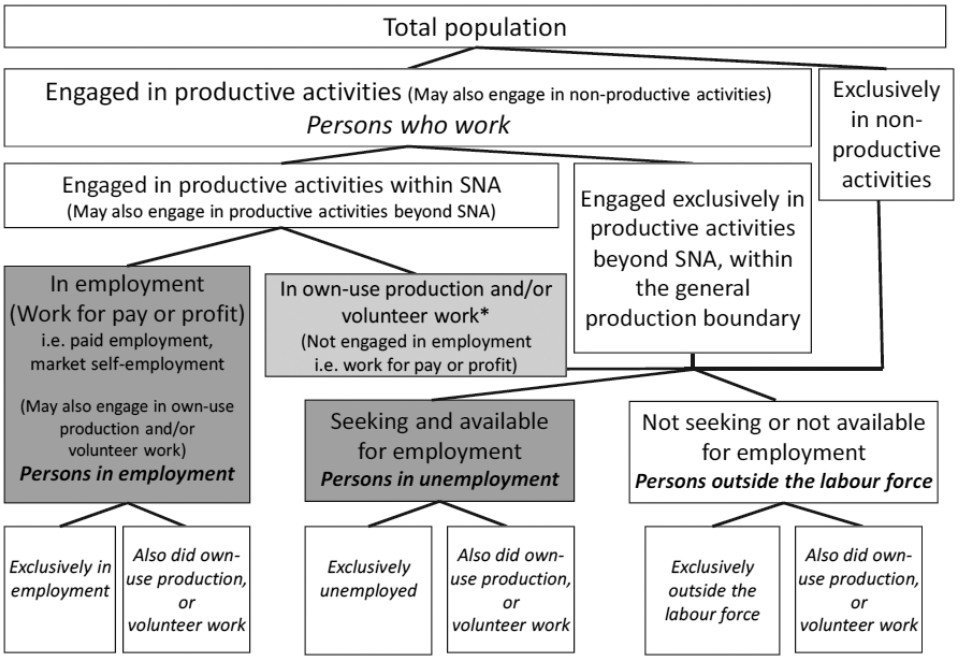
SDG Indicator Target 9.2: Manufacturing employment, in percent to total employment

SDG Indicator Target 10.4: Labour share of GDP, comprising wages and social protection transfers.

10. Way forward

Central Bureau of Statistics is major government data producer. CBS has always adopted the standard concepts and definitions according to the guidelines to maintain comparable labour indictors. New definitions of employed, unemployed, under employed and labour underutilization are adopted by ILO on the 19th ICLS conference. CBS is also adopting this new concept and definition in upcoming Labour Force Survey. The following Figure 3 gives clear idea about classification of the population by labour force status according to new concept.

Figure 3: Classification of the population by labour force status



* *New treatment based on proposed revised scope of employment.*

Source: ICLS-Report II-[STATI-130719-1] Page 17

According to new definitions of labour statistics which is adopting by CBS are mentioned below.

Employed: Person in the working-age population who, during the reference week, did one of the following are employed:

- worked for one hour or more for **pay or profit** in the context of an employee/employer relationship or self-employment
- worked without pay for one hour or more in work which contributed directly to the operation of a farm, business, or professional practice owned or operated by a relative
- had a job but were not at work due to: own illness or injury, personal or family responsibilities, bad weather or mechanical breakdown, direct involvement in an industrial dispute, or leave or holiday.

According to the resolution adopted in 19th ICLS (ILO, 2013), the employed comprises:

... all persons above a specified age who during a specified brief period, either one week or one day, were in the following categories:

(a) "Paid employment":

*(a1) "at work": persons who during the reference period performed **some work** for wage or salary, in cash or in kind;*

(a2) "with a job but not at work": persons who, having in already worked in their present job, were temporarily not at work during the reference period and had a formal attachment to their job.

(b) "Self-employment":

*(b1) "at work": persons who during the reference period performed **some work** for profit or family gain, in cash or in kind;*

(b2) "with an enterprise but not at work": persons with an enterprise, which may be a business enterprise, a farm or a service undertaking, who were temporarily not at work during the reference period for any specific reason.

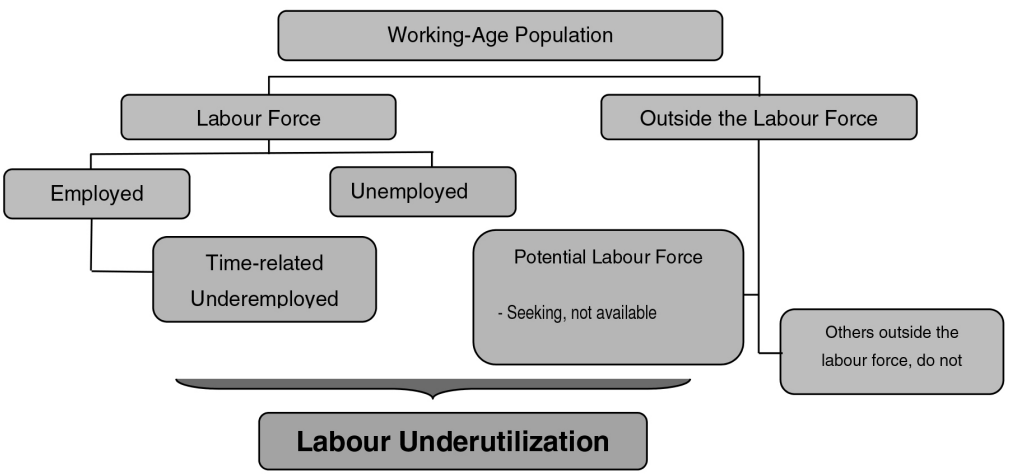
Unemployed: All people in the working-age population who during the reference week were without a paid job, available for work, and had either actively sought work in the past four weeks ending with the reference week, or had a new job to start within the next four weeks.

Underemployment: Employed people who work in part time and are willing and available to work more hours than they usually do.

Labour underutilization (unmet need for employment): New definition has removed the "inadequate earnings" criteria from previous calculation. The potential of labour force is used instead of discouraged worker and others inactive person with labour force attachment.

In order to enable more detailed monitoring of the labour market cycles, the components of labour underutilization can be categorized as time-related underemployment, unemployment and potential labour force as illustrated in Figure 4 below.

Figure 4: Components of underutilization relating to insufficient labour absorption



Source: ICLS, 2013

11. Recommendations

National development plans have given high priority for the production of labour statistics. But the collection of labour statistics is not regular and timely. Moreover, the labour information is collected by several agencies in different surveys but there is no any regular time frame for data collection and they are not following standard concepts and definitions to produce comparable statistics. To remove labour data duplication, maintain the timely production, narrow down data gap at disaggregated level and follow consistent definition, government should form Labour Bureau of statistics. The coherent supply of labour statistics can be maintained by making a labour survey calendar to address the labour market information. It is also necessary to monitor implementation of development plan and review labour related policy.

The concepts and definitions of employment, unemployment and under-employment developed by the ILO needs to be adopted. However; care should be taken while presenting those indicators especially from Nepali prospective where significant portion of our economic activity is based on subsistence agriculture. The underutilization of labour force would fit better in our context rather than unemployment rate alone while highlighting the outputs of the labour statistics in Nepal. Labour market information should focus on the user demand as there is a high flow of unemployed youth to unskilled foreign employment to contribute for labour force management.

12. Conclusion

Employment sector, unemployment rate, rate of wages, economically active population, skilled manpower, labour force participation rate, etc. are some of the major labour indicators produced in Nepal. These statistics are generated from different data sources like official recording system, different censuses and various household/establishment surveys. Official recording system has not followed international standards, concepts and definitions in some cases in Nepal so it might pose comparability problem between countries. Generally, primary data producing agencies follow the ILO's guidelines for comparing labour indictors among countries. These guidelines are regularly updated according to changing scenario of economic activity.

Central Bureau of Statistics is major government data producer. CBS has always adopted the standard concepts and definitions according to the guidelines to maintain comparable labour indictors. Nepal is facing a great challenge in managing its human capital especially to create employment opportunities for the youths. The user and supply sides of labour information has not been addressed much in our labour statistics compilation. The regular labour force surveys will supply timely information to policy makers who can intervene the labour related problems based on the labour force pattern in Nepal.

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INDUSTRIAL STATISTICS

Rajesh Dhital*

Abstract

Industrial statistics is the branch of economic statistics that deals with the production activity of industry. It provides information on economic activity, particularly in the areas of mining and quarrying; manufacturing; electricity, gas, steam and air-conditioning supply; and water supply, sewerage, waste management and remediation activities. Mostly, National Statistical Organization (NSO) is responsible for producing, analyzing and disseminating such industrial data. United Nation Industrial Development Organization (UNIDO) has been engaged in developing Guidelines and Methodology for common concept, definition and methodology to produce national industrial statistics. Basically, this article provides knowledge on industrial statistics and its sources, methodology, current status, practices and challenges in Nepal. In Nepal, altogether 10 Census of Manufacturing Establishment (CME) and five Surveys of Small Manufacturing Establishments (SSME) have been conducted by following the UNIDO's Guideline and Methodology. Apart from CBS, Department of Industry (DOI), Department of Cottage and Small Industry (DOCSI), Department of Mining and Geology, Office of Company Registrar (OCR), Nepal Electricity Authority (NEA), are the major responsible agencies for generating the industrial statistics.

1. Introduction

The economic growth of any nation is directly related to its industrialization. For measuring and monitoring the economic growth and making evidence based policy for industrial sector, industrial statistics is essential. Industrial statistics is the information on economic activities, particularly in the areas of mining and quarrying; manufacturing; electricity, gas, steam and air-conditioning supply and Water supply, sewerage, waste management and remediation activities. *A Business Register (BR) is an essential tool for industrial statistics for serving as a statistical frame for industrial surveys, managing an industrial census and controlling for under coverage and preparing the reliable industrial time series data for employment, value added and business demography in the industrial sector*[50].

This article provides an overview of official process of generating industrial statistics and its sources in Nepal. Economic census/survey, annual industry survey, industry registers, administrative records and reports, tax registers; non-tax administrative records are the major sources of Industrial Statistics. In Nepal, Central Bureau of Statistics (CBS), Office of Company Register (OCR), Department of Industry (DOI), Department of Mining and Geology (DOMG), Electricity Authority, Drinking Water Corporation, Land Revenue Offices are the major organizations for generating industrial statistics and updating business register.

* Director, CBS

50 UNIDO (2010), Industrial Statistics Guidelines and Methodology, Vienna

2. Objectives

The overall objective of this chapter is to provide ideas on industrial statistics to the readers. The specific objectives are:

- To provide information, how industrial statistics is collected and arranged in Nepal to meet policy development, monitoring and evaluation of national plan documents and
- To provide a reference material for academicians, researchers, entrepreneurs, planners, policy makers and bankers for industrial and economic analysis.

3. Methodology

The methodology adopted for this chapter is based on the revision of various literatures particularly related to the practices and the production of the industrial statistics in Nepal. In this regard, Industrial Statistics Guideline and Methodology, UNIDO; International Standard Industrial Classification (ISIC); System of National Account (SNA) and various statistical reports of censuses and surveys are reviewed. Also, the process and methods, production and management of the administrative data such as Office of Company Registrar, Department of Industry, Land Revenue Office and others are also reviewed.

4. Results and analysis

4.1 Industrial statistics: concept and definition

At the very beginning of the discussion on Industrial Statistics, it is indispensable to understand the terms economic activity, establishment, Industry and International Standards for Industrial Classification (ISIC). Here, in brief, we discuss on these terms which are frequently used when talking industrial statistics.

***Economic activity*:** In general, the term "economic activity" is the combination of actions carried out by a certain entity that uses labour, capital, goods and services to produce specific products (goods and services). An activity is characterized by (a) an input of resources; (b) a production process; and (c) an output of products[51].

***Establishment*:** An economic production is an economic activity, carried out under the responsibility, control and management of an institutional unit that uses inputs of labour, capital, and goods and services to produce outputs of goods and services". Such institutional unit is called establishment. *Thus establishments is an economic unit, which engages under a single ownership or control, in one or predominantly one kind of economic activity at a single physical location*[2]

***Industry*:** According to the System of National Accounts (SNA) and International Standard for Industrial Classification (ISIC), *an industry consists of a group of Establishments engaged in the same, or similar, kinds of activity.* At the most detailed level of classification, an industry consists of all the

51 UN, (2009), International Recommendations for Industrial Statistics 2008, New York

establishments falling within a single Class of *ISIC*. At higher levels of aggregation corresponding to the Groups, Divisions and, ultimately, Sections of the *ISIC,* industries consist of a number of establishments engaged on similar types of activities. For detail see *International Recommendations for Industrial Statistics 2008 or ISIC Revision 4*.

International Standards for Industrial Classification (ISIC): ISIC is the international reference classification of productive activities. Its main purpose is to provide a set of activity categories that can be utilized for collection and reporting of statistics according to such activities. *It consists of a coherent and consistent classification structure of economic activities based on a set of internationally agreed concepts, definitions, principles and classification rules.* The classification structure represents a standard format to organize detailed information about the state of an economy according to economic principles and perceptions.

In brief, industrial statistics are those statistics which provide information on economic activities, particularly in the areas of mining and quarrying; manufacturing; electricity, gas, steam and air-conditioning supply; and Water supply, sewerage, waste management and remediation activities. Although economic activity is understood to be much larger, including also the provision of services, the historical scope of "industry statistics" as a measurement of the goods-producing activities. Such information may cover indicators that describe the state and growth of individual goods-producing branches of the economy and indicators that describe the outputs of the physical production.

Internationally, in general "industrial statistics are statistics reflecting/indicating the characteristics and economic activities of units engaged in a class of industrial activities that are defined in terms of the International Standard Industrial Classification of All Economic Activities, Revision 4 (ISIC, Rev.4, United Nations, 2008)".

The recommendations made on scope of industrial statistics are relevant to a limited set of economic activities undertaken in the following areas:

a. Mining and quarrying (section B of ISIC, Rev.4);
b. Manufacturing (section C of ISIC, Rev.4);
c. Electricity, gas, steam and air-conditioning supply (section D of ISIC, Rev.4);
d. Water supply; sewerage, waste management and remediation activities (section E of ISIC, Rev.4).

Note: *Industrial activities in international waters, such as the operation of petroleum and natural gas wells, should be included if these activities are subject to the laws, regulations and control of the country concerned.*

4.2 Statistical units

A *statistical unit* is an entity or object or unit about which information is sought or required and for which statistics are ultimately compiled. It is the unit that provides the basis for statistical aggregates and to which tabulated data refer. The main statistical units of industrial statistics briefly described below.

Institutional units: An institutional unit may be defined as an economic entity that is capable, in its own right, of owning assets, incurring liabilities and engaging in economic activities and in

transactions with other entities. These units are the core units of the System of National Accounts. The main attributes of an institutional unit are: institutional unit has its own goods or assets, has a complete set of accounts including balance sheet of assets and liabilities. These units are able to take economic decision and engage in economic activities, able to incur liabilities on its own behalf.

Enterprise: An enterprise is the view of an institutional unit as a producer of goods and services. An enterprise is an economic transaction with autonomy in respect of financial and investment decision-making, as well as authority and responsibility for allocating resources for the production of goods and services. It may be engaged in one or more productive activities. The term enterprise may refer to a corporation, a quasi-corporation, a nonprofit institution (NPI) or an unincorporated enterprise.

Enterprise group: Enterprises under the control of the same owner form a group to achieve economic advantages such as economies of scale, control of a wider market and an increase in domestic productivity through more effective business management.

Establishment: An establishment is defined as an economic unit, which engages under a single ownership or control, in one or predominantly one kind of economic activity at a single physical location. For the censuses of manufacturing establishments, a manufacturing establishment is thus one predominantly engaged in manufacturing activity.

System of National Account, 2008 (SNA, 2008) defined "*An establishment is an enterprise or part of an enterprise that is situated in a single location and in which only a single productive activity is carried out or in which the principal productive activity accounts for most of the value added".* Further, the SNA defines industries in terms of establishments. An industry consists of a group of establishments engaged in the same, or similar, kinds of activity.

4.3 Data items

The UN International Recommendations for Industrial Statistics, 2008 (IRIS, 2008) provide an extensive list of data items proposed for inclusion in Industrial census and Surveys, along with their definitions. A list of basic data items that may be included in the census and survey are given in the Table 1.

Table 1: Basic data items that may be included in the census and survey

SN	Data Items (basic modules)	Data Items (Supplementary modules)
1	Identification	Quantity and value of major materials used
2	Persons engaged, employment, wages and salaries	Quantity and value of production of items
3	Sales, income from services and other revenue	Production capacity and its utilization
4	Expenditures, taxes and subsidies	Changes in sales and profitability
5	Changes in stocks and inventories	Major problems encountered in doing business
6	Profits and their appropriation	Research and development
7	Capital formation	Orders
8	Quantity and value of fuels used and produced	Traded goods, trade margin calculations
9	Quantity and value of electricity used and produced	
10	Quantity and value of water used and produced	

Above mentioned basic data items for those units that maintain their accounts, otherwise the data items in the questionnaire should be limited for which information is available. With this view, two basic questionnaires are recommended, one for large units and the other for small units. For details see *"Industrial Guideline and methodology, UNIDO"*

4.4 Indicators of industrial statistics

Indicators are policy-relevant statistics that provides an indication of the conditions in and the functioning of any segment of the economy, including the industrial sector or its units. Here, indicators are classified into two groups (a) Principal indicators and (b) performance indicators.

a. Principal Indicators: Principal indicators can be any information that shows the status of a unit or sector. Some examples of the Principal indicators of industrial sectors are:

a. Number of establishments/enterprises
b. Number of persons engaged
c. Number of employees
d. Wages, salaries and other benefits
e. Value of fixed assets
f. Value of output
g. Value of input
h. Value added

b. Performance indicators: Performance indicator can be any ratio that summarizes two or more important measurements and that is tied to the performance of a unit or a sector. Some examples of important performance indicators are:

1. Growth rate:
a. Value added growth
b. Employment growth

2. Ratio indicators:
a. Output Input ratio
b. Input as a percentage of output
c. Output per person employed
d. Value added per person employed
e. Value added output ratio
f. Value added per unit of capital
g. Ratio of orders received to shipment

3. Share indicators:
a. Share of industrial activity value added in total value added
b. Employment in industrial activity as a share of total employment

4.5 Sources of Industrial Statistics:

Primarily, Industrial statistics are obtained through two sources, primary and secondary. Primary sources are economic census and survey, Establishment census and survey. The secondary sources are

various administrative records and report of different concerned government and non-government agencies and authorities which are briefly describe in the heading *4.7 Analysis and result*.

4.6 Industrial statistics in Nepal

Though, Central Bureau of Statistics (CBS) has mandated for collecting, processing, analyzing and disseminating the industrial statistics, Office of Company Registrar (OCR), Ministry of Industry (MOI), Department of Industry (DOI), Department of Cottage and small Industries (DOCSI), Department of Mining and Geology (DOMG), Federation of Nepalese Chambers of Commerce and Industries (FNCCI), Department of Custom(DOC), Department of Inland Revenue (DOIR), The Confederation of Nepalese Industries (CNI) and Nepal Investment Board are also responsible and generating industrial statistics. The industrial statistics generating by them are briefly described below.

Central Bureau of Statistics

National Census of Manufacturing Enterprises (NCME) and Surveys of Small Manufacturing Establishments (SSME) are the two primary sources of industrial statistics (for manufacturing sectors) by CBS in Nepal. These census and survey are the regular periodic statistical operation for collecting, managing and disseminating data on the manufacturing sector. CBS has been conducting manufacturing census since 1964/65 and publishing its statistics. After onward, in every five year, CBS has been conducting manufacturing census. Altogether 10 manufacturing censuses were conducted and the 10th census was conducted in 2011/12. Likewise, the first Survey of Small Manufacturing Establishments (SSME) was conducted in 1972/73. After onward in every 10 year, CBS has been conducting SSME. Altogether five SSME were already conducted. The 5th SSME was conducted in 2008/09. Besides, CME and SSME, CBS has been collecting limited industrial statistics in Living Standard Survey (NLSS), Labour Force Survey (LFS), Population and Housing Census and in other ad-hoc survey. For more detail see website: http://www.cbs.gov.np

Objective of NCME and SSME

The overall objective of the NCME and SSME is to collect process and disseminate statistics of operational manufacturing establishments engaging ten or more (in SSME less than ten persons) in the reference period. For specific objectives of the NCMEs and SSMEs see the publication of CBS: *National Census of Manufacturing Establishments and Survey of Small Manufacturing Establishments Nepal*.

Scope and Coverage

The scope and coverage of the CME is "all units involved in manufacturing activities defined in the Section C of NSIC/ISIC and engaging 10 or more persons and registered in any government body, where ever they may be located in the entire territory of the country". Likewise, the scope and coverage of the SSME is "all units involved in manufacturing activities defined in the Section C of NSIC/ ISIC and engaging less than 10 persons and registered in any government body, where ever they may be located in the entire territory of the country".

Methodology

The CBS carried out the entire work of planning, questionnaire design, manual preparation, training, supervision, data entry, editing, processing and disseminating the result of the NCME and SSME.

The information collected by various CMEs and Surveys follow the international conventions, practices, concept, definition, guideline and methodology. Particularly, "Industrial Statistics Guideline and Methodology, UNIDO" and "International recommendation for Industrial Statistics, Statistical Division, UN", are used as the guideline and procedure for conducting the Industrial census and survey.

The establishments enumerated were classified according to the Nepal Standard Industrial Classification (NSIC) which is corresponding to *"International Standard Industrial Classification (ISIC4)".* Particularly, for conducting census and survey, questionnaires were designed to collect information of manufacturing establishments covering all the data items recommended for inclusion in Industrial census and Surveys.

The overall picture of the manufacturing sector

The current status of the manufacturing industries is best described by the size of the establishments, number of employees, wages/salaries, investments, inputs, outputs, and value added. In terms of size of the establishments and its employees, Table 2 shows that the manufacturing sector had its best year in 1991/92, declined in the census years 1996/97, 2001/2002, and 2006/07, and started a cautious recovery by the year 2011/12".

Table 2: The principal indicators of last five NCMEs

Principal Indicators	2049 (1991/92)	2054 (1996/97)	2059 (2001/02)	2064 (2006/07)	2069 (2011/12)
Total Number of establishments	4,271	3,557	3,213	3,446	4,076
Total Number of persons engaged	223,463	196,708	191,853	177,550	204,360
Total Number of employees	213,653	187,316	181,943	169,891	194,989
Total wages, salaries and other benefits ('ooo Rs.)	3,348,493	4,058,069	6,389,661	8,044,096	16,440,763
Value of fixed assets at the end of the reference period ('ooo Rs.)	20,067,126	26,491,045	40,371,381	78,889,352	119,728,060
Value of input during the reference period ('ooo Rs.)	20,937,000	34,868,272	69,484,824	115,304,387	241,767,640
Value of output during the reference period ('ooo Rs.)	33,086,808	54,930,649	95,096,951	156,305,650	322,551,699
Total value added during the reference period ('ooo Rs.)	12,149,808	20,062,377	25,612,127	41,001,263	80,784,059

1. Nepal's manufacturing sector did not perform as the engine of growth. It is the smallest in the south Asia region.
2. The share of manufacturing in the GDP gradually declined from 9.0 per cent in 2000/01 to 6.2 per cent in 2012/13.
3. Apart from a declining contribution to the total GDP, the manufacturing sector also retreated towards more basic industries, e.g., food and beverages.
4. The MVA/Output ratio by census year showed a continuous decline in each CME year.

(For detail see analytical report "Development of Manufacturing Industries in Nepal, 2014", CBS).

Department of Industries (DOI) and Department of Cottage & Small Industries (DOCSI)

Nepal has institutional and legal framework for registration of company, private firm and partnership firm. Public companies, private companies and company established with an objective of not distributing profits/dividends are registered according to Company Act 2063 by OCR. Additionally, partnership and private firms need to register either in DOI or DOCSI under Ministry of Industry or in Department of Commerce under Ministry of Commerce and Supplies, based on the nature of their business.

DOI has been generating and publishing Industrial Statistics since two decades. Industrial statistics publish by DOI are useful for making and updating Business Resister. It is also useful for academicians, researchers, entrepreneurs, planners, and policy makers for industrial and economic analysis. This publication basically provides industrial demography: List of industries registered, Number of industries by category and scale, Number of industries by district, List of industries Approved for Foreign Investment category and scale, Industries Approved for Foreign Investment by Country of Origin, Joint Venture Industries, Registration of Industrial Property (Trademark, Patent & Design), List of Initial Environmental Examination (IEE) Approved Industries, Revenue Accumulation to the Department of Industries and others related information. Visit website: http://www.doi.gov.np/en

DOCSI has mandated for registering private firms and partnership firms engaged in (trade) and industry and those classified as cottage and small industries engaged production of goods and other related provisions in order to maintain the convenience and economic interest of general people. Thus, DOCSI has also generated and disseminate industrial statistics through its website as well as in hard copy. Basically, number of industries registered under the DOCSI by category, ownership, size and scale are available and very useful. Visit website: http://www.dcsi.gov.np/en

Office of Company Registrar (OCR)

Public companies, private companies and company established with an objective of not distributing profits/dividends are registered according to Company Act 2063 by OCR. OCR Nepal website comprises data regarding company registration since 2002 and the data is available for everyone to download and reuse in CSV and XML format. These industrial data are essential for making and updating Business Register and useful for academicians, researchers, entrepreneurs, planners, and policy makers for industrial and economic analysis. Visit website: *www.ocr.gov.np/index.php/en*

Department of Mines and Geology (DOMG)

DOMG is the government organization responsible to conduct various types of geo-scientific investigations and mineral exploration throughout the country for uplifting living standard of people through rapid industrialization by utilization national mineral resources. DOMG conduct several activities under two development projects: Mineral Exploration and Development, and Geo-scientific Survey and Research. DOMG publishes 'Annual Report' providing various type of statistics regarding to the mineral exploration and quarrying. Mining license list, royalty collection and much other mining and quarrying related information can be found on this annual report see: *www.dmgnepal.gov.np*

Nepal Electricity Authority (NEA)

NEA was incorporated on 16 August, 1985 under the Nepal Electricity Authority Act, 1984. The principal objectives of NEA include generation, transmission and distribution of adequate, reliable and affordable electric power by planning, constructing, operating such facilities in Nepal's power system. NEA basically provide the statistics on availability of energy and its utilization, energy sales and its revenue, Expenditure, and load forecast through annual report. Report also provides the list of

electric generation power plants with its capacity and projects, Thermal power plants with its capacity. Likewise, it provides the statistics on under construction plants, planned and proposed plant with their capacity, existing High Voltage Transmission Lines & Substations, existing grid sub-station, and many others. For detail see the NEA website: *www.nea.org.np*

Besides, the above mentioned agencies Department of Inland Revenue, Nepal Drinking Water Supply Corporation, FNCCI and CNI are also generating and publishing related industrial statistics. These agencies publish the annual report with related and concerned industrial statistics. For detail visit website *http://cnind.org/*

5. Sustainable Development Goal (SDG) and its indicators

SDG is the Post 2015 Global Development Agenda. Countries are now focusing on the need of this SDG's indicators for monitoring progress and knowing the level of economy through their national statistical programmes.

In Nepal SDGs indicators of industrial sector has been generating and publishing by using availability of industrial statistics and information. Due to data gap, all industrial indicators described in Goal 9 of SDGs could not generate. Those indicators are indispensable for monitoring the SDG indicators itself and knowing the status of industrial sector as well as the development level of economy of the country. Some industrial indicators described in Goal 9 of SDGs are given in Table 3:

Table 3: The targets and its priority indicators of goal 9 of industrial sectors

Target 9.1	Indicator 9.1.1: Percentage share of people employed in business infrastructure (consultancy, accounting, IT and other business services) in total employment.
Target 9.2	Indicator 9.2.1: MVA (share in GDP, per capita, % growth)
	Indicator 9.2.2: Manufacturing employment (share of total employment and % growth).
Target 9.3	Indicator 9.3.1: Percentage share of (M) small scale industries' value added in total industry value added.
	Indicator 9.3.2: % of SMEs with a loan or line of credit.
Target9.4	Indicator 9.4.1: Intensity of material use per unit of value added (international dollars).
	Indicator 9.4.2: Energy intensity per unit of value added (international dollars).
Target 9.5	Indicator 9.5.1: Research and development expenditure and employment.
	Indicator 9.5.2: Percentage share of medium and high-tech industry value added in total value added.
Target 9.a	Indicator 9.5.3: R&D expenditure as percentage of GDP.
	Indicator 9.a.1: Annual credit flow to infrastructure projects (in International Dollar)
Target 9.b	Indicator 9.a.2: Percentage share of infrastructure loans in total loans
	Indicator 9.b.1: Aggregate value of all support mechanisms for technology and innovation (in International Dollar, % of GDP)

6. Major issues and challenges

- Industrial statistics of Nepal could not cover all the industrial economic activities as recommended for industrial statistics, 2008. Hence it is the challenge to cover the all the industrial economic.

- It is believed that Economic Census and Establishment Census are the "gold standard" for updating or populating a Business Register and capturing the entries and exits of the industry. In Nepal, proper Business Resister has not been prepared till now and it is a great challenging issue ahead.
- The nature of economics activities are dynamic, so developing a good sampling frame of economic establishments is generally the most challenging part of planning and conducting Economic Surveys.
- During the census and survey period, enumerators of the statistical agency face the difficulty to enter establishments where security guards are told to keep out visitors. The statistical agencies have the legal authority to enter and deliver questionnaires in the establishments but not in practice, institutional authority could not utilize its legal authority. In such a case enumerators send the questionnaire through the guards to the senior management. Management could not response properly in time and do not return complete fill up questionnaire and need to be revisiting them many times. This create problem and take a long time for data processing and dissemination the data, so it is the great challenge for the establishment census and survey.

7. Policy recommendations

- In order to generate good industrial statistics proper Business Register should be in place as soon as possible and should be updated as required.
- Establish a sampling frame of enterprises and establishments for different industrial as well as economic survey and provide a unique permanent identification number for each enterprise and establishment. This should be shared with other government agencies, which are sources of information for the Business Register, such as MOI, MOF and CBS for statistical purposes.
- Strong coordination between concerned agencies should be made and shared industrial informational and statistics, particularly with CBS in order to generate and publish industrial statistics.
- Legal provision should be made for obtaining industrial data from establishments through system itself for statistical purposes.

8. Conclusion

On the basis of *international recommendation for the industrial statistics, 2008* and industrial statistics status and its practices in Nepal described above has not cover all the industrial economic activities. Economic census and Business Resister are urgently needed for Industrial Statistics. With the absence of complete list of industrial business units, it is difficult to manage and control under coverage. Census and survey of manufacturing industry covered only those establishments which are registered in any government body. Those manufacturing industries operated without registration and operated by household level could not be captured. High frequency data which are needed for the National Accounts purpose, policy and decision makers as well as planners, are not available.

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TOURISM INFORMATION SYSTEM OF NEPAL: CURRENT STATUS, CHALLENGES AND POSSIBLE WAYS FOR IMPROVEMENT

Sharad Kumar Sharma (PhD)*

Abstract

Nepal has been getting benefit from international tourism. It has been recognized as an important sources of revenue for economic and social development. However, due to the absence of adequate tourism information system, a true impact of tourism on social and economic development is not known. In this paper current status and problems faced by Nepalese tourism information system are briefly described and possible ways for improvement are suggested. The information described in this paper is based on review of literatures from published journal articles, government and non-government reports, plans and policy documents. The literatures show that Nepal has been a major destination for international tourist. Even though foreign exchange earnings from tourism have been increasing, true picture of tourism sector contribution in national GDP is unknown. Various plans and policies have clearly spelled out to develop tourism satellite account for sustainable monitoring the contribution of tourism sector in national GDP. Government of Nepal is committed to devise and effectively implement policies to promote sustainable tourism that increase three million tourist arrivals and creates job so as to attain Sustainable Development Goal. Absence of tourism information system equipped with qualified human resources has been a major challenge to monitor the tourism sector progress. It is concluded that development of an integrated tourism information system and tourism satellite account is essential for monitoring the tourism sector progress and evaluate impact of tourism in national development.

1. Background

Nepal has been a key tourist destination since it is open for international tourism in 1951. After the successful summit of Mount Everest first time by Edmond Hillary and Tenzing Norgye Sherpa in 1953, number of tourists visiting Nepal for expedition to Mount Everest and other peaks was significantly increased. Private sector came forward in tourism business in organized manner and started forming tourism business after 1960s (MoCTCA, 2009). As of 2015, more than 5,000 tourism establishments including hotel, home stay, trekking, rafting, paragliding, ultra-light, skydiving and aviation agencies have been providing tourism services and these agencies are officially registered at the Department

* Director, Ministry of Health

of Tourism. It is recorded on an average about 800,000 international tourists visit Nepal every year (MoCTCA, 2016). Although tourism sector has been identified as an important vehicle for economic and social development, existing tourism information system is not adequate to measure true impact of tourism in Nepal.

2. Objectives

This paper aims to describe output and impact indicators specified in existing plan and policies. This paper also aims to explore current system of collecting information required to measure the indicators and problems faced in computing the information. Finally, this paper provides some recommendations to develop an integrated tourism information system which is able to provide quality data to monitor tourism sector impact.

3. Methodology

This paper is based on review of literatures from published journal articles and web-based literature. In addition, grey literatures such as books, book chapters, government and non-government reports, and plan and policy documents were examined. Some literatures were also searched from Google scholar using key terms such as tourism information system, tourism satellite account, tourism strategic plan, tourism policy etc. All relevant literatures accessible online were download and screened. Only the relevant information was reviewed. The results were synthesized using rapid review technique.

4. Results and analysis

4.1. Tourism related policy, plan and programs in Nepal

Government of Nepal has made a concentrated effort to plan and develop tourism sector since 1955, when the first five year development plan 1956-1960 was formulated which had identified tourism development opportunities and infrastructure requirements (MoCTCA, 2015). Tourism Development Board was the first national tourism organization in Nepal which was formed in 1957 and the Royal Nepal Airlines Corporation was created in 1958. The Department of Tourism was established in 1959 and the first legislation involving tourism came into force in 1962. In the third five year plan period (1966-1970), tourism sector was considered as an important source of foreign currency generation through the international tourist arrival. During this plan period, tourism development activities such as tourism infrastructure development and promotion of tourism at the international-level were included. Similarly, a tourism development committee was formed to prepare National Tourism Master Plan, which was formulated in 2072 (MoCTCA, 2015).

The 10 year Tourism Master Plan had set goals of increasing foreign exchange earnings, generating employment and creating income opportunities. Sightseeing tourism, trekking tourism, recreational tourism, and international pilgrimage were identified as tourism products on focus and recommended developing a Nepal tourism Brand (Sharma and Shrestha, 2012). The plan had also suggested developing Pokhara as a second tourism hub after Kathmandu, and Chitwan and Lumbini as major tourism pillars. As per the recommendation of the tourism master plan, Ministry of Tourism was established in 1976 so as to manage, regulate and develop the tourism sector. Subsequently, Tourism

act 2035, Foreign Investment and Technology Transfer Act (2049), The National Aviation Policy (2050), The National Civil Aviation Act (2053), the Nepal Tourism Board Act (2053) and other several policies and acts were introduced with the aim of management and development of tourism sector (MoCTCA, 2015). Despite the significant progress towards developing plans, policies, and acts, only a few activities recommended by the Master Plan were actually implemented.

Viewing this slow progress in mind, Nepal Tourism Policy 2052 was drafted in 1995 with the objective of developing tourism as main source of national income and as means to improve economic condition of Nepalese people. The Tourism Policy 2052 was further revised and Nepal Tourism Policy 2065 was brought in to operation in 2009 (MoCTCA, 2008). Similarly, Ministry of Culture, Tourism and Civil Aviation, in collaboration with private sector formulated Nepal Tourism Vision 2020 in 2009. Aim of the Tourism Vision 2020 was to bring 2 million international tourists every year and generate one million employments in tourism sector (MoCTCA, 2009). In Nepal, current tourism sector activities are guided by the Nepal Tourism Policy 2065, Nepal Tourism vision 2020 and 14th three year plan (National Planning Commission, 2016).

4.2 Monitoring and evaluation of tourism sector

Monitoring and evaluation is very important for effective implementation of any policy, plan and programs. Therefore, types of indicators required to monitor tourism activities, system of collecting data to calculate the indicators, challenges faced while institutionalizing the tourism information system and possible ways for improvement are discussed here in brief.

Up to now reliable system of monitoring progress of tourism activities has not developed. However, under the Ministry of Culture, Tourism and Civil Aviation, a Statistics Section has been established with limited human resources (one senior Statistical Officer, one Statistical Officer and one Computer Officer). MoCTA publishes Tourism Statistics every year using the primary and secondary data. The report contains data generated from the Department of Tourism (DoT), Civil Aviation Authority of Nepal (CAAN), Nepal Rastra Bank (NRB), Department of Immigration (DoI), Department of Archeology (DoA), Mountaineering Association of Nepal, Nepal Academy of Tourism and Hotel Management (NATHM), Central Bureau of Statistics (CBS) and other government and non-governmental agencies working in tourism sector. The Tourism Statistics is the main source from which the key tourism indicators are published. However, data published in the Tourism Statistics has various limitations in terms of completeness, timeliness and reliability issues. To adequately monitor the tourism program following strategies have been envisioned in Tourism Policy 2065 in terms of development and use of tourism information system in Nepal (MoCTCA, 2008).

- Use of information technology in mapping and publicizing new and existing tourist places so as to attract tourists
- Give priority to establish national and international communication networks to increase facility of accessing air tickets, booking of hotel, travels and tours through the tour operator for international tourists willing to visit Nepal
- Develop and strengthen national tourism information system to integrate and computerize tourist information generated by various tourism sectors
- Data related to new concepts and ideas related to tourism are regularly collected, analyzed and disseminated
- Strengthen existing tourism data collection, analysis and dissemination system

- Develop new system of collection, management, analysis and dissemination of internal and Indian tourist
- Ensure that information generated by tourism information system are reliable, timely, complete and are of good quality and that the information is used in decision making process
- Develop Tourism Satellite Account System so as to measure the contribution of tourism sector in National Gross Domestic Product (GDP)

Nepal Tourism Vision 2020 aims to bring two million international tourists every year and to generate one million new employments in tourism sector. Therefore development of Tourism Satellite Account is very critical to measure tourism sector impact on national GDP (MoCTCA, 2009). Furthermore, to meet the Sustainable Development Goal (SDG), Nepal is committed to devise and implement policies to promote sustainable tourism that creates jobs and promotes local culture and products so that at least 3 million tourists visit Nepal every year by 2030 (National Planning Commission, 2015). Despite the commitments shown in National Tourism Policy to strengthen tourism information system, the activities have not fully implemented. As a result, reliable data is not available to estimate key indicators identified to monitor tourism sector progress.

National Tourism Statistics published every year by MoCTCA indicate that there has been gradual increase in tourist arrival in Nepal and reached to highest level at around 800000 in 2012 and is in decreasing trend thereafter (Figure 1). However at the same time, foreign exchange earnings from tourism is increasing (Figure 2) (MoCTCA, 2016). Generating one million new employments in tourism sector by 2020 (MoCTCA, 2009) is also difficult, because, tourism employment survey conducted by MoCTCA in 2014 shows that only about 138000 people are directly employed in tourism sector (MoCTCA, 2014).

Figure 1. Trend of Tourist Arrival (Source: Tourism Statistics 2014)

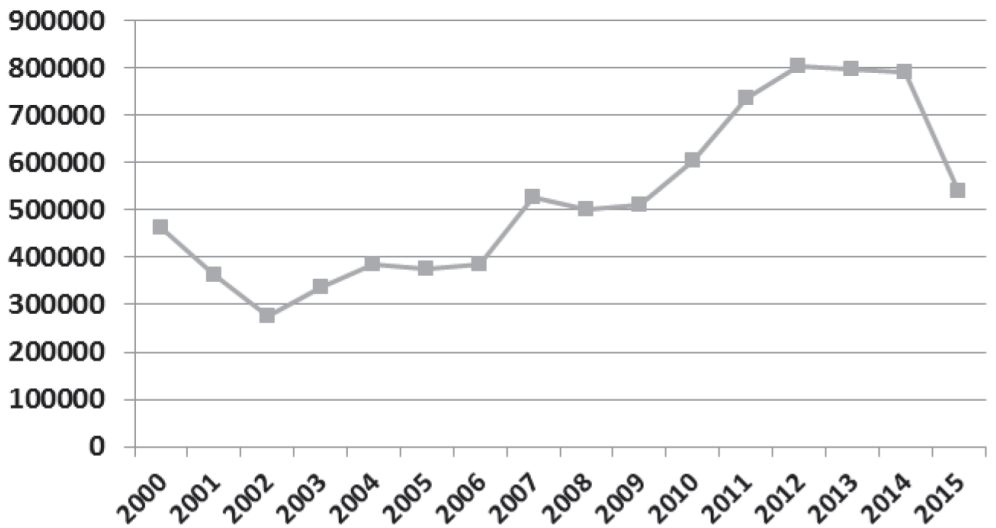
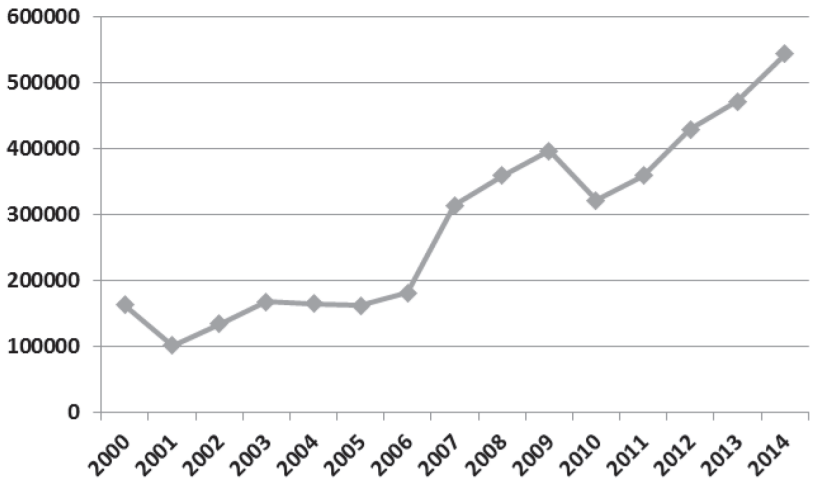


Figure 2. Trend of Gross Foreign Exchange Earning from Tourism (1000 US$)



4.3 Tourism sector monitoring and evaluation indicators

As per the Nepal planning monitoring and evaluation guideline, various output and impact indicators related to tourism sectors have been identified (National Planning Commission, 2013). Name of the indicators, source of data, period of measurement and current measurement status have been explained in Annex 1 in appendix.

4.4 System of collecting, processing, analyzing and disseminating tourism information

Ministry of Culture, Tourism and Civil Aviation (MoCTCA) has been publishing Tourism Statistics every year to disseminate annual progress made from tourism activities in Nepal (MoCTCA, 2016). Main sources of data for the tourism statistics are:

- arrival and departure cards filled up by Nepali and foreign citizens (data managed by Department of Immigration)
- royalty received from tourists visiting national parks and wildlife reserves (data managed by Department of National Park and Wild Life Reserve)
- royalty received from tourists for mountaineering and expedition (data managed by Nepal Mountaineering Association and Department of Tourism)
- foreign exchange earnings from tourists (data managed by Nepal Rastra Bank)
- GDP earn from tourism sector and share of tourism sector in National GDP (data managed by CBS and NRB)
- room occupancy of five star hotels (data managed by Department of Tourism)
- flight and passenger movement at Tribhuvan International Airport and Pokhara Airport (data managed by Nepal Civil Aviation Authority of Nepal)
- tourism related training provided (data managed by NATHM)
- tourist related crime (data managed by tourist police, Department of Tourism)

These statistics are compiled using data from many agencies within and outside Ministry of Culture, Tourism and Civil Aviation. Due to the lack of proper coordination among different agencies, irregular reporting from tourism industries, shortage of human resources in the statistics section and in absence of integrated tourism information system, there are many challenges to compile the statistics and quality of the compiled information is also not known.

4.5 Some major tourism indicators of Nepal

Trend of some major tourism indicators published in the Nepal Tourism Statistics are presented in Annex 2. Trend of tourist arrival was in increased order up to 2012 which is decreasing thereafter. Because of the earthquake, 2015 has become the most terrible in terms of tourist arrival having decrease by 32 percent compared to 2014 (MoCTCA, 2016). Despite significant reduction in total number of tourist arrival, it is encouraging to note that the length of stay of the tourist is in increasing trend (from 12 days in 2012 to 13 days in 2015). This may be the reason why there is continuous increase in foreign exchange earnings generated from tourism sector (from 36 Billion NPR in 2012 to 50 Billion NPR in 2015).

Annex 2 also presents the trend of tourism sector share in national Gross Domestic Product (GDP). The proportion tourism sector share in national GDP has increased from 1.9 in 2012 to 2.1% in 2015. The share of tourism sector GDP looks very low as this percentage includes earning only from hotel and restaurant (MoCTCA, 2016). By including domestic tourism and other tourism sub-sector earning, the tourism sector contribution to GDP would be much higher. The World Tourism and Travel Report estimate that direct, indirect an induced contribution of travel and tourism sector to GDP of Nepal in 2012 was 9.4%. However, it is very difficult to come to concrete conclusion on share of tourism sector GDP without developing a separate Tourism Satellite Account (TSA) (MoCTCA, 2015).

Though Annex 2 provides other important tourism indicators such as purpose of tourist visit, numbers of tourism establishments, hotel occupancy, and airline movements, system of collecting various other indicators proposed for monitoring of tourism sector progress are yet to be developed. Some important information currently not included in Nepal Tourism Statistics include; share of internal tourists, total investment in tourism sector, number of hotel beds available, number of tourism promotion activities, number of ancient archeological and cultural places etc., All the above information should be collected regularly through the development of integrated tourism information system.

5. Linkage of tourism with Sustainable Development Goals (SDG)

It is well known fact that tourism is a key to development, prosperity and wellbeing of a country. Therefore, it can play a vital role to attain SDGs through employment generation and poverty reduction. To attain SDG 8 of promoting sustained, inclusive and sustainable economic growth, full and productive employment and decent work for all, Nepal is committed to devise and implement policies to promote sustainable tourism. Such policies will create jobs and promote local culture and products by serving over three million tourists by the end of 2030. Ministry of Culture, Tourism and Civil Aviation (MoCTCA) has already developed the system of collecting international tourist arrival. However, we should be able to produce quality tourism product and service to them for sustainable development. A strong integrated tourism information system is required to monitor the progress of SDGs.

6. Problems and challenges in compilation of tourism statistics

Due to the lack of integrated tourism information system, occasionally there appears some confusion over the responsibility towards data collection and management leading to delay in reporting, analysis and publication. For example, until 2013, MoCTCA used to process tourist arrival and departure information. But in 2014, after an agreement between Nepal Tourism Board (NTB) and Department of Immigration (DoI), NTB was made responsible to process and generate tables related to tourist arrival and departure based on arrival and departure cards issued by DoI. This has caused a delay in processing, analyzing and publishing the annual tourism report and some important information (such as number of tourists entering Nepal via surface route) are missed out, as NTB could not collect the arrival and departure cards issued at the seven immigration points other than Tribhuvan International Airport.

There is also no specific timeline and standard formats of reporting tourism statistics to MoCTCA from various organizations within or outside MoCTCA as well as tourism industries. MoCTCA does not have updated information about number of tourism industries by district and corresponding employment, production, earning etc. Therefore, MoCTCA has been facing difficulty in evaluating various indicators including total investment made in tourism sector and contribution of tourism sector in national GDP, etc.

Tourism is the major sources of Nepal's national income, but existing documents indicate that share of tourism sector in national GDP is only about 2% (MoCTCA, 2016). On the other hand, the World Tourism Organization (UNWTO) suggests that contribution of tourism sector in Nepal's National GDP is about 10% (UNWTO, 2013). This discrepancy over the GDP estimate indicates that a reliable tourism information system under MoCTCA has to be developed so that it is able to estimate the output and outcome related tourism indicators mentioned in Table 1. CBS compiles and disseminates the Accommodation and Food Services (ISIC rev 3.1: Hotel and Restaurant industry) GDP which is not true GDP contributed by tourism sector rather tourists consumed many goods and service from markets, for example toilet papers, agriculture products such as cereals, vegetables, etc., telecommunication services, land and air transport etc. So, tourism services cut across many industries of economy. Separate Account for Tourism services is required which is also called Tourism Satellite Account will be the only solution for this kind of problem.

Other major related problems are as follows:

- A system of collecting information about number of Indian tourists entering Nepal via surface route is not available, therefore, current data about international tourists published in annual tourism statistics is not truly representative
- MoCTCA does not have any system of estimating internal tourists
- There is no any system of estimating direct and indirect employment generated by tourism sector
- MoCTCA does not have information about total number of tourism industries, total number of hotel and hotel room available and occupied, total public and private sector investment in tourism sector
- MoCTCA does not have an adequate system of collecting information on perception of tourists towards tourism service, preferred destination and potential tourist markets

7. Possible ways to improve tourism information system

The Nepalese tourism sector needs a systematic method to collect a range of data, which are required by various categories of stakeholders in order to take decisions. Investors need to understand the existing investment climate; marketers need to understand tourist characteristics, behaviours, likes/dislikes and overall market trends. Governments need statistics to assess trends and changes in the sector, understand the economic importance of tourism and compare it with other sectors, and monitor the resource base for planning purpose. Therefore, the following categories of statistics should be collected in regular basis (World Tourism Organization, 2000; World Tourism Organization, 2001; MoCTCA, 2015; MoCTCA, 2010):

7.1. Demand statistics

Arrivals, seasonal variation, traffic by month, length of stay, purpose of visit (business, pleasure, culture, adventure, special interest, faith, health, and education), nationality and place of residence, socio-demographic information (sex, age, income, education), travel behavior (transport and communication choice), activities engaged in during the visit, main sources of information, trip planning characteristics, lifestyle information and trip rating

7.2. Supply statistics

Number, location and classification of attractions, accommodation, transport companies, travel service firms, catering and retail outlets, access and infrastructure, load factors, occupancy rates, sources of finance, etc.

7.3. Value statistics

Expenditure (including transport payments), average spend per trip, average spend per day, volume of foreign exchange brought in by tourism, marketing expenditure, indirect and induced earnings from the sector.

7.4. Visitor spatial flow statistics and environmental and social management statistics

To understand how tourists travel around the country from site to site (by air and by road), Tourism Management Information System (TIMS) information for trekkers, GIS modeling to monitor the impact of tourism on the environment and society, carrying capacity studies

7.5. Major studies to be carried out in regular basis

- Tourist arrival and departure survey
- Hotel occupancy rate survey
- Inbound and outbound tourism survey
- Household tourism expenditure survey
- Monthly accommodation statistics survey

To successfully conduct above studies, it is very important to develop a frame for tourism industries. Thus a census of tourism industries should also be carried out every five year. In addition, tourism is the main source of employment in Nepal and it can play important role to meet the SDG goal of ending poverty. Therefore, Tourism Satellite Account (TSA) should be institutionalized so as to measure the contribution of tourism sector in national GDP.

Need of TSA has been well recognized in policy and planning documents of MoCTCA, however it has not yet implemented as per need. Existing human resource at the research and statistics is not enough to institutionalize TSA. Therefore, good coordination among MoCTCA, Nepal Tourism Board (NTB), Central Bureau of Statistics (CBS) and Nepal Rastra Bank (NRB) is required.

7.6. Introduction to Tourism Satellite Account (TSA)

Development of TSA to understand the true contribution and impact of the tourism to the economy is essential. Its introduction has been considered by the MoCTCA, and NTB has been given the role of developing the system. The methodology involves several institutions including the Ministry of Tourism, the CBS, the Ministry of Finance (MoF) and Nepal Rastra Bank (NRB) and the collecting of specific economic and tourism data.

MoCTCA and NTB currently do not have the capacity to operate a comprehensive tourism statistics collection and interpretation system. Relevant government organization, which works on national account such as the CBS, should be mobilized for insuring data quality as well a precise collection and interpretation of methods.

Private research firms or universities with research background can be commissioned to undertake surveys required for satellite accounting. Statistics managers at MoCTCA should be assigned as reporting manager for all research activities. Commercial software and online statistical services available (e.g., TStats supplied by Acorn Tourism) should be exploited.

A working committee comprising representatives from each of the concerned institutions should be formed to develop Nepal's TSA system. Inter-ministerial committee including CBS, to develop and manage the system should be ensured and external technical assistance for capacity building of the partners should be sought for.

8. Conclusion

Information gathered from various sources has indicated that despite great potentiality of tourism sector for economic, social and cultural development, current tourism information system is not adequate to measure true impact of tourism in Nepal. Therefore, an integrated tourism information system and tourism satellite account should be developed so as to sustainably monitor tourism sector progress. Close coordination between different stakeholders such as MoCTCA, CBS, NRB, DoI, NTB, tourism industries and related association is very important for standardization of tools and flow of information. Formation of core technical groups of experts in data collection management, analysis and dissemination and capacity building of the team is crucial.

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Annex

Annex 1. Output and impact indicators selected to monitor tourism sector progress

SN	Name of Indicator	Source	Period of Measurement	Current Status
Impact Indicators				
1.	Average expenditure per tourist per day (US$)	Tourism Management Information System (TMIS)	Annual	In the absence of TMIS, currently taken from Nepal Rastra Bank (NRB)
2.	Contribution of tourism in national GDP	TMIS	Annual	In the absence of TMIS, currently taken from NRB and Central Bureau of Statistics (CBS)
Output Indicators				
3	Total tourist arrival	TMIS	Annual	In the absence of TMIS, currently taken from Department of Immigration (DoI)
4	Average length of stay of tourist (Day)	TMIS	Annual	In the absence of TMIS, currently taken from DoI
5	Total tourist arrival according to purpose of visit	TMIS	Annual	In the absence of TMIS, currently taken from DoI
6	Total Annual Foreign Exchange Earnings from Tourism (US$)	TMIS	Annual	In the absence of TMIS, currently taken from NRB
7	Percentage of Internal Tourist Out of Total (%)	TMIS	Annual	Currently system of collecting internal tourist has not been developed
8	Number of beds available in star hotels	TMIS	Annual	Currently this information is collected only from star hotels in Kathmandu and Pokhara
9	Number of places with home stay	TMIS	Annual	Home stay related information is not computerized
10	Number of available sits in international airlines	TMIS	Annual	Information about aviation industries has not computerized
11	Number of promotive activities outside Nepal	TMIS	Annual	Collected from Nepal Tourism Board (NTB) but the information is not computerized
12	Total number of Cultural heritages and areas	TMIS	Annual	Information about cultural heritages is not computerized
13	Number of memorial monument development and management projects	TMIS	Annual	Information about the memorial monument projects is not computerized
14	Number of ancient archeological places	TMIS	Annual	Information about archeological and ancient places is not computerized

Annex 2. Summary of tourism scenario, 2012-2015 in Nepal

Indicators	2012 (2069/070)	2013 (2070/71)	2014 (2071/072)	2015 (2072/073)
Tourist Arrival by:				
Air	598258	594848	585981	405995
Land	204834	202768	204137	132975
Total	803092	797616	790118	538970
Average length of stay	12.16	12.60	12.44	13.16
Sex:				
Male	439270	449058	445627	289158
Female	363822	384558	344491	249812
By Age groups:				
0-15 years	35468	46262	50441	19614
16-30 years	181558	190630	185685	123444
31-45 years	231117	237690	235738	157416
46-60 years	201835	195416	183582	129614
61+ years	109239	115654	106666	74518
Not Specified	43875	11964	28007	34365
Top Five Country of Nationality:				
Rank 1	India	India	India	India
Rank 2	P.R. of China	P.R. of China	P.R. of China	China
Rank 3	Srilanka	U.S.A	U.S.A.	Srilanka
Rank 4	U.S.A.	Thailand	Sri Lanka	U.S.A
Rank 5	U.K.	U.K.	U.K.	Thailand
Purpose of Visit:				
Holiday/Pleasure	379627	410934	395849	386065
Pilgrimage	109854	71610	98765	14996
Trekking & mountaineering	105015	102001	97185	9162
Official	30460	37386	32395	21479
Business	24785	28183	24494	20876
Conference/Conv.	13464	15552	13432	9038
Others	139887	131950	53728	77354
Length of Stay:				
Average length of stay	12.2	12.6	12.4	13.2
Tourist Arrival by Major Five Airlines				
Rank 1	Indian Airlines	Indian Airlines	Jet Airways	Jet Airways
Rank 2	Jet Airways	Jet Airways	Qatar Air	Air Ariabia
Rank 3	Qatar Airways	Qatar Airways	Air Ariabia	Neal Airlines
Rank 4	Spice Jet	Spice Jet	Indian Airlines	Fly Dubai
Rank 5	Thai Airlines	Thai Airlines	Fly Dubai	Indian Airlines
Mountaineering Expedition				
Total Team	311	298	316	381

Indicators	2012 (2069/070)	2013 (2070/71)	2014 (2071/072)	2015 (2072/073)
Successful Person	1202	687	541	825
Royalty to government (Rs.' 000)	344784	341579	342950	342586
Revenue from Tourism:				
Total earning(US$ ' 000)	356725	429216	471769	497838
Average income per visitor per day(US$)	35.6	42.8	48.0	68.6
Proportion of tourism sector GDP at current price (%)	1.9	2.0	2.1	2.1
Tourism Related Enterprises (Registered in Tourism Industry Division)				
Hotel (Kath. Valley)	522	557	532	533
Rooms (Kath. Valley)	11087	11835	11519	11531
Beds (Kath. Valley)	21498	22871	19589	20360
Travel agencies	2116	2336	2567	2768
Trekking agencies	1524	1665	1860	2016
Tourist guide	2935	3102	3355	3507
Trekking Guide	8163	9076	10213	10705
Places Visited in Nepal				
National parks and wildlife reserve	267280	390207	431673	384321
Pashupati Area (excluding Indian)	139885	156858	166173	78680
Lumbini (excluding Indian Tourists)	136067	125496	132926	129180
Manaslu trekking	3319	4439	3764	2134
Mustang trekking	2965	2862	3883	2673
Humla trekking	1508	1603	492	1346
Lower Dolpa trekking	982	585	1117	788
Kanchanjunga trekking	635	837	777	731
Upper Dolpa trekking	536	338	469	328
International Airlines Movement:				
Arrival	11661	11812	13605	13283
Departure	11659	11807	13603	13281
Total	23320	23619	27208	26564

TRADE STATISTICS

Pramod Raj Regmi*

Abstract

This paper aims to present the concept of trade statistics along with the methodologies being adopted for the compilation of trade data in Nepal. Customs declaration forms are the major data sources for foreign trade in goods statistics and this statistics are disseminated by three public agencies: Department of Customs (DoC), Nepal Rastra Bank (NRB) and Trade and Export Promotion Centre (TEPC). Statistics on trade in services are compiled by NRB and is displayed in Balance of Payments statistics. Central Bureau of Statistics (CBS) compiles data on domestic trade activities through household surveys, establishment surveys and administrative records. Due to various agencies' involvement in the compilation of external merchandise trade data and poor coordination among them has resulted in challenge to reliable, comparable, and timely trade statistics. To overcome this, the statistical capacity of DoC needs to be enhanced. Likewise, NRB, as a central Bank, is encouraged to establish a strong administrative reporting system so that reliable data on foreign trade in services can be compiled. In a nutshell, national statistical system should be strengthened with CBS as a strong and effective statistical coordinating agency in the country.

1. Introduction

Trade statistics is the branch of economic statistics that refers to data/information on trade activities. In general, trade involves the transfers of ownership of goods and services from one person or entity to another particularly in exchange for money or kind. Thus, trade statistics includes all data/information on goods and services that are being transacted inside or outside of an economic territory. Domestics and foreign trade are broadly classified into merchandise and service trade.

Trade is one of the major economic activities in the national economy. Due to its significant contribution to national economy, the availability of timely and high quality trade statistics is essential for developing, monitoring and evaluating economic policies in general and trade policy in particular. The major uses of trade statistics can be described as follows:

- Development of national, regional and international trade policy, including trade negotiations, monitoring trade agreements and settling trade disputes;
- Measurement of the trade output and value added generated by this sector

* Director, CBS

- Estimating the final consumption expenditure of households on the basis of retail trade sales
- Construction of exports, imports, wholesale and retail price indices
- Help to assist on collection of right size revenue originating from imports
- Preparation of current account, national accounts and balance of payments (BOP)
- Help policy makers, business communities and individuals to take informed decisions on trade issues

2. Objectives

This chapter aims to present the concept and scope of trade statistics. In addition, the trade related data management practices being adopted in Nepal are also discussed with some policy recommendations.

3. Methodology

The methodology adopted to prepare this chapter is literature review of manuals and guidelines published by the United Nations Statistical Division (UNSD) and other international agencies such as World Trade Organization (WTO), International Monetary Fund (IMF) etc. Furthermore, reports and publications made by the national agencies have been used as reference documents.

4. Findings and analysis

4.1 Concept and scope

Trade can be classified as domestic and international trade. The domestic trade is also known as internal or distributive trade and it involves wholesale and retail trade. International merchandise trade statistics record all goods which add to or subtract from the stock of material resources of a country by entering (imports) or leaving (exports) its economic territory.

Distributive trade statistics (DTS) concerns with the information of economic units whose main activity is wholesaling and retailing (that is to say, sale without transformation) of any types of goods together with performing services incidental to sales such as repair, installation and delivery. The International Recommendation for Distributive Trade Statistics 2008 (IRDTS, 2008), a publication of the United Nations Statistics Division (UNSD) provides the recommendations on the concepts, definitions, classifications, data sources, data compilation methods etc. applicable to DTS. Wholesale trade is defined as the resale (sale without transformation) of new and used goods to retailers, business-to-business trade (for example, to industrial, commercial, institutional or professional users) or resale to other wholesalers. Retail trade is defined as the resale (sale without transformation) of new and used goods mainly to the general public for personal or household consumption or utilization, by shops, department stores, stalls, e-commerce retailers, mail-order houses, hawkers and peddlers, consumer cooperatives, etc. (UN, 2008).

In general, the measurement of domestic trade is displayed in the framework of national accounts. As per International Standard Industrial Classification (ISIC) Rev. 4, the scope of distributive trade refers to

the items belonging under ISIC rev. 4 section G i.e. wholesale and retail trade. It includes division 45 (all activities related to sale and repair of motor vehicles and motorcycles), and division 46 (wholesale) and division 47 (retail). Apart from this classification, the COICOP (Classification of Individual Consumption According to Purpose) is also used for the compilation of distributive trade statistics by commodities. Census/surveys of trade units, Establishments surveys, household surveys, and administrative records are the major sources for domestic trade statistics.

International trade in goods or merchandise trade covers all types of inward (imports) and outward (exports) movement of goods across the border of a country or economic territory including movements through customs warehouse and free zones. There are two types of measurement approaches used foe the statistical valuation of the goods being traded- FOB type and CIF type. FOB-type values include the transaction value of the goods and the value of services performed to deliver goods to the border of the exporting country. CIF-type values include the transaction value of the goods, the value of services performed to deliver goods to the border of the exporting country and the value of the services performed to deliver the goods from the border of the exporting country to the border of the importing country (UN, 2010,).

To make trade statistics consistent and internationally comparable, different commodity classification have been developed and used. Most common classification used by majority of the customs administration is the Harmonized Commodity Description and Coding System (Harmonized System or HS). However, other commodity classification has their specific advantages for economic analysis. Standard International Trade Classification (SITC), the Classification by Broad Economic Categories (BEC), the International Standard Industrial Classification of All Economic Activities (ISIC), and the Central Product Classification are in place for various statistical and analytical purposes.

International trade in services or commercial services covers all exports and imports of commercial services. The term services cover a wide range of intangible and heterogeneous products and activities such as transport, telecommunication and computer services, construction, financial services, wholesale and retail distribution, hotel and catering, insurance, real estate, health and education, professional, marketing and other business support, government, community, audiovisual, recreational, and domestic services (UN, 2010). Manual of Statistics on International Trade in Services 2010 follows 2008 SNA definition of services. As per 2008 SNA, services are the result of a production activity that changes the conditions of consuming units, or facilitates the exchange of products or financial assets. The commercial services are further subdivided into transportation, travel and other commercial services.

For the first time, WTO formulated General Agreement on Trade in Services (GATS) as multilateral rules for international trade in commercial services and it stressed that the international trade in services can take place through four modes of supply (WTO, 2006). The four modes of supply are given below.

Mode 1: *Cross border trade*, this is defined as delivery of a service from the territory of one country into the territory of other country. For example, software services supplied by the supplier in one country to consumers in another country

Mode 2: *Consumption abroad,* covers supply of a service of one country to the service of any other country. For example, visits to museums in a foreign country as well as medical treatment and language courses taken abroad

Mode 3: *Commercial presence,* covers services provided by a service supplier of one country in the territory of other country, i.e., cross-border foreign investment. Examples of commercial presence are services supplied through business or professional establishment of one member in the territory of another country

Mode 4: *Presence of natural person,* covers services provided by a service supplier of one country through the presence of "natural persons" (a human being quite distinct from legal persons such as companies or organizations) in the territory of another are defined as movement of natural person. For example, it is the case when a lawyer of one country supplying through his physical presence services in another country, or foreign employees or consultant of a foreign think tank.

The measurement of international trade in services is displayed in a framework of BOP statistics and Foreign Affiliates Trade in Services (FATS) statistics. The BOP statistics under the fifth edition of the Balance of Payments Manuals (BPM5) covers data on trade in services transacted between residents and non-residents into following 11 service components (WTO, 2006).

- Transportation
- Travel
- Construction services
- Insurance services
- Financial services
- Computer and information services
- Royalties and license fees
- Communication services
- Other business services
- Personal, cultural and recreational services
- Government goods and services not included elsewhere (n.i.e)

The measurement of services supplied by foreign affiliates is displayed within the framework of FATS statistics. This framework serves as a guideline for the compilation of a number of indicators aimed at describing the operations of foreign affiliates (turnover, exports and imports of goods and services, number of enterprises, etc.) (WTO, 2006).

The data for BoP statistics comes mainly from International Transactions Reporting System (ITRS) and Establishment/Enterprise and household surveys whereas for FATS statistics, the migration/ employment surveys are the major data sources.

4.2 Trade related data compilation in Nepalese context

4.2.1 International trade in goods

In Nepal, collection, compilation and publication of foreign trade statistics in goods are carried out by three organizations: Departments of Customs (DoC), Nepal Rastra Bank (NRB) and Trade and Export Promotion Centre (TEPC). All these three organizations use the customs declaration forms known as *"Bhansar Pragyapanpatra*" being used in all custom offices and administrative records from foreign post office for the compilation of foreign trade statistics in goods. It includes volume and value of imports and exports of commodities.

DoC has adopted ASYCUDA (Automated System for Customs Data) for data management in most of the custom offices, including International Airport Custom Office. All three organizations process the data available from ASYCUDA and disseminate trade statistics. DoC uses the Harmonized System (HS) code for commodities classification for compiling trade data and publishes in the publication **"Foreign Trade Statistics of Nepal"** monthly and annually (visit www.doc.gov.np for more information). The major indicators provided by the DoC are as follows.

- Trade balance by chapters
- Trade balance by partner countries
- Imports by commodities (HS-8 digits) and partner countries
- Exports by commodities (HS-8 digits) and partner countries
- Revenue collection by chapters
- Revenue collection by commodities (HS-8 digits)

NRB uses the trade statistics mainly for preparing Balance of Payment. It adopts Standard International Trade Classification Revision (SITC) 3 for analysis of the trade data. It publishes the data monthly and annually in the publication **"Current Macroeconomic situation**" (visit www.nrb.org.np for more information). The major information being available in its publication is as follows.

- Total export to India, China and other countries
- Total imports from India, China and other countries
- Composition of foreign trade (Customs wise)
- Total trade balance
- Total foreign trade
- Exports of major commodities to India, China and other countries
- Imports of major commodities to India, China and other countries
- Terms of trade i.e. ratio of export value to import value and expressed in percentage

TEPC also publishes the trade statistics similar that of DoC. It compiles the customs data monthly and uses the HS code for commodities classification being used by DoC. It publishes **"Foreign trade statistics of Nepal"** quarterly (visit www.tepc.gov.np for more information). The information available in the publication is on the following topics.

- Foreign trade balance of Nepal
- Total exports of some major commodities
- Total imports of some major commodities
- Export of major trading partners of Nepal
- Exports of NTIS products by value and volume
- Exports by commodities and by countries
- Imports by commodities and by countries

4.2.2 International trade in services

The statistics on international trade in services in Nepal is compiled by Nepal Rastra Bank (NRB) through official records. The major export services are transportation, travel, communication services,

insurance services, government services, and labor services. Travel has been a dominant sector in the export arena. Other services following travel are government services, labor services and other service categories growing over periods. The major imported services include transportation, travel and other service categories. The share of transportation and travel categories only account nearly three-fourth of total import services (ADB and MOF/GON, 2010). The BoP statistics displaying international trade in goods and services published by the NRB can be shown as below.

Nepal Trade Integration Strategy (NTIS) 2010 developed by the Government of Nepal, Ministry of Commerce and Supplies has stated that Nepal has nineteen priority export potentials and out of them seven sectors has been identified under the service sector. The identified priority service sectors are tourism, labor services, IT and Business Sources Outsourcing (BSO) services, and Health services, Education, Engineering and Hydro-electricity. Major focus is on remittances from the labor services (ADB and MOF/GON, 2010).Table 1: Annual summary of Balance of Payments

Table 1: Annual summary of Balance of Payments

(Rs. in million)

Particulars	2013/14	2014/15	2015/16 P	% Change	
				2014/15	2015/16
A. Current Account	89721.5	108319.8	140418.5	20.7	29.6
Goods: Exports f.o.b.	100960.6	98276.3	74866.1	-2.7	-23.8
Oil	0.0	0.0	0.0	-	-
Other	100960.6	98276.3	74866.1	-2.7	-23.8
Goods: Imports f.o.b.	-696373.3	-761773.0	-756487.8	9.4	-0.7
Oil	-132976.4	-112044.6	-68724.4	-15.7	-38.7
Other	-563396.9	-649728.4	-687763.4	15.3	5.9
Balance on Goods	-595412.7	-663496.7	-681621.7	11.4	2.7
Services: Net	20882.2	27617.5	9849.3	32.3	-64.3
Services: credit	125061.2	149288.4	138471.8	19.4	-7.2
Travel	46374.9	53428.6	41765.3	15.2	-21.8
Government n.i.e.	24352.8	32481.1	38330.8	33.4	18.0
Other		63378.7	58375.7	16.6	-7.9
Services: debit	-104179.0	-121670.9	-128622.5	16.8	5.7
Transportation	-39822.0	-43996.3	-44030.3	10.5	0.1
Travel	-42175.6	-53190.2	-56417.8	26.1	6.1
O/W Education	-15121.3	-17065.4	-20139.0	12.9	18.0
Government services: debit	-1625.7	-1974.8	-2100.3	21.5	6.4
Other	-20555.7	-22509.6	-26074.1	9.5	15.8
Balance on Goods and Services	-574530.5	-635879.2	-671772.4	10.7	5.6

Source: Current Macroeconomic and Financial Situation Table 25 (Based on the Annual Data of 2015/16), NRB, Nepal

4.2.3 Domestic (Distributive) trade

CBS compiles domestic trade data through household sample surveys, establishment surveys and administrative records. For the first time, Central Bureau of Statistics (CBS) conducted the Distributive Trade Survey in 2008 in Nepal. The Distributive Trade Survey 2008 (DTS) was a national level survey

of trading establishments engaged in trading activities as classified under the Major Division G "Wholesale and Retail Trade on Goods" of Nepal Standard Industrial Classification (NSIC). As wholesale and retail trade of goods has a significant contribution to the economy of the country, the DTS was implemented with the aim of providing reliable information on wholesale and retail trade to policy makers and planners for understanding the structure, contribution and other aspects of wholesale and retail trade in Nepal. Apart from that, this survey is considered as a benchmark survey for assessing the contribution of wholesale and retail trade to the national economy. The objectives of the survey were to:

- Collect information such as employment, compensation of employee, income, intermediate consumption, stocks and other economic data relating to wholesale and retail trade that are required for national accounts purpose;
- Estimate trade margins by some major commodities in accordance with central product classification (CPC); and
- Assess the contribution of wholesale and retail trade to the national economy;

All trade establishments operating in the country, having registered in any government unit were covered in this Survey. A trade establishment is an economic unit engaged in wholesale or retail trade of goods within the national territory under a single ownership or control, i.e. under a single legal entity at a single fixed location. In other words, a trade establishment is an establishment having three characteristics: economic activity (trading), legal status (registered one) and fixed location (housed in fixed structure) (CBS, 2008). This survey has collected information on wholesale and retail trade of goods envisaged under Major Division G of NSIC however the service parts of this group (repair of motor vehicles, motorcycle and personal and household appliances) have been excluded from this survey. The following trading activities were not included in the survey.

- Departmental Stores
- Public trading establishments
- Non registered trade establishments
- Street/vendors shops, Hat Bazar

The survey is a random sample survey and the sampling frame was constructed from the lists of all establishments. It used stratified random sampling. Stratification of all establishments listed in the country was done by rural/urban by NSIC two digits of wholesale and retail trade (50, 51 and 52) and by annual transactions. The samples were selected randomly from each stratum. The major information collected were name, legal status, major trading activities, types of trade and trade establishment, employment, salaries/wages, and other facilities, fixed assets, sales and purchases of goods, other incomes, operating costs, stocks, tax paid etc. The major findings of the survey have been given as follows:

Table 2: Major findings of Distributive Trade Survey, 2008

Statistics	Value
Total number of trade establishment	58816
Total number of person engaged	136835
Male	100343
Female	36492
Total number of employee	27506
Male	25293

Statistics	Value
Female	2213
Average number of person engaged per hundred establishment	
Male	171
Female	62
Total salaries, wages and benefits provided to employees ('000 Rs.)	1239164
Average annual expenditure of establishment on salaries, wages and benefits (Rs.)	94000
Average annual compensation of employees paid per paid employee (Rs.)	45000
Trade Margin	
Sale of motor vehicles and motorcycles; retail sale of automotive fuel (NSIC 50)	15.64 %
Wholesale trade and commission trade; except of motor vehicles and motorcycles (NSIC 51)	12.21 %
Retail trade; except of motor vehicles and motorcycles (NSIC 52)	16.07 %
Total value of other receipts ('000 Rs.)	1018455
Ratio of Intermediate Consumption to trade margin	
Sale of motor vehicles and motorcycles; retail sale of automotive fuel (NSIC 50)	20.4 %
Wholesale trade and commission trade; except of motor vehicles and motorcycles (NSIC 51)	17.4 %
Retail trade; except of motor vehicles and motorcycles (NSIC 52)	23.3 %
Total value of fixed assets at the beginning of the reference year ('000 Rs.)	37899333
Total value of fixed assets added during the reference year ('000 Rs.)	2336632
Change in stocks of goods for sale ('000 Rs.)	3865729

Source: Distributive Trade Survey of Nepal, a Statistical Report 2008, CBS, Nepal.

Trade related indicators are displayed in National Accounts statistics. The major indicators are contribution of wholesale and retail trade to total GDP, ratio of export to total GDP in percentage, ratio of import to total GDP in percentage, ratio of remittance to total GDP in percentage and trade output or trade margin, i.e. the difference between the actual or imputed price realized on a good purchased for resale (either wholesale or retail) and the price that would have to be paid by the distributor to replace the good at the time it is sold or otherwise disposed of (UN, 2010).

4.3 Trade statistics and Sustainable Development Goals (SDGs)

SDG 17 focuses on strengthening the global partnership for sustainable development and it contains a separate section on trade. Trade related targets under SDG 17 are as follows (NPC, 2015).

- Promote a universal, rules-based, open, non-discriminatory and equitable multilateral trading system under the World Trade Organization, including through the conclusion of negotiations under its Doha Development Agenda (Target 17.10)
- Significantly increase the exports of developing countries, in particular with a view to doubling the Least Developed Countries (LDC) share of global exports by 2020 (Target 17.11)
- Realize timely implementation of duty-free and quota-free market access on a lasting basis for all LDCs, including by ensuring that preferential rules of origin applicable to imports from LDCs are transparent and simple, and contribute to facilitating market access (Target 17.12).

The Ministry of Commerce and Supplies (MoCS) has formulated trade policy 2072 that aims to promote domestic industries and to boost the exports. With the implementation of this new policy, trade is believed to be an engine for the economic development of the country. To assess the contribution of

trade to economic development of the country and to measure the trade related targets set by SDGs, the main bodies responsible for compilation of trade data are DoC, TEPC and CBS.

5. Challenges and issues

a) Three agencies DoC, NRB and TEPC compile and disseminate data on international trade in goods, unfortunately published data are not consistent and comparable each other often making serious dilemma to the users. It is worthy to note that the primary data originates from Customs itself and as a result the validation capacity while processing that crude data is superior to DoC than other agencies.

b) The scope and nature of services has been expanding and due to its intangible phenomenon during transaction and development of ICT (Information, Communication and Technology), the coverage and quality of trade in services statistics seems much poorer.

c) BoP statistics published by NRB only covers very limited categories of services. Due to this reason, it has been hard to assess the contribution of various services separately to the national economy.

d) Due to lack of frequent conduction of distributive trade survey, the estimation of wholesale and retail trade related indicators is being carried out on the basis of DTS 2008. As trade is a dynamic phenomenon and its types and natures are expanding over time, the estimates made based on the old benchmark survey as DTS 2008 is likely to be biased.

e) Production of timely and comparable trade statistics has been a challenge due to absence of work plan of the surveys /regular reporting system.

f) Due to absence of quarterly trade related surveys, the measurement of short term fluctuation of distributive trade is lacking.

g) There has been missing in the estimation of unrecorded or informal trade, especially to our neighbour, India.

6. Way forward/policy recommendations

To overcome the challenges being faced in the compilation and dissemination of trade statistics in Nepal and to fulfill the requirements of trade data in the monitoring and evaluation of trade related policies and programs, the following activities are recommended.

- Customs records are the major data source for compiling statistics on international trade in goods. So, DoC needs to be institutionalized with adequate and trained statistical staffs so as to produce reliable and timely trade data continuously.
- To capture all types of services in the estimation of GDP (Gross Domestic Product), NRB should incorporate statistics for all services. Preparing data compilation manual would help enhance the coverage and quality of data on trade in services.
- A statistical plan is needed so that frequent conduction of benchmarking survey such as DTS can be carried out.
- CBS needs to carry out quarterly trade survey so as to meet the demands of measuring short term distributive trade survey using indices.

- Special periodic survey can be administered to gauge the level and structure of informal cross-border trade.

7. Conclusion

Trade is one of the vital components of national economy and the timely production of high quality trade statistics is essential for developing, monitoring and evaluating trade policies and programs. Custom offices are the major sources of data on international trade in goods whereas data on international trade in services are compiled by NRB. Three agencies DoC, NRB and TEPC are involved in the production of data on international trade in goods. These data are not comparable with each other due to differences in processing the crude data, although they all use same database of custom records. NRB displays service related data on a few categories and seems under coverage. Due to absence of a national statistical plan, most of the surveys in Nepal are carried out on an ad-hoc basis. As a result, there has been always challenge of production of data timely and frequently. Trade is on rise and particularly contribution of services to the economy is increasing over the years. Thus, the production of reliable, consistent and timely trade statistics is the needs of today so that a realistic monitoring and assessment of trade policies and programs can be done. To respond such needs, all trade data producers DoC, TEPC, NRB and CBS must work in a co-ordinated way. For this purpose, a technical committee representing all these agencies needs to be established and the committee should be responsible for formulating and monitoring an annual plan for external merchandise trade statistics.

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SYSTEM OF NATIONAL ACCOUNTS

Ishwori Prasad Bhandari*

Abstract

This article presents the basic concepts on national accounts statistics, country practices of Nepal. The main aim of this article is to provide readers about the brief introduction on national accounts and to familiarize on data sources and methodologies adopted in Nepal. The main uses of national accounts are to monitor the economic behavior, macroeconomic analysis and international comparisons. Nepal follows the recommendations and guidelines provided by the UN publications. Central Bureau of Statistics is responsible for the compilation of national accounts in Nepal. Current national accounts statistics are limited to production accounts and to some extent the expenditure and income approach accounts. All sequence of accounts are not prepared since Nepal has serious limitation on data availability and technical competency. Most of the SDG indicators are directly or indirectly related to national account statistics. The SDG 8 mainly focuses on the economic agenda which can be measured by using the macroeconomic indicators. To be more comfortable, organizational and technical competency of CBS should be strengthened. It is also necessary to ensure the regular availability of economic data for the sake of good economic indicators.

1. Introduction

National accounts are a coherent, consistent and integrated set of macroeconomic accounts, balance sheets and tables based on a set of internationally agreed concepts, definitions, classifications and accounting rules[52]. The national accounts provide a comprehensive, conceptual and accounting framework for analyzing and evaluating the performance of an economy. National accounts are organized framework of economic statistics and indicators based on all economic activities taking place in designated time frame within an economy. System of National accounts provides estimation of macro-economic indicators like production, value added, final consumption, income, capital formation, saving etc. based on all economic activities performed by all types of economic institutions or economic transactions in an economy within the designated time period.

The then league of nation had initiated the development and worldwide use of system of national accounts. United Nations has been playing effective role for development and implement of system of national accounts after its formation. First version of System of National Accounts (SNA 1953) was

* Director, CBS

52 System of National Accounts (SNA 2008)

published in 1953. Modern era of national accounting could be said to have started after United Nations published fully revised version of System of National Accounts (SNA 1968) in 1968. Following eight years development by international agencies such as the United Nations, IMF, World Bank, OECD and Eurostat, a revised System of National Accounts was released in 1993 (SNA 1993). SNA 1993 fully integrates national income, expenditure and product accounts. It also connects supply and use tables, input-output tables, financial flow accounts and national balance sheets. United Nations with other international agencies published the System of National Accounts, 2008 (2008 SNA) as an updated version of the system of National Accounts, 1993 to bring the national accounting frame work into line with the needs of data users.

2. Economic activities

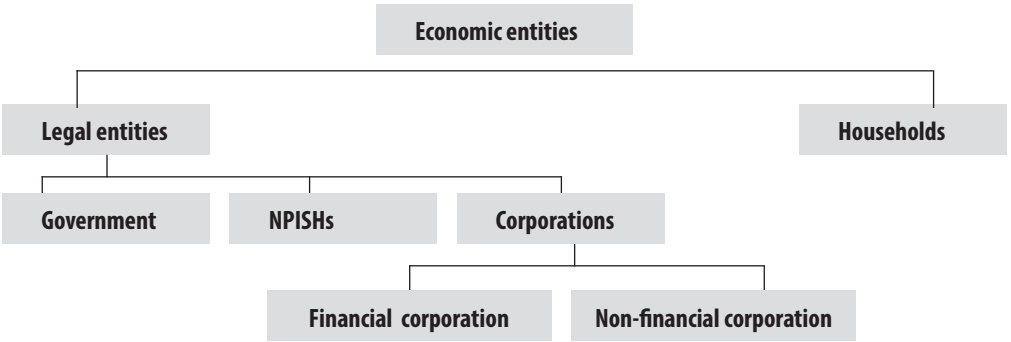
According to the SNA 2008, the three basic economic activities recorded in the SNA are production of goods and services, consumption to satisfy human wants or needs and accumulation of various forms of capital. Thus, economic activities consist of production of goods and services used for final consumption, intermediate consumption or capital formation. The production of all agricultural goods for sale or own final use and their subsequent storage, the gathering of uncultivated crops, forestry, wood-cutting, production of animal product, manufacturing product, construction, trade service, financial activity, public service etc. are economic activities. Some informal type activities are also treated as economic activities such as the collection of firewood, hunting and fishing, water fetching etc. All activities are not treated as economic activities and included in the production boundary of the System of National Accounts. Most of the personal and domestic services that are produced and consumed within the same households, such as cleaning, decoration, cooking, caring for and educating children, caring for sick and old people, maintenance and repair of dwellings and durables, transportation of household members etc. are treated as household work and exclude from production boundary. Some services like owner occupied dwelling and paid domestic staff are considered as economic activities as they are treated as "work" and included in the production boundary.

3. Institutional units

The aim of national accounts is to describe the economic activity (measurable in monetary terms) of every unit of a national economy. The basic concepts of the SNA are used to analyze and aggregate the numerous aspects of the elementary actions in the economy, and are capable of answering important questions: Who takes action in the economy? What do they do? How is this measured? How this information is presented? The simple answers of these questions are institutional units (households, financial corporations, non-financial corporations, government and non-profit institution serving household (NPISH) and they are the actors of the economy. They do economic activities (production, consumption and accumulation). This is measured by transactions and other flows by applying SNA guidelines. This information is presented on accounts and tables.

An institutional unit is an economic entity that has right of owning assets, incurring liabilities, and engaging in economic activities and transactions with other entities. There are mainly two economic entities and these entities are further divided into institutional units (Figure 1).

Figure 1. Institutional units



3.1 Non-financial corporation

Non–financial corporations are institutional units that are principally engaged in the production of market goods and non-financial services. Example: manufacturing establishments, business companies, transport companies, construction companies etc.

3.2 Financial corporation

Financial corporation are institutional units that are principally engaged in financial services including financial intermediation. Example: Nepal Rastra Bank, Commercial Bank, Development Bank, Financial Institution, etc.

3.3 Government

Government consists of institutional units that, in addition to fulfilling their political responsibilities and their role of economic regulation, produce services (and possibly goods) for individual or collective consumption mainly on a non-market basis and redistribute income and wealth.

3.4 Non-profit institutions serving households (NPISHs)

NPISHs are legal entities that are principally engaged in the production of non-market services for households or community at large and whose main resources are voluntary contributions.

3.5 Households

Households are institutional units consisting of one individual or a group of individuals. Any physical persons in the economy must belong to one and only one household. The principal functions of households are to supply labour, to undertake final consumption and, as entrepreneurs, to produce market goods and non-financial (and possibly financial) services. The entrepreneurial activities of a household consist of unincorporated enterprises that remain within the household except under certain specific conditions.

4. Enterprise, establishment and industry

An enterprise is an institutional unit engaged in production of goods and services. An enterprise may be a corporation, a quasi-corporation, a non-profit institution or an unincorporated enterprise.

An establishment is an enterprise or part of an enterprise that is situated in a single location and in which only a single productive activity is carried out or in which the principal productive activity accounts for most of the value added. Since an establishment may perform different activities and produce more than one output, they are classified according to their principal activity or output. The principal activity is the activity from which the establishment earns most of its revenue. Secondary activities are those activities carried out within an establishment, in addition to the principal activity, that is suitable for delivery outside the establishment. The output of an establishment is therefore the sum of the outputs of the principal and secondary activities. Establishments can also engage in ancillary activities. Ancillary activities are defined as activities that provide supporting services for the principal or secondary activities. The output of an ancillary activity is not explicitly recognized or recorded separately in the system.

A group of establishments engaged in the same, or similar kinds of activity are classified into one industry according to International Standards Industrial Classification (ISIC). Certain activities produce more than one product simultaneously, while the same product may sometimes be produced by using different production techniques. The most important criterion used for classifying industries is the type of goods and services produced.

5. Total economy and the Rest of the World (ROW)

The total economy is defined in terms of institutional units. It consists of all the institutional units which are resident in the economic territory of a country.

The economic territory of a country does not coincide exactly with its geographical territory. The term economic territory means the geographical territory administered by a government within which persons, goods, services and capital move freely. It also includes international waters declared as an exclusive economic zone where the country enjoys exclusive fishing, fuel and mineral exploitation rights. Finally, certain territories in foreign countries, such as embassies, consulates and military bases, are included in an economic territory. On the other hand, territories in a country used by foreign governments and international organizations are excluded from the economic territory of that country.

"Resident" is the concept that differentiates which units belong to the domestic economy and which belong to the Rest of the World (ROW). A resident institutional unit has a center of economic interest in the economic territory of that country. That interest is indicated by having a dwelling or place of production for long or indefinite period (generally one year or more). The rest of the world consists of all non-resident institutional units that enter into transactions with resident units, or have other economic links with resident units.

6. Flows and stocks

There are two basic forms in which information about the economy is recorded in the accounts and tables: flows and stocks. Flows refer to actions and events that take place within a period. Stocks

refer to a position at a point in time. Economic flows reflect the creation, transformation, exchange or extinction of economic value[53]. They involve changes in volume, composition, or value of assets and liabilities. There are two types of economic flows: transactions and other flows. Transactions are economic flows that results:

- The exchange of economic value
- Voluntary transfer by one unit to another of a certain amount of economic value without a counterpart.

Transactions usually involve interactions by mutual agreement between institutional units, as well as certain actions within institutional units. Examples of actions within institutional units that constitute transactions are consumption of fixed capital and own account capital formation. Transactions can be either monetary or non-monetary. Monetary transactions include expenditure on consumption of goods and services, wages and salaries, interest and dividends and taxes. Non-monetary transactions include barter, remuneration in kind such as meals and housing services, transfers in kind etc. Since all entries in the accounts have to be measured in terms of money. Non-monetary transactions have to be indirectly measured or otherwise estimated. Illegal actions that arise from mutual agreement between parties are treated as transactions in the system. However, an illegal action that is a crime against person or property such as theft is excluded. Other economic flows are changes in the value or volume of assets and liabilities resulting from events other than transactions. These include revaluation of assets and liabilities and changes in volume due to events such as mineral discoveries, growth of natural forest and major national disasters.

7. Rules of accounting

Transactions of institutional units (who), of their action (what) carried out for different purpose (why) are recoded in the SNA according to clear rule.

7.1 Double entry and quadruple entry

Like business accounts, the SNA accounts are two-side "T" shape. Resources are presented in the right side of the current account whereas uses are shown in the left side. Liabilities are shown in the left side and assets are shown in the right side of the Balance Sheet.

Like business account, National Accounts is also based on double entry. If one institutional unit provides somethings to the other institutional unit, the account of both units shows the transaction: as a resource in the accounts of one unit and as a use in the accounts of the other ('horizontal' double entry). As for example, the compensation of employees paid by different economic units should be equal to the sum received by employees. In the accounts of an institutional unit, each transaction must be recorded twice as a resource and as a use ('vertical' double entry).Thus, the total of the transactions recorded as resources and the total of the transactions recorded as use are equal. The simultaneous application of both the vertical and horizontal double-entry bookkeeping results in quadruple-entry bookkeeping in the System of National Accounts.

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7.2 Time of recoding

The time of recording in SNA is different for flows and stocks:

flows are recorded over a certain period of time;

- stocks are recorded at a certain point in time, namely at the beginning (opening balance) and at the end of the accounting period (closing balance). The accounting period in national accounts usually corresponds to the calendar year or a quarter of a year.
- All transactions between institutional units in SNA are recorded on an accrual basis not on a cash basis. Accrual basis records flows at the time when economic value is created, transformed, exchanged, transferred or extinguished.

7.3 Valuation principle

Under SNA, a transaction must be recorded at the same value throughout all the accounts of all the sectors involved. Transactions are valued at market or equivalent market prices. Market prices are the actual and economically significant prices agreed upon by the transactions. The current market price is the basic reference for valuation in SNA. In the absence of market transactions, valuation is made based on cost of production (for example: non-market services produced by government) or by reference to market prices for similar goods or service (for example: services of owner occupied dwellings).There are three types of market prices of the same transaction due to taxes and subsidies, trade margin and transport margin.

Basic price:

Basic price is the amount receivable by the producer from the purchasers for a unit of output. Thus, it should exclude any tax assessed on the output (i.e., taxes on products) and include any subsidies on the output that the producer receives. It also excludes any transport charges invoiced separately by the producer. The measurement of output at basic prices makes value to reflect better volume.

Producer's price:

Producer's price is the amount receivable by the producers from the purchasers for a unit of goods or service produced as output minus any VAT, or similar deductible tax invoiced to the purchasers; it excludes any transport charges invoiced separately by the producers.

Purchaser's price:

Purchaser's price is the amount paid by the buyer for a unit of output less any taxes invoiced by the seller but deductible by the purchaser. It should be equal to the producer price plus transport costs and trade margins on products, which are not separately invoiced.

8. Sequence of accounts

The sequence of accounts describes how income is generated, distributed, redistributed and used for consumption or the acquisition of assets and when assets are disposed of, or a liability is incurred,

in order to acquire other assets or undertake more consumption than current income permits. The accounts of the economy presented in the SNA are broadly classified into three categories: Current Accounts, Accumulation Accounts and Balance Sheet.

8.1 Current accounts

These accounts record the production of goods and services, the generation of incomes by production, the subsequent distribution and redistribution of incomes among institutional units, and the use of incomes for purposes of consumption or saving in an accounting period. Main macroeconomic aggregates such as Gross Domestic Product (GDP), Gross National Income (GNI), Net National Income (NNI), Gross National Disposable Income (GNDI), Consumption, Saving, etc., are prepared from these current accounts.

Table 1: Structure of current accounts

			Balance items	Main aggregates
I. Production account	I. Production account		Value added	Domestic product (GDP/NDP)
II. Distribution and use of income accounts	II.1 Primary distribution of income accounts	II.1.1 Generation of income account II.1.2 Allocation of primary income account	Operating surplus/ mixed income balance of primary income	National income (GNI/NNI)
	II.2 Secondary distribution of income accounts		Disposable income	National disposable income
	II.3 Redistribution of income in kind account		Adjusted disposable income	
	II.4 Use of income account II.4.1 Use of disposable income account II.4.2 Use of adjusted disposable income account		Saving	National Saving

8.2 Accumulation accounts

Accumulation accounts cover all changes in assets, liabilities and net worth. Since the accounting system is fully integrated; saving, being the balancing items of all current accounts is the starting element of accumulation accounts. Accumulation accounts are structured in such a way, which permits various types of changes in assets, liabilities and net worth to be distinguished into two groups. The first group of accumulation accounts contains the capital account and the financial account. These two accounts are distinguished in order to show a balancing item which is useful for economic analysis, which is net lending/net borrowing. The second group of accounts relates to changes in assets, liabilities and net worth due to other factors. The second group of accounts are other change in assets accounts which is further divided into two sub groups: Other changes in volume of assets account and Revaluation account.

Table 2: Structure of accumulation accounts

Accumulation accounts	III.1 Capital account		Change in net worth due to saving and capital transfers net lending borrowing
	III.2 Financial accounts		Net lending borrowing
	III.3 Other change in assets accounts	III.3.1 Other changes in volume of assets account III.3.2 Revaluation account Neutral holding gain/losses Real holding gain/loses	Changes in net worth due to other changes in volume of assets Changes in net worth due to neutral holding gain/losses

8.3 Balance sheet

The opening and closing balance sheets display assets on the left side, liabilities and net worth on the right side. Assets and liabilities are valued at the prices of the date a balance sheet is established. Net worth, the difference between assets and liabilities, is the balancing item of balance sheets. It is equivalent to the present value of the stock of economic value, a unit or a sector holds. The system is closed if the closing balance sheet of one year equals the opening balance sheet of the following year.

9. Main macroeconomic aggregates

Aggregates in national accounts are composite values that measure one aspect of the activity of the entire economy. They are summary indicators and key magnitudes for the purposes of macroeconomic analysis and comparisons over space and time. For user needs, the aggregates of the SNA provide a simplified but complete and detailed picture of an economy. Some aggregates can be obtained directly as totals of particular transactions in the SNA, such as total production, final consumption, gross fixed capital formation, etc. Others result from aggregating balancing items of institutional sectors accounts: value added, balance of primary incomes, disposable income and savings, etc.

9.1 Output

Output is the value of goods and services produced in an economy. This includes market production, production for final use and non-market production. Output is related to the unit of production. Output, therefore consists only of those goods or services that are produced within an establishment that becomes available for use outside that establishment. Output is calculated by multiplying volume (Q) and Price (P).

Output = Q * P

9.2 Intermediate consumption

Intermediate consumption (IC) is the value of goods and services consumed as inputs in the production process excluding fixed assets. The goods and services may be either used up or transformed in the production process. Some inputs re-emerge after being transformed and incorporated into the outputs

(e.g.: grain is transformed into flour, which is further transformed into bread). The consumption of fixed capital does include in intermediate consumption, which is recorded separately as consumption of fixed capital.

9.3 Gross Value Added

Gross value added (GVA) is a productivity metric that measures the difference between output and intermediate consumption. Gross value added provides value for goods and services that have been produced, less the cost of all inputs and raw materials that are directly attributable to that production. It is the balancing item of the production accounts.

GVA = Output – IC

There is some consumption of fixed capital along with the consumption of inputs and raw materials in most of the production processes. If the consumptions of fixed capital is also subtracted from the output, the result will be the net value added. Practically, this is little difficult job and thus, gross value added is mostly used.

9.4 Gross Domestic Product (GDP)

The measurement of the total production of an economy is the Gross Domestic Product (GDP). This is the single most widely used indicator of economic performance. GDP is the total value of all final goods and services *(without duplication)* newly produced within an Economic territory in a given period of time that generates net incomes to the economy and are available for domestic uses and exports. GDP is usually calculated in annual basis, it can be calculated quarterly basis as well. There are three equivalent ways to estimate GDP: Production approach, Income approach and Expenditure approach.

Production approach

GDP is the sum of gross value added of all resident producer units (institutional sectors, or industries) plus that part (possibly the total) of taxes, less subsidies, on products, which is not included in the valuation of output. Gross value added is the difference between output and intermediate consumption.

GDP = ∑GVA

Where GVA = Output + taxes less subsidies on product - IC

Expenditure approach

Gross Domestic Product can also be viewed as the value of all goods and services available for different domestic final uses or for exports. The expenditure approach to calculating GDP is the sum of household consumption (C), Government consumption on goods and services (G), gross capital formation (I), and exports (X) less import (M) of goods and services.

GDP = C+I + G+(X-M)

Income approach

The income generated through the production activity is distributed between the two factors of production, namely, labor and capital, which receive respectively the salaries and the operating surplus/mixed income of self-employed. Thus, the income approach GDP is the sum of compensation of employees (CE), gross operating surplus and gross mixed income plus net taxes on production.

GDP = CE + Gross operating surplus/mixed income + taxes – subsidies

9.5 Gross National Income (GNI)

Some of the productive activities of residents may take place abroad (for example temporary and seasonal labour working abroad). Conversely, some production taking place within a country may be used temporary and seasonal foreign labour. In addition, some primary income generated within the country may go to non-resident units (for example, interest paid to providers of loans from abroad or dividends paid to non-resident owners of shares). Symmetrically, some primary incomes generated in the rest of the world may go to resident units. Thus, the concept of gross national income seeks to measure the net income due to their ownership of factors of production (labour, unproduced assets and capital) received by residents in a country. Thus GNI is given by the formula:

GNI = GDP + compensation of employees and property income from the rest of the world – compensation of employees and property income to the rest of the world

9.6 Net National Income (NNI)

Net National Income is derived by deducting the consumption of fixed capital from gross national income.

NNI = GNI – consumption of fixed capital formation

9.7 Gross National Disposable Income (GNDI)

Total GNI is not available for domestic final use, since some of it is transferred to other countries without anything being received in exchange, such as money sent to support dependents living in another country. Such transfers are called current transfers, and taking them into account leads to the following concept of gross national disposable income:

Gross national disposable income = GNI + current transfers from the rest of the world – current transfers to the rest of the world

9.8 Gross National Saving

Gross National Saving is derived as balancing item subtracting final consumption expenditure from the gross national disposable income. Gross National Saving represents that part of disposable income that is not spent on final consumption of goods and services.

Gross national saving = GNDI – final consumption

9.9 Nominal and real GDP

Nominal GDP is GDP calculated at current market prices. Therefore, nominal GDP include all of the changes in market prices that have occurred during the current year due to inflation or deflation. Inflation is defined as a rise in the overall price level, and deflation is defined as a fall in the overall price level.

Real GDP is GDP evaluated at the market prices of some base year. For example, if 2010 were chosen as the base year, then real GDP for 2016is calculated by taking the quantities of all goods and services purchased in 2016 and multiplying them by their 2010 prices. The rate of change in real GDP from period to period provides an indication of economic performance as it eliminates the price effect and only shows the change in volume of goods and services produced.

GDP deflator: By dividing nominal GDP to real GDP, one can calculate an implicit index of the price level for the year. This index is called the GDP deflator and is given by the formula

$$\text{GDPdeflactor} = \frac{\text{nominal GDP}}{\text{real GDP}} \times 100$$

Note that in the base year, real GDP is by definition equal to nominal GDP so that the GDP deflator in the base year is always equal to 100.

10. Quarterly National Accounts (QNA)

Quarterly National Accounts originated mainly because of the need for monitoring and analysis of the short- term movements of the economy. Each country needs information about the state of the economy to take economic policy decisions. Quarterly accounts can supply this kind of information in a coherent accounting framework. The Quarterly accounts should adopt the same principles, definitions and structure as the Annual accounts, subject to certain modifications, due to the period covered. Since quarterly accounts adopt the same framework of annual accounts, they have to be consistent over time with them. This implies that the sum of the quarterly data is equal to the annual figures for each year.

An attempt has been made for compilation of Quarterly National Accounts (QNA) from the year 2004/05 in 2010. Currently there is some lacking for timely release of QNA in Nepal.

11. Supply and use tables

The Supply and Use Tables is an integral part of the 2008 SNA. It is presented in the form of matrices and records. Supply and use tables provide a detailed picture of the supply of goods and services by domestic production and imports and the use of goods and services for intermediate consumption and final use (consumption, gross capital formation, exports)[54]. The use table also shows how the components of value added (compensation of employees, other net taxes on production, consumption

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of fixed capital, net operating surplus) are generated by industries in the domestic economy. Thus, supply and use tables give detailed information on the production processes, the interdependencies in production, the use of goods and services and generation of income generated in production. After balancing supply and use table provide coherent data linking industries, products and sectors.

Nepal has published first Supply and Use Tables in 2013 taking the 2004/05 as the reference year. The first SUTs was prepared based on the benchmark surveys year 2004/05 when around 40 different surveys, censuses and studies were conducted. The size of the SUTs is 51 by 32.

The second attempt to publish SUTs in Nepal has been done in 2016 for the reference year 2010/11. The size of these SUTs is 81 x 60. While compiling SUTs, System of National Account (SNA) 1993 was followed. All outputs were measured in basic price and import of goods and services were measured by using CIF/FOB adjustment. Domestic output and imports together produce total supply at basic price. Then by incorporating trade and transport margin with net taxes on products, the supply was converted in purchaser's price. Similarly, intermediate consumption, final consumption expenditure, gross capital formation and exports are the use of economy which was measured in purchaser's price. And finally these SUTs has been manually balanced.

12. Input-output tables

Supply and Use tables are the basis for constructing Input output tables. Input Output tables are product-by-product or industry-by-industry matrices combining both supply and use into a single table with identical classification of products or industries, applied to both rows and columns. They provide detailed information about the supply and use of products in the economy, and the structure of and inter relationships between industries. The input-output table provides an important database for impact studies and productivity analysis at very detailed industrial and product levels.

13. SDG and national accounts

The Sustainable Development Goals (SDGs) are a common set of development goals for all countries, with a deadline for attainment of 2030 developed by United Nations (UN). As per the effort made by UN to transform the world into prosperous society by 2030, there are 17 SDGs and 169 targets adopted by most of the member countries. By convention, it is very important to achieve the economic development in order to ensure the social transformation to end poverty, protect the planet and ensure prosperity for all. In this context, macroeconomic indicators are key barometers to measure the progress of SDG. Most of the SDG indicators are directly or indirectly related to national account statistics. Out of 17 goals, Goal number 8, "Promote sustained, inclusive and sustainable economic growth, full and productive employment and decent work for all" is directly related with National accounts. The SDG 8 mainly focuses on the economic agenda which can be measured by using the macroeconomic indicators directly. The good national account statistics will support to measure the progress towards SDG in time and left much more opportunities to correct as per necessary.

14. National accounts compilation practices in Nepal

CBS under the National Planning Commission is responsible for the compilation of National Accounts Statistics (NAS) in Nepal. The NASs are compiled by the CBS, following the recommendations and

guidelines enunciated in the United Nations - System of National Accounts (UN-SNA), brought out by the United Nations for the purpose of standardization of computations of NAS and comparability of these statistics among the countries. The CBS has been broadly following the UN-SNA, as revised from time to time.

14.1 Historical background

For the first time in the history, an attempt to estimate the main aggregates of Gross domestic Product (GDP) was made in 1961/62 by a Committee formed for estimating national accounts in the then Ministry of Economic Planning. After two years, the work was assigned to Central Bureau of Statistics (CBS). Since then the national accounts estimates are continuously prepared and published by CBS in an annual basis.

The limited national accounts aggregates for the period 1964/65 to 1973/74 were prepared following the concepts of UN system of national accounts 1953.Benchmarking of national accounts estimates has become prime need for improving the quality of national accounts statistics. Rebasing and benchmarking exercise of national accounts series was done continuously following first revision which changed the base year 1964/65 to 1974/75 with implementing SNA 1968, second revision which changed the base year 1974/75 to 1984/85, third revision which changed the base year 1984/85 to 194/95.

14.2 Data source and compilation methodology

The present series of national accounts is the consequence of fourth revision, which changed the base year from 1994/95 to 2000/2001. This revision was rebased and benchmarked national accounts estimates and updated the methodology according to the 1993 SNA guidelines. Present series of NA is limited to compile major macroeconomic indicator like GDP, final consumption, gross capital formation and net export were GDP has been estimated by production approach and final consumption, gross capital formation and net export has been estimated by expenditure approach. These macroeconomic indicators are available in current and constant price. Other major indicator like GDP growth rate, consumption as a percentage of GDP, saving as a percentage of GDP, capital formation as a percentage of GDP, GNI, GNDI, saving etc., are prepared based on these major microeconomic indicators.

CBS has been using both primary and secondary data sources for compilation of National Accounts. Various studies, surveys and censuses conducted by CBS are primary sources where as other agencies producing different economic statistics are secondary sources.

Data on production of crops, livestock and fisheries provided by Ministry of Agricultural Development are used to estimate the output of agriculture sector whereas study on cost of production conducted by CBS gives the intermediate consumption of this sector. Price of agriculture commodities are available from CBS survey. GVA of the mining and quarrying sector are based on the data provided by Department of Mining.

Manufacturing sector estimates are prepared by analyzing the data provided by census of manufacturing establishment conducted every 5 years, survey of small manufacturing establishment conducted every 10 year, Nepal Living Standards survey conducted and quarterly manufacturing surveys conducted by CBS. Output, input, value added, capital formation and other aggregates generated in the electricity generation activities are obtained from the financial statements of Nepal

Electricity Authority and other private electricity corporations. For the aggregates of water subsector, financial statement of Nepal Drinking Water Corporation and Kathmandu Upatkaya Khanepani Limited (KUKL) are analyzed. Construction sector estimates are prepared by commodity follow approach. Major data source for this sector are imports and domestic production of construction material and study on the cost composition of construction activities (2005).

The estimates of output for trading activities are derived using a benchmark study of trade margins, 2003. The volume of tradable goods for domestic production, especially agricultural production and production of manufacturing goods from informal sector is estimated using NLSS data and for the imports, Department of custom data are used. The GVA and other NA aggregates for the hotels and restaurants are obtained from processing the individual financial statements of five star and four star hotels and for the other category of hotels, estimates are based on the survey on Hotels and Lodges, 2003 and number of tourist arrival. GVA and other aggregates of transport, storage and communication sector are prepared by analyzing the data of number of vehicles by type and financial statements collected form respective agencies and corporations. Main data sources for the financial intermediation are Nepal Rastra Bank, commercial bank, development bank, other financial companies and Rastriya Bima Sansthan. The GVA and other estimates of real estate are based on benchmark survey conducted by CBS in 2005 and number of real estate in current year. NLSS data are used for estimation of renting activities. Business service activities such as computer and related activities, research companies, legal service activities, cooperative activities, auditing and tax consultancy, advertising agencies, employment agencies, security services, and photographic activities are covered through benchmark survey 2004/05. GVA and other aggregates of public administration and defense sector are estimated through the data provided by Financial Comptroller General Office (FCGO). Different types of benchmarking surveys were conducted by CBS for the estimation of private education services. For Government education service FCGO, Department of Education, Higher Secondary Education Council, University Grant Commission (UGC) and Technical Education and Vocational Training (CTEVT) data are used to derive the estimates. The estimates for the government health sector are obtained from the government accounts. The estimates of private business sector health activities are based on the data collected from the survey on private hospital activities and survey on private clinics and health services. Community and Other Personal Services includes range of services provided by different establishments/ industries. GFCO, benchmark surveys (CBS 2004 and 2005), Village Development Committee (VDCs), District Development Committee (DDCs), and Municipalities data collected annually are used to prepare the estimate of this sector.

14.3 Revision policy

CBS has been publishing the National Account Statistics with three years revision policy. Revisions are carried out in order to incorporate the most current information from the regular surveys, censuses, administrative records, public sector accounts etc. The national accounts estimates for the current fiscal year are prepared before ending the year due to high demand from government and other agencies. The first estimate is preliminary and this is followed by two subsequent revisions. At the same time, previous years' estimates are revised and before two years' estimates are final.

14.4 Way forwards

Following major points should be considered to improve and update the national accounts estimates of Nepal.

1. CBS should explore the areas where the data gap is highly persistent. Some surveys should be conducted in this area to fulfill the data gaps and make robust estimates and some necessary benchmark survey should be conduct to migrate from SNA 1993 to SNA 2008.
2. The base year of the current national account series is quite prolonged. There is immediate need of rebasing and benchmarking to address the newly emerged economic activities and implementing the SNA 2008.
3. For the reliability and robust estimate of national accounts, SUTs should be prepared annually.
4. For the sound analysis of aggregate demand of the economy, there is inevitable need of input-output table of the economy. Having experience from the preparing two SUTs, CBS should take initiative to construct input output table.
5. CBS estimates are limited to production accounts even if CBS has long history of compiling national accounts. To address the demand of user and standardized national accounts estimates, it is urgent to preparing all sequence of accounts.
6. QNA estimates are highly demanded by the policy makers and general users because of its properties of providing picture of current economic developments and capacity to measure business cycles. CBS (especially national account section) should be strengthened by providing capable human resource to prepare and publish QNA estimate timely.
7. A fixed calendar of releasing NA estimates should be prepared.
8. There is an urgent need to strengthen the inter and intra organizational coordination and collaboration to produce and interact for necessary macroeconomic statistics.

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FORESTRY STATISTICS IN NEPAL

Deepak Kharal*

Abstract

This chapter deals with the system of generating and publishing the forestry sector statistics in Nepal. It further gives the recent forestry sector statistics with the original format published by the authorities. The data generating authorities as well as experts of the concerned fields were visited and consulted while analyzing the statistics. The forestry system includes the management of the forests, conservation of the protected areas and watersheds, study, research and survey of the forests and biodiversity resources. There is no established forestry information system in place so far. However, initiation is being taken to develop the open source forestry information system (OSFIS) through web portal. The major forestry sector statistics includes forest area statistics, growing stock of wood and biomass resources, carbon stock, plant and animal richness etc. The production and sales statistics of timber, fuelwood, herbs, non-timber forest products including sand, stone and gravel are also generated annually by the Department of Forests. Forest crime statistics is also important information provided by the authority. The protected area statistics include their number and area extension, wildlife census and count, number of protected wildlife, wildlife attack and relief statistics, tourist arrival, royalties from the system, research and study within the area etc. The watershed and landslide inventories are the important statistics under soil conservation and watershed theme. The forestry sector needs an integrated forestry information system covering all dimension of the sector that are technical, managerial and financial.

1. Introduction

Forest is the largest land use in Nepal which has strong linkages with the agricultural productivity and environmental conservation. The Ministry of Forest and Soil Conservation accounts the forestry and logging products of commercial use monthly, quarterly and annually while a large part of the services from it are outside the scope of the market, they are not easy to value in a monetary sense. The forests cover about 44.78 % (40.36% by forests and 4.38% by shrub land) of the total area of the country (DFRS, 2015). The official statistics of forest area can be found through 1960s when first forest inventory was accomplished with the support from United States Assistance for International Development (USAID). Such forest inventory had provided area statistics and timber stock assessment of Terai and adjoining hilly districts of Nepal. Similarly, Land Resources Mapping Project (LRMP) published the area statistics of Nepal's forests in 1986 covering all development region and physiographic region based on the interpretation of aerial photos of 1978/79 (LRMP, 1986). It was the second time in Nepal generating forest statistics particularly on forest area.

* Director General, Department of Forest Research and Survey

Master Plan for Forestry Sector of Nepal (MPFS) generated large amount of forestry statistics including plantation and natural forest areas, growing stocks, forest productivity, consumption of forests product, future forecasting of supply and demand situation etc. (MPFS, 1989). During 1990s the Department of Forest Research and Survey with the support from FINNISH government has published forestry statistics covering area and growing stocks of the forests which was third of its kind in Nepal (DFRS, 1999). The DFRS has recently produced large number of forestry statistics covering area, growing stocks, carbon stocks, forest trees and species distribution, forest disturbances (DFRS, 2015).

Besides area and growing stock statistics, the Department of Forests (DoF) as an authority for the forest management also produces large datasets specially production, sales and revenue statistics of timber, fuelwood and non-wood forests products. The Department of Forests also administers the different type of forest regime as indicated in the Forest Acts (1993) and Forest Regulation (1995). Area statistics of such forest regime as well as production statistics of wood and non-wood resources are updated by the Department annually. Forestry statistics also includes the number and area of protected areas (National Parks, Wildlife Reserves, Hunting Reserves, Buffer Zone, Conservation Area) administered by the Department of National Parks and Wildlife Reserves.

2. Objectives

This chapter aims at describing the processes and practices of generating forestry statistics in Nepal. It reviews the data policy, institutional mechanism, programs and projects in generating forestry sector statistics. It also describes about the forestry sector data types, data collection, analysis and reporting. It assesses the problem and constraints in forestry sector statistics. It finally recommends some suggestions for standardization of the forestry sector statistics.

3. Methodology

The analysis and reporting of this writing was thoroughly based on the secondary sources of information. Forestry sector experts and focus persons were first identified based on their publications and consulted them for sources of data, data collection, analysis and reporting purpose. The major organization involved in the data collection, analysis and publishing the forestry sector statistics were also visited and consulted with the focal point.

The Published reports from government organizations were reviewed and collected the information from there. There are also a large number of reports from international organization on the forestry sector statistics which were cautiously taken into consideration for data analysis. However, reports from other non-government entity were observed only as a reference material.

4. Research and analysis

Present scenario

Forestry sector statistics are mostly generated from district and management level whereas such statistics are mostly published by the Departments at central level. The central level organizations synthesize the information and published the statistics as necessary. Some statistics are published regularly at annual basis and some are published at periodic basis. Besides government organization, the Forests Products Development Board, the Timber Corporation of Nepal and the Herbs Production

and Processing Company Limited are also working as the para-governmental organizations under the Ministry and they also generate statistics in line with their mandates.

Department of Forest Research and Survey has the mandate of generating and updating the area, stock, productivity assessment of forests at national, regional and district level. The Department also produces forestry sector statistics in the form of research finding through Journal, leaflets, booklets, books and reports. It has a long history of publishing national level peer reviewed journal namely the *Banko Janakari* to disseminate research finding especially in forestry, environment and livelihood sector. The latest one (Vol 26 No. 1) is published recently and up-loaded at the official website (www.dfrs.gov.np, 2016). There is separate editorial board of *Banko Janakari* to select or reject the paper as well as edit and publishing the journal.

The DoF publishes production, sales and revenue statistics of major forest products annually. The major products are timber, fuelwood, herbs and non-wood forest products. There are also a number of products under the herbs as well as non-wood forest categories. Even the sales statistics of stone, gravel and sand comes under the category of non-wood forest products. The DoF has also a system of publishing crime statistics related to forests as indicated by the prevailing acts, regulations and directives. Besides, the Department also generates large date sets about the number and area statistics of different forest regimes.

The statistics on protected area system of Nepal are mostly generated by the he Department of National Parks and Wildlife Conservation (DNPWC) in different theme in yearly and periodic basis. The major statistics of protected area system can broadly be grouped into two types that are i) Area statistics and ii) wild animal statistics. Protected area system of Nepal includes National Parks, Wildlife Reserves, Hunting Reserves, Conservation Areas and Buffer Zones which are being managed under the prevailing National Parks and Wildlife Conservation Acts and Regulation. In addition, The DNPWC monitor and count the number of major protected wild animals in periodic basis and publishes the statistics regularly.

Area statistics of forests

The Department of Forest Research and Survey has recently published six reports related to forest resources assessment covering area statistics, growing stocks, biodiversity, carbon stock and level of disturbances in the sector. Table 1 shows the recent area statistics of forest resources of Nepal in original format.

Table 1: Area statistics of forest and other land cover in Nepal

Physiographic Regions	Forest	Other Wooded Land (OWL)			Other Land	Total[55]
		Tree crown cover 5-10%	Shrub	Total OWL		
	411,580	5,573	3,930	9,502		
		22,336	336	22,672	501,848	1,898,263
Middle Mountains	2,253,807	29,308	32,979	62,287	1,993,302	4,309,396
High Mountains and High Himalia	1,922,909	473,850	79,581	553,431	4,072,426	6,548,766
National total	5,962,038	531,066	116,826	647,892	8,163,492	14,773,423

Note: Due to rounding-off of area figures, there are slight differences in their total.

Source: DFRS (2015)

55 This area indicates the total mapped area based on the generalized international boundary data from the Survey Department. The official area of Nepal is 147,181 km2.

Statistics on forest growing stock

Another important forestry sector statistics is about growing stock of forests and wood resources. Growing stock refers the stocking of forest and tree resources in terms of number, volume and biomass. This information is useful in assessing the production and supply potential of the forests in sustainable basis. Table 2 below depicts the recent stock statistics forest resources of Nepal.

Table 2: Growing stock of forest resources in Nepal

Physiographic Regions	Regeneration/ ha (<10 cm DBH)	Stem/ha (>10cm DBH)	Basal area (sq.m/ha)	Stem Vol/ ha Cum	Biomass (Ovendry-MT/ ha)	Carbon stock in tree component (MT/ha)
Terai	31,620	274.19	17.08	161.66	172.75	104.47
Churia	21,152	342.46	17.17	147.49	156.55	97.69
Middle Mountains	8,780	429.29	16.53	124.26	130.24	79.42
High Mountains	3,689	526.51	28.49	225.24	246.78	152.49
National average	11,566	429.93	20.58	164.76	176.83	108.92

Source: DFRS (2015)

Regime-wise forest statistics

The prevailing forestry legislation has defined two major forest categories namely the private forests and national forests. The National Forests are further categorized into six types based on the management modalities and they are government managed forests, community forests, leasehold forests, protection forests, religious forests and collaborative forests. The district level organizations (District Forests Offices) provide the basic information of forest regime to the DoF. The DoF updates the regime-wise forest statistics in terms of number, area and peoples benefited and also publish such statistics in HAMRO BAN and web-site regularly (www.dof.gov.np, 2016). The HAMRO BAN book published by the DoF is a major source of information in this regard. Table 3 reveals the national level statistics of forest regimes in Nepal.

Table 3: National statistics on forest regime in Nepal

SN	Type of forest regime	No. of management unit	Area (in ha.)	No. of HH (involved)	Remarks
1	Community Forests	18324	1717811	2260688	
2	Leasehold Forests	7419	42835	75021	
3	Collaborative Forests	21	57663	800000	
4	Protected Forests	16	356792	-	

Source: www.dof.gov.np, 2016

Statistics on forest products

The sustainable supply of basic forests product to the people is one of the prime objectives of Forest Policy, 2015 (MoFSC, 2015). The DoF is mandated to fulfill such responsibility under the MoFSC. The major forests products are timber, fuelwood, fodder, non-wood forests products (NTFPs). There are numbers of reports showing environmental benefits of forest ecosystem at small and local level but comprehensive environmental benefits from such services are yet to be assessed. All the forest products statistics are generated by the district forests offices at first and then forwarded to the DoF for reporting and publishing purposes. The format as well as forest products statistics of Nepal is shown in Table 4 below.

Table 4: Wood productions and sales statistics in Terai and inner Terai districts by agencies

Particulars	Items	Unit	Agencies			Total
			TCN	DFO	DFPSB	
Old stock (069/70)	Timber	Cft	600098.08	1065230.86	95136.60	1760465.54
	Fuelwood	# stack	707.59	864.90	69.20	1641.69
Production	Timber	Cft	572499.30	208523.19	68038.32	849060.81
	Fuelwood	#stack	300.35	312.25	92.10	704.70
Total	Timber	Cft	1179948.54	1291293.59	163174.92	2634417.05
	Fuelwood	# stack	1011.94	1180.30	161.30	2353.54
Sales	Timber	Cft	224957.57	356054.81	106433.35	687445.73
	Fuelwood	# stack	140.50	493.82	482.94	1117.26
	Royalty	NRs.	153640554.98	303438304.00	89307847.18	546386706.16
Remaining stock	Timber	Cft	954990.97	935238.74	54159.35	1944389.06
	Fuelwood	# stack	871.44	686.48	-321.64	1236.28
Low grade	Timber	Cft	0.00	47061.90	1089.47	48151.37
	Fuelwood	# stack	0.00	110.75	0.00	110.75

Source: DoF (2014)

Table 4 shows the national summary of wood production, sales and stocks remaining of Terai and Inner Terai districts by the agencies involved in the activities. Such agencies are the Timber Corporation of Nepal, District Forests Office and the District Forest Products Supply Board which provide field level information to the DoF for publication purpose. There is a separate data sheet to show the production, sales and stock statistics of wood resources coming from private forests, community forests and government managed forests for hilly districts.

The management, production and sales of the non-wood forest products also come under the jurisdiction of DFO at district level and DoF looks after the overall planning and management of the resources at central level. Obviously, the MoFSC is the apex institution in policy formulation and periodic and perspective planning of the sector. The Table 5 reveals the number of herbs species sold in 2013/14 by development region of Nepal.

Table 5: Sells statistics of herbs, NWFP and minerals by development region (2013/14)

SN	Dev region	Herbs			NWFP				
		No. of type	Quantity (kgs)	Royalty (NRs.)	No. of type	Quantity (kgs)	Royalty (NRs.)	Quantity (cft)	Royalty (NRs.)
1	EDR	19	1653898.0	1961151.0	6	634202.2	4664894.0	-	-
2	CDR	21	206443.0	468236.3	9	298353.8	5022872.0	4652365.0	3908851.0
3	WDR	21	1404287.5	415729.0	6	1057063.7	5116309.1	-	-
4	MWDR	42		17755171.0	4	6267930.9	17374249.8	-	-
5	FWDR	13	119356.0	4465268.0	5	3409528.9	14957652.5	-	-

Source: DoF (2014)

The DoF also updates the forest crime statistics annually. The major types of forest crime include illegal logging, forest encroachment, illegal hunting of wild animals, illegal collection of herbs and NTFPs, forest fire and other forest products. Such a forest crimes are measured in terms of the number of people involved in forest crime, amount of confiscated forest products (wood, fuelwood, herbs and NTFPs etc.), area of forest encroachment and number of weapons used in forest crime activities. The district level forest crime statistics are updated at national level and published accordingly.

Statistics on protected area system

Protected area system of Nepal occupies about 23.31% of the total physical area of the country. The major categories are National Park, Wildlife Reserve, Hunting Reserve, Conservation Area and Buffer Zone. The Buffer Zone also has number of forest protection system namely the BZ Community Forests, BZ Leasehold Forests, BZ Religious Forests and BZ Private Forests. Table 6 shows the protected area statistics of Nepal.

Table 6: Protected area statistics of Nepal

SN	Type of PA	No.	Total area (ha.)	No. of Tourists arrival (2014/15)	Royalty in NRs. (2014/15)	Remarks
1	National Park	10	1085300	378364	456446951	
2	Wildlife Reserve	3	110739	9806	15538822	
3	Hunting Reserve	1	132500	-	370945	
4	Conservation Area	6	1542595	128925	9782810	
5	Buffer Zone	13	570841	-	56571074	Dept.'s royalty
6	Wetlands	10	60561	-	538710602	Total Royalty

Source: DoF (2014)

The DNPWC assesses the current status of the protected wild life and update the statistics as envisioned by the National Parks and Wildlife Conservation Act, 1973. Currently there are 26 numbers of animals, 9 birds and 3 reptiles listed as the protected wildlife in Nepal. Besides, the DNPWC maintains the statistics on wild animal counting, wildlife translocation, death, wounded and relief cases of wild animals, damages from wild animals etc. It also gives the statistics of encroachment area within the protected area system.

Watershed statistics

More than 6000 rivers and rivulets constituting watersheds of varying sizes (big basins to micro-watersheds) intersect the physiographic regions of Nepal. These watersheds possess distinct characteristics depending on the origin of the rivers and rivulets from different physiographic regions. The district-wise watershed condition of Nepal is assessed using estimated index representing the current state of soil erosion in an area in comparison with that of area under natural or "well managed" condition (www.dscwm.gov.np, 2016). The categorical statistics on watershed conditions is presented in Table 8 below.

Table 8: Watershed condition by district in Nepal

SN	Category	# of district	Remarks
1	Very poor	7	Accelerated erosion is advanced. Agricultural and forest productivity is absent or greatly reduced. Sediment production and extreme runoff conditions have effectively destroyed the natural character of the streams
2	Poor	5	Disturbance by accelerated erosion is serious and results in considerable stream sedimentation and reduced land productivity
3	Marginal	13	Significant disturbance in the soil mantle and / or stream channel exist
4	Fairly good	25	Minor amounts of disturbances may be present. Correction can come about through normal management practices
5	Good	25	In or near undisturbed condition
		75	

Source: DSCWM (2015)

Plant statistics

Nepal is rich in terms of plant biodiversity compared to the proportion of land in earth. The Department of Plant Resources specially updates the plant statistics from research perspective. There is a record of medicinal and aromatic plants in the Department and the book is published for common purpose. The Department further updates the statistics of herb species prioritized for the economic development of the country.

5. Sustainable development goal and forests

Management of forests and trees can deliver to a full range of goals for sustainable development. It would be hard to find a simpler way of changing the world for the better than by planting and managing trees. There are forest related targets and indicators in several or most of the SDGs. Full integration of the benefits of trees and forests in the SDGs is both desirable and feasible. Many forest related targets already prevail in international policy instruments such as Rio conventions; forest sector instruments; food and agriculture goals and challenge targets; and trade and economic development conventions and initiatives. There are 10 key targets arranged in three groups – can be justified and incorporated into the SDGs. The target 1 aims to increase Income and employment from forests and trees in rural areas. The second one is to strengthen Rights, tenure and governance of forests. The third target is related to food security and nutrition contribution from forests and trees while forth one is to improve

forest resources quantity and quality. Conservation and improvement of forest biodiversity is the fifth target. Sixth target is related to enhancement of water quantity and quality contribution from forests. Other subsequent targets are strengthening climate resilience and mitigation contribution of forests, increasing energy from forest resources, improving efficiency of forest resource use and enhancing Investment in, and use of, products from sustainably managed forests.

6. Policy recommendations/Way forward

Ministry of Forests and Soil Conservation is the apex institution in policy formulation and planning of the forestry sector in Nepal (MFSC, 2014). However, Ministry doesn't have institutional structure to deal with forestry sector database system. Of course, the Departments support in its mission as necessary. It is better to have forestry sector database system at the Ministry covering all its sub-sector so that a holistic and consolidated forestry statistics can be generated. The sub sectoral organizations have some sort of structure to deal with their statistics that needs to be strengthened with specific mandate and IT professionals. Capacity of forestry professionals to deal with database system should be enhanced regularly. Frequent change of the forestry staffs at central level, except in the Department of Forest Research and Survey, is another problem for the sustainability of the database system. The DFRS can be developed with required facilities as a central depository of sub sectoral forestry statistics so that sustainability of the central level database system can be ensured. An internet based forestry information system could be very much useful to managing the system. The forestry sector data need assessment is necessary before developing any kind of database system in this sector. There are some duplication of works in some sub-sectoral forestry organizations. Area and stock assessment of the forests resources have been made by the both DFRS and DoF. Similarly, herbs and NTFPs research have been made by the DFRS and the DPR. Such kind of duplication needs to be corrected by restructuring of the institutions.

7. Conclusion

Forestry sector statistics can broadly be categorized into five division: i) forest management, ii) forest production and sales, iii) protected area, iv) watershed and v) forests and plant research based on the nature of data generation, namely the forest management, production and sales of forest protected area management, research and survey . The management authorities at the district level generate the statistics whereas Departments at central level synthesize and publish them as necessary. Publication of the previous fiscal year statistics only in the end of the current fiscal year indicates the very cumbersome process in collection, analysis and publication of forestry sector statistics. There seems lack of database management system in all sub-sector though very few of them works in the GIS based database system. Majority of the analysis are conducted in spread sheet and presented in the word format later. The sub-sectoral coordination mechanism or framework is not well established so far except some meetings at the Ministry for discussion and decision making in a particular purpose.

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AGRICULTURE AND RURAL DEVELOPMENT STATISTICS

Badri Kumar Karki*

Abstract

The Agriculture statistics, conventionally, revolves around the crop and livestock statistics. This chapter will review on arrangement for the collection of agriculture and rural development statistics to meet policy, monitoring and evaluation of agriculture related development plans. Methodology adopted for preparing this article is based on review of published reports, literatures and concerned websites. Presently, Nepal's agricultural and rural development statistics are somewhat limited and sometimes the data obtained from different sources differ widely. Agriculture and rural development statistics are being collected through Central Bureau of Statistics (CBS) and Ministry of Agricultural Development (MoAD) since long time. This chapter helps readers to identify the data producer, the key sources of information, the strengths and weaknesses of agriculture statistical system in Nepal. In order to cater for the growing demand of high quality and timely agriculture statistics, responsible agencies need to forge better harmonization.

1. Introduction

Agriculture statistics is comprehensive and provides data on a wide range of areas such as area and production of crops, land use, irrigation, land holdings, agricultural prices, livestock, fisheries, forestry, etc. Eighty three percent of the total population of Nepal lives in rural areas and mostly they rely directly or indirectly on agriculture as their principal means of livelihood. Agriculture has been playing a significant role in the Nepalese economy for a long time. Agriculture along with fisheries and forestry accounts for one-third of the nation's Gross Domestic Product (GDP) In view of the predominant position of the agricultural sector, collection and updating of agricultural statistics assume great importance. The reliable and timely available statistics is the back bone of developmental process not only for policy formulation but also for implementation, monitoring and evaluation of agriculture policies and development of the country. In the 21st century, agriculture and rural development statistics have been extensively used for environmental, and sustainable development, food security and poverty alleviation, monitoring SDG and MDG, and gender equity perspective.

* Director, CBS

2. Objectives

This chapter discusses how the collection, processing, and dissemination of Agriculture and rural development statistics are arranged in Nepal to meet policy development, monitoring and evaluation of national plan documents. It explores on different data collection initiatives and enlightens on how the system could be better organised and suggests ways to improve institutional co-operation.

3. Methodology

This article is based on review of published reports of CBS and MoAD. FAO publication and literatures are also looked at thoroughly. Experts' opinion and my own experiences are main instruments for this write up. International journal and relevant website are supporting hands for coming up with this article. Manual of surveys and census and unpublished papers are also taken into account.

4. Agricultural statistics

The agriculture statistics in itself comprise the area, production and marketing of crop, livestock, horticulture, fisheries, poultry etc. while the broader concept includes the aspects of forestry, land and water use.

The statistics related to agriculture activities can be broadly divided into two parts: Structure and Current agriculture statistics.

4.1 Structural agriculture statistics

The structural agricultural statistics such as number of holding, number of parcel, average parcel per holding and size, land use, land tenure, Irrigated area and source of irrigation, Crop area, number of livestock and poultry, Agricultural equipment, etc. are being collected regularly through decennial agricultural censuses undertaken by CBS since 1961/62. The census of agriculture is one of the key pillars of a national statistical system, and it is often the only means of producing statistical information on the structure and other relevant aspects of the agriculture sector. Moreover, it is the only data collection instrument that produces statistical information on farms at the lowest geographical level and therefore is an essential source of information for governments and decision-makers in the country. However, agricultural activities undertaken by government organizations, businesses enterprises, etc. had been excluded in the census.

National Sample Census of Agriculture (NSCA) 2011/12

Agriculture census is a statistical operation for collecting, processing, analyzing and disseminating data on structure of agriculture, representing whole part of the country. CBS has been involved in the operation of such important basic data on agricultural structures through decennial NSCA. NSCA Nepal 2011/12 is the sixth census in its history conducted by the CBS following the recommendations and framework of Food and Agriculture Organization (FAO) of the United Nations. All of these censuses were conducted on a sampling basis. The sample size is so large that instead of calling it simply sample, it's called sample census.

The basic information needed for frame building for the agriculture census is the number of agriculture holdings which is based on the information collected in the population census at the time of household listing. This is the ultimate sampling unit of the agriculture census.

Most of the terminologies used in Agriculture Census are common except "agriculture holding" and "parcel".

***Agriculture holding**: Agricultural holding is defined as an economic unit of agricultural production under single management satisfying any of the following conditions:*

a) Agriculture land at least 4 Anna in Hill and mountain or 8 Dhur in Terai

b) Livestock raising at least one big head (cow, buffalo, etc.)

c) Livestock raising at least five small head (goat, sheep, etc.)

d) Poultry raising at least 20 birds (chicken, duck, etc.)

***Parcel**: A parcel is any piece of land of one land tenure type entirely surrounded by other land, water, road, forest or other features.*

Agriculture census questionnaire

The 2011/12 NSCA was face-to-face paper based interview. There were three types of household questionnaires used in the census. In addition to this, a community questionnaire was also administrated to collect community level characteristics.

Schedule 1: Agricultural Holdings Listing Form for the selected primary sampling unit (PSUs)

Schedule 2: List of Selected Agriculture Holdings

Schedule 3: Main Questionnaire for Individual Agricultural Holdings

This Agriculture Census adopted most of the FAO recommended items under main headings like: identification, holder characteristics, demographic and other characteristics, employment, land and water, crops, livestock and poultry, agricultural inputs, agricultural machinery and equipment, non-residential buildings, agricultural credit, forest, fishery and ancillary activities on the holding. For the first time in this census, the community questionnaire was administered to collect community level information on socio-economic conditions, community infrastructure and service and development facilities.

Sampling design

The sampling design adopted in the 2011/12 NSCA was a two-stage stratified sampling with district as strata, either an individual ward or a sub-ward or a group of contiguous wards as the primary sampling units (PSUs), and agricultural holdings as the ultimate sampling units (USUs) for district-wise publication of the data. Each of the 75 districts was considered a stratum.

The first-stage selection was done using probability proportion to size systematic sampling (PPS systematic) with the number of holdings in USUs as the measure of size. Selection of agricultural holdings at the second stage was done using equal probability systematic sampling. The overall

sampling design is self-weighted within each district, provided the number of households in every enumeration area (EA) at the time of listing and in the population census is same. Differences in these numbers, if any, were easily taken care of at the selection stage of the number of agricultural holdings by adjusting the holdings from 20 to 30. The sample selection was done in such a way that all holdings in a given district have the same chance of selection in the sample. Manang district was completely enumerated because it had only a small number of holdings. The sample size was 1,24,000 agriculture holdings in 2011/12 census.

Census reports and micro-data

The following are the main reports published by CBS.

- National level report
- Report for each of 5 development regions
- Report for each of 3 ecological belts
- Report for each of 75 districts &
- A summary report

In addition to the census reports, for the first time census micro-data are also have been made available for sale.

4.2 Current agriculture statistics

Current agriculture statistics is very crucial and widely used statistics. The MoAD and the CBS are both involved in collecting current agricultural statistics such as area and production of crops (temporary and permanent), yield rate, price of crops, livestock inventory and livestock products and fisheries production etc. Current agriculture statistics in Nepal are being collected mainly from the reporting system of various units of MoAD which sometimes differ widely with the data obtained from census/ surveys conducted by CBS. A synchronized effort of CBS and MoAD on regular production of current agriculture statistics improved methodology is our next step.

Surveys, Crop cutting experiment and Administrative records are the major sources for current agricultural statistics in Nepal.

Surveys

CBS is mandated for the collection, compilation and dissemination of current statistics of agriculture sector. It had developed and to some extent, put in place the Crops and Livestock Survey (CLS) in 1993 but could not meet the expected requirements. As a result, MoAD has been producing current agriculture statistics annually based on crop condition survey. In order to improve current data collection system, sample design along with its instruction manual for agricultural household survey was developed by MoAD in 2001 especially for major crops (paddy, wheat, maize, millet, barley, potato, pulses, oilseeds, vegetables, fruits and sugarcane) as well as livestock population (cattle, buffaloes, goats, pigs, chicken). The main objective of this survey was to find annual change for forecasting crop situation of the country.

In this technique, a two-stage sample design was adopted for data collection. At first stage, ward (PSU) is selected with probability proportional to size (PPS). The number of PSU is minimum 30 or 5 percent of total number of wards of the Village Development Committees (VDC) or Municipality. In the second stage; all agricultural holdings of selected wards are first listed and 5 percent of that holdings

are selected by applying systematic sampling technique and interviewed. Interview are made twice a year in summer and winter crop cutting period for estimation and adjustment of crops and one time in a year for livestock population and production.

Unfortunately, this technique could not be fully implemented by MoAD/district level offices due to many problems such as trained manpower, financial constraints, etc.

On the other hand, ad- hoc surveys like vegetable survey, commercial poultry survey, fishery survey, commercial floriculture survey, etc. are being accomplished by CBS. Likewise, Nepal Central Bank is also collecting the retail and wholesale price of agricultural commodity by household budget survey. Customs department is producing statistics on import and export of agriculture commodities.

Crop cutting experiment

Crop cutting experiments are conducted by each District Agriculture Development Office (DADO) aiming to find out the average yield of the major crops at district level. The number of cuttings depends upon the size and characteristics of agriculture in the district which are allocated by DADO. Generally, the area for crop cutting is taken as 2 by 5 Square meter but in mountainous region, it is less. Also, the crop cutting experiment is carried out considering the type of area such as irrigated and non- irrigated, improved and local seed used etc. The figures so obtained are used to adjust corresponding crops production.

Administrative records/reports

Information on weekly/monthly crop situation reports and effects of natural disaster obtained from district level offices are the mechanics that have been used by MoAD for estimating current food and agriculture statistics. As per system set up by ministry, the field level offices (Service Centers) report detail information on crop condition, agricultural inputs, fertilizer availability, rainfall, livestock population as well as natural disaster like flood, drought, hailstone, cold wave, epidemic,; etc. through district offices to the ministry. These reports are used to adjust crop and livestock estimates such as area production of crops as well as livestock numbers and products. Likewise, Customs Department is responsible for keeping amount and price of imported and exported data on agriculture products.

4.3 Strengths and weaknesses of agriculture statistics in Nepal

Current agricultural statistics are usually collected through administrative reporting systems and/or through sample surveys by MoAD. This reporting method of data collection is cheap and easy, but data quality often suffers because of poor reporting and problem in adoption of statistical procedures. This may leads a wide discrepancy in agriculture data. Data on area under crop usually poses question marks in our data system. There are often incompatible differences between production estimate published from District Agriculture Development Office (DADO) and MoAD. In these circumstances, a regular survey on crops and livestock can be done by joint efforts of CBS and MoAD which could be invaluable in providing a statistically sound source of current agricultural statistics. So there is urgent need of collective effort of these two agencies.

Strengths

- Years of experience of CBS in statistical system and good image in international arena.
- Availability of human resources in CBS and Statistical cadre in Civil Service

- Large network of local level administrative units in MoAD
- Capable of following the international guidelines and recommendations

Weaknesses

- No-disaggregated data at local level(VDC) and by gender
- Institutional weak coordination among data producing agencies
- Weakly followed of statistical calendar
- Indifference attitude to create statistical/MIS units in some of the ministries and departments
- Absence of innovation (research and development)
- Staff motivation and limited field staff
- Inadequate statistical literacy

Table 1: Producers and major indicators of agriculture statistics in Nepal

Producer	Major indicator	Method	Frequency	Major Users
Central Bureau of Statistics	Area & Production of crop; Livestock; Land use; Land tenure etc.	sample census	Decennial	CBS:-for National Account Purpose MoAD:- for planning and monitoring purpose NPC:- for monitoring plan & policy International Agencies (FAO/ WFP, etc):- for monitoring SDG/MDG Researchers/Academician:- for study & research
Ministry of Agricultural Development	Area & production of major crops, and livestock	Survey	Annual	
Nepal Rastra Bank	Prices of agriculture commodities	Survey	Annual	
Customs Department	Import and Export of Agriculture Commodities	Administrative record	monthly/annual	

5. Rural development statistics

Rural development in Nepal is a multidimensional aspect involving an interaction of economic, social, political and cultural factors. The concept of rural development is a process of development and change to improve rural life entirely. Based on Nepal Living Standard Survey (III), about twenty eight percent of rural population is below poverty line. Mostly they rely directly or indirectly on agriculture for their livelihoods. Rural development has been a sectoral issue with agriculture as the main focus. Agriculture is still in the core of the rural economy particularly on poverty reduction. The policies and programmes have been designed to reduce rural poverty since long time, one of the primary objectives of previous planned national document. This all demands a quality and reliable Agriculture and Rural development statistics. However, proper attention has not been given yet in producing quality and reliable statistics. Keeping this in mind, FAO developed an action plan in 2012 to implement "Global Strategy to improve Agriculture and Rural Statistics".

6. The global strategy to improve agriculture & rural statistics

The initiative to develop a Global Strategy in order to improve agricultural and rural statistics came as a response to the above mentioned declining quantity and quality of agriculture statistics. The GS is

aimed to provide a comprehensive conceptual framework for the production and use of agricultural and rural statistics to guide the decision making required in the 21st century.

This Strategy is based on three pillars:

Pillar I: Identifying a minimum set of core data and determining national priorities

Country needs to identify a minimum set of core indicators to meet its current and emerging demands based on national priority. This set is intended to be used as a starting point in building agricultural and rural statistical systems. National Planning Commission of Nepal has prepared a Monitoring and Evaluation guideline with designated set of indicators to improve the effectiveness of the monitoring and evaluation of development program and projects.

A Strategy paper "National Strategy for the Development of Statistics (NSDS) Nepal" is about to be released which has identified a minimum required data set or indicators for monitoring our yearly development plan, SDG, and other local level development plans and policies. Data duplication and data gaps are clearly identified in this strategy paper.

Pillar IIi: The integration of agriculture and rural statistics into the national statistical systems

Countries are encouraged to design a strategic plan for the development of agriculture and rural statistics. Developing Master Sampling Frame (MSF) for Agriculture is essential to integrate population and housing census with agriculture census. The MSF for agriculture will be the foundation for all data collection based on sample surveys. The concept of integration across data domains will also be ensured by an integrated data management system for all official statistics related to agriculture. NSDS Nepal has given high priority for the integration of Surveys and Censuses.

Pillar IIIi: The sustainability of agricultural statistics through governance and statistical capacity building

Countries are required to develop an adequate governance structure and to build sufficient capacity in the concerned entity of the government. Right man in right place with motivated human resources and infrastructures form the foundation of sustainable statistical system. The sustainability of a statistical system depends on stable and predictable financing that ensures ongoing support for data collection at appropriate interval of time. Evidence based planning and understanding the importance of statistics is a key element for the sustainability of an agriculture statistical system. NSDS Nepal has clearly visualised the need of statistical capacity and infrastructures within CBS and across line ministries and departments in its paper.

The basic information for indicators of rural development are being generated from censuses, surveys and administrative data. Censuses gives very useful information at local level because the sample size is generally large. Sample surveys are normally carried out with a higher frequency but the sample size makes it difficult to draw conclusion for small geographical domain. The use of administrative data for the purpose of generating rural development statistics is not that common yet. However, it is the easiest and cheapest means of generating statistics. If the relevant registers are well kept, this is a very powerful tool. CBS publications (Census & survey reports), Ministerial reports & publications, Research Reports are the major sources for rural development statistics.

7. Data gaps

Different Ministries and the line agencies have different mandate to produce statistics in Nepal. It is difficult to coordinate as they have own purpose, scope and timing of their work. It causes duplication and conflicting statistics produced. For the proper use of available statistical resources, NSDS Nepal has identified the data gaps (Data gap = Demand – Supply). The main data gaps in Agriculture Sector are:

- VDC level statistics for all agriculture related commodities
- Data on the impact of global warming in agriculture sector
- Agriculture master sampling frame for surveys
- Seasonal variation on agriculture product
- Post- harvest losses
- Data on agriculture vegetation using satellite maps
- Geo-referencing of agriculture data
- Information on environmental consequences of the intensive use of land and agricultural inputs
- Information on nutritional food
- Information to understand the users' satisfaction

8. Issues and challenges

The following issues and challenges are clearly observed in Agriculture and Rural Development Statistics.

- Coordination amongst statistics producing agencies
- Capacity Development at National and Subnational Levels
- Mainstreaming of agriculture and rural development statistics into NSDS Nepal
- Mobilization of statistical resources
- Strengthening governance and service delivery
- Imbalance between demand and supply
- Understanding of statistics at national and local level
- Poor mechanism available for cross check of information obtained from farmer's recall or prediction

9. SDG and agriculture statistics

Countries are now focusing on the need to monitor progress towards the Sustainable Development Goals through their national statistical programmes. Here in Nepal, achieving the agriculture goal is instrumental for achieving several other goals including those concerning absolute poverty (SDG1), hunger (SDG2), health (SDG3), education (SDG4), inequality (SDG5), economic growth (SDG8) and environment (SDG13).

SDG1-Agri-data help explain how changes in the agriculture sector affect household food security and thereby reduce extreme poverty.

SDG3 –Agri-data on availability of nutritious food for household would explain, to some extent, how healthy the family is.

SDG4- Agri-data help planners better understand the reasons for low school enrolment, for example, due to farm labour requirements.

SDG5- Agri-data explain the participation of women and economically vulnerable groups in agriculture sector that reveal in social and cultural patterns.

SDG8-Agri-data explain how overall economic growth is affected through commercialization of agriculture by technological upgrading and innovations.

SDG13-Agri-data on irrigation, soil degradation, use of mineral fertilizers and pesticides, forest land and tenure help governments to integrate climate change measure into national policy.

10. Conclusion and recommendations

This paper has identified many areas that need continued improvement in agriculture statistics in Nepal. In general, the weaknesses observed in the agricultural statistics appear to be more a function of concept, definition and methodology used in the census and survey done by CBS and MoAD. For agriculture statistics, these two institutions have to work with close contact that leads to omission of duplication and identification of data gaps. Annual Crop Survey is recommended to be done jointly by CBS and MoAD where CBS plays the lead role in survey planning, developing concepts, definition and procedures, and preparation of field materials e.g. manual of instruction, questionnaires, and MoAD staffs carry out the field work of data collection with supervision from CBS and MoAD.

CBS has to play a significant role for the coordination amongst statistics producing agencies. A strong and dedicated technical committee on coordination of Agriculture Statistics has to be set up mainly focused on standardising concepts and definition and methodology.

Statistical capacity building across line ministries could be instrumental for quality data especially for administrative record keeping system.

A clear demarcation of responsibilities mentioned in the NSDS Nepal could be a key document for overall improvement for the production of agriculture statistics by implementing its statistical calendar in the days to come.

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ENVIRONMENT STATISTICS

Sushil Kumar Sharma*

Abstract

Environment statistics is relatively young but multi-disciplinary area and emerging in the field of official statistics. Environment statistics describes the state and trends of the environment. Contribution of environment statistics is crucial for the SDGs set. Most of the goals and targets of SDGs are related with environment. CBS is producing and compiling the environment statistics of Nepal within the guidelines of the United Nations Framework for the Development of Environment Statistics (FDES). CBS has published the third series of Compendium of Environment Statistics Nepal 2015 which is the analytical report of environment statistics of Nepal contributed by sector experts. It is very essential to develop the mechanism of regular conducting environment-specific censuses, sample surveys and environmental management information system to get the baseline and updated environment statistics. Quality of environment statistics can be ensured only on the base of strong statistical infrastructure in the country which is also essential for the monitoring of the targets of SDGs.

1. Introduction

"Environment" means the interaction and inter-relationship among the components of natural, cultural and social systems, economic and human activities and their components (Environment Protection Act 2053). Degradation of air quality, water and other natural resources; lack of solid waste management; diminishing of water resources; release of toxic pollutants; loss of biodiversity; impacts of climate change; improper land use etc. are the major environmental problems of Nepal. Policies and programs on environment management have been incorporated in the periodic plans. Issues relating to environment have been addressed since the sixth Five-Year Periodic Plan. TYP (2013/14 – 2015/16) had focused on the green development by reduction of the adverse impact of environment and climate change. The Fourteenth Periodic Plan has also followed the concept of green development by making human activities and development process environment friendly and to develop the adoptive capacity of the impact of climate change. Clean environment, Green jobs and poverty reduction, Climate adaptation and resilience, Promotion of alternative energy, Low-Carbon Development path, Resource efficiency, Gender equality and social inclusiveness, Disaster risk reduction and Increase forest coverage are the priorities for environment sector for the sustainable development. For this, it should be enhancing the production of timely, reliable, disaggregated and demand-driven environment statistics.

* Director, CBS

2. Environment statistics

2.1 Definition of environment statistics

Environment statistics is relatively young but multi-disciplinary area and emerging in the field of official statistics. Principle 10 of the United Nations Declaration on Environment and Development (Rio de Janeiro, June 1992), stated "*……..each individual shall have appropriate access to information concerning the environment that is held by public authorities ……. and the opportunity to participate in the decision making process. States shall facilitate and encourage public awareness and participation by making information widely available.*"

Environment statistics describes the qualitative and quantitative aspects of the state and trend of the environment. It also describes interaction with human activities and natural events by integrating data from a multitude of different subject areas and sources. It therefore, describes the quality and availability of natural resources, human activities, natural events that effect the environment, the impacts of these activities and events and social responses to these impacts.

2.2 Objective of environment statistics

The main objective of environment statistics is to provide information about the environment, its most important changes over time and across locations and the main factor that influence them. The specific objectives are:

- To provide the statistical information of environment statistics to the general public and specific user groups.
- To improve the knowledge of the environment, and
- To support the evidence based policy formulation and decision making

2.3 Scope of environment statistics

The scope of environment statistics cover components of the natural environment (air/climate,water, land/soil, etc.), the living organisms found within these components and human settlements. It depends mostly on the geographic situation of the country. The scope of environment, social and economic statistics overlap and not easy to draw a fine dividing line between these statistical areas. Social and economic statistics are also required to put environmental issues to facilitate the integrated analysis of environmental, social and economic processes.

2.4 Sources of environment statistics

The source of environment statistics is no single rather it is originating from multiple sources. Thus, the sources of environment statistics can be summarized as follows:

- Censuses and sample surveys
- Administrative records
- Remote sensing (eg. satellite images of land use, forest cover, etc.)

- Monitoring systems (eg. field monitoring stations for water quality, air pollution or climate change)
- Scientific research and special projects undertaken to fullfill domestic or international demand

2.5 Uses of environment statistics

1. Policy and decision makers at all levels
2. The general public including media and civil society
3. Analysts, researchers and academia
4. Internationai agencies

2.6 The challenge of producing environment statistics

Environment statistics is relatively young sector in statistics and there are numerous links between environment statistics and other domain of statistics. The sources are found to be dispersed over a variety of data producers, and similarly numerous methods are applied in their compilation. To effectively produce environment statistics, specific statistical and environmental expertise, scientific knowledge, institutional development capabilities, and adequate resources are equally necessary.

3. Framework for Development of Environment Statistics (FDES)

The FDES is a multi- purpose conceptual and statistical framework that is comprehensive and integrative in nature and marks out the scope of environment statistics. It provides an organizing structure to guide the collection and compilation of environment statistics at the national level. It brings together data from the various relevent subject area and sources. It is broad and holistic in nature, covering the issues and aspects of the environment that are revelant for policy analysis and decision making by applying it to cross-cutting issues such as climate change and SDGs.

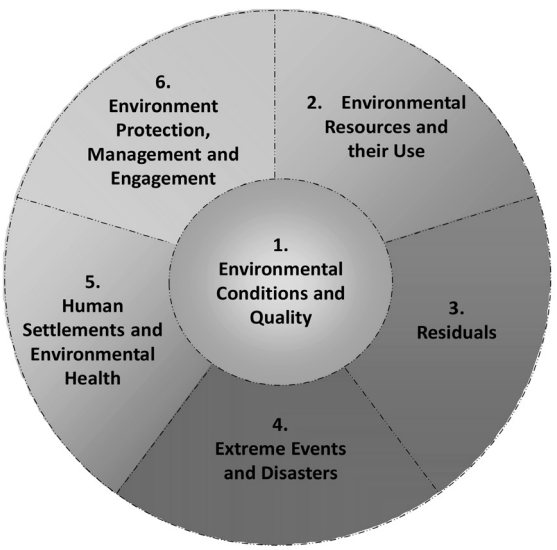
The FDES was first published in 1984 by UNSD. For almost three decades it had been a useful framework for guiding countries in the development of their environment statistics programmes. It had identified the major 6 components of the environment. However, the combination of lessons learned during its application, along with improved scientific knowledge and emerging environmental concerns over the intervening years,it was revised in 1995 which identified 9 clusters of environment (Table 1). Now, CBS is following this framework for the production of environment statistics of Nepal .

Recently, UNSD has endorsed the FDES 2013 to addresses the charactersitics and challenges of environment statistics by providing a conceptual foundation and organizing structure for environment statistics, identifying the scope of relevant statistics, and by indicating the availability of classifications, methodologies and the most common sources of data as well as the most relevant institutional stakeholders. It also recognized as a useful tool to adequatel y respond to the incresing demand for environmental information in the follow-up to Rio+20 and the Sustainable development Goals.

Table 1: FDES 1995 Structure

Information categories				
Agenda 21 Issues (clusters)	**Socioeconomic activities,** events (pressure /driving force)	**Impacts and Effects events** (part of state)	**Responses to impacts events** (response)	**Inventories, stocks, background conditions events** (part of state)
Economic issues				
Social/demo- graphic issues				
Air/climate				
Land/soil				
Water (fresh water resources)				
Marine water resources				
Other natural resources				
Biological resources				
Mineral (including energy) resources				
Waste				
Human settlements				
Natural disasters				

Figure 1: The FDES 2013 Structure

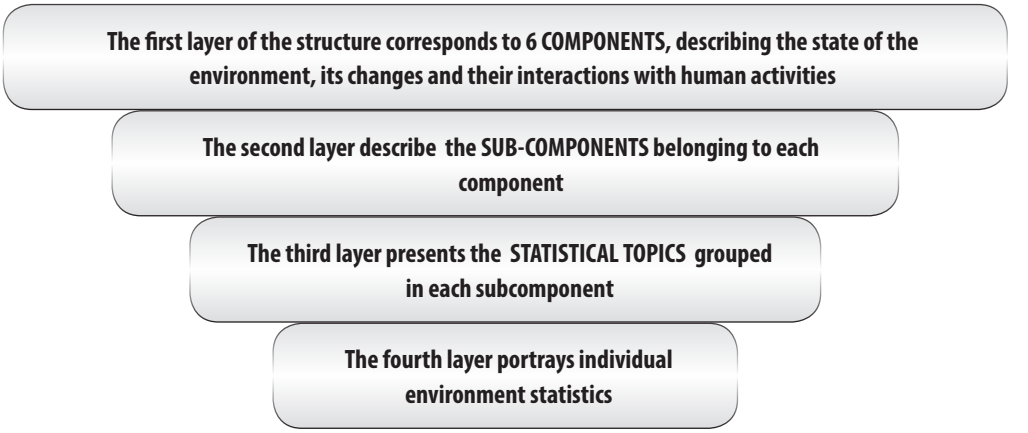


Source:- FDES 2013,UNSD

There are six components in FDES 2013 (Figure 1). All of the components are related to each other, at the centre of the FDES, it remains environmental conditions and quality. These components are multi-layered, flexible and adaptable. The FDES 2013 organizes the domain of environment statistics in layers of Components, Sub- Components and Topics. Under topics, there are the individual environment

statistics (Figure 2). CBS is not able to collect and publish the environmental data in this FDES 2013 format but in near future its effort is to produce environment statistics of Nepal in this format.

Figure 2: Domain of environment statistics



Source:- FDES 2013, UNSD

4. The System of Environmental Economic Accounting (SEEA)

SEEA is an internationally agreed statistical framework to measure the environment and its interactions with economy. The SEEA central framework was adopted as an international statistical standard by the UN Statistical Commission in 2012. There are the economy impacts on the environment and the environment impacts on the economy, to understand these linkages we need to integrate environmental and economic information. SEEA is an important statistical framework for monitoring the SDGs which provides a statistical framework to calculate indicators for many SDGs in an integrated way and also helps to support integrated policy decisions.

5. Status of environment statistics in Nepal

5.1 Environment Statistics in the national statistical system

In past, all statistical mechanisms were geared for the production of socio economic statistics because this was the demand of the day for planning, policy purpose and decision making. Socio-economic statistics has been developed to some extent in different areas for the last few decades; the environment statistics that can be compiled from the socio economic data sets are, more or less, available in many respects. And, side by side, various indicators, rates and ratios can be computed from that available database. But, with regard to bio- physical areas, the existing information system is not adequate enough to meet the current data needs. From 1980 or so, the government of Nepal has taken initiation to develop information system on natural environment in the process of addressing the environmental issues from the line functions of some agencies concerned with environmental aspects. Now, the major environment data producing Agencies in Nepal are: Central Bureau of

Statistics(CBS), Department of Environment(DoEnv), Department of Forest Research and Survey(DFRS), Alternative Energy Promotion Centre (AEPC), Department of Forest (DoF), Department of Hydrology and Meteorology (DHM), Department of Livestock Services (DoLS), Department of National Park & Wildlife Conservation (DNPWC), Department of Plant Resources (DPR), National Agriculture Research Council (NARC), Water and Energy Commission Secretariat (WECS), Line Ministries and affiliated Departments, Development community - I/NGOs, etc.

5.2 Role of Central Bureau of Statistics for the development of environment statistics in Nepal

CBS first published a compendium on Environment Statistics in 1994 which provided valuable insights into the importance and usefulness of the subject matter. 'A Compendium on Environment Statistics 1998 Nepal' was brought as second publication with an attempt to analyse available data on various aspect of the environment of Nepal. Recently, CBS has published "Compendium of Environment Statistics Nepal 2015" which is the third in the series of compendium. This publication is the milestone for the development of environment statistics in Nepal. It is the analytical report contributed by the sector expert on the FDES guidelines. However, database on the environment was limited. Therefore, CBS continued attempts to bring out the environment related statistics by compiling and publishing its publication 'Environment Statistics of Nepal" since 2002 in the interval of two years. The latest publication is "Environment Statistics of Nepal, 2013".

5.3 Role of other agengies for the development of environment statistics in Nepal

Air quality monitoring program is one of the initiative of the Department of Environment. Department of Environment is planning to set a network of air quality monitoring network throughout the country. At present it has been established three monitoring stations two in Kathmandu valley and one in Dhulikhel. Every minute emission data can be accessed through the website pollution.gov.np. Department of Hydrology and Meteorology is regularly collecting and publishing the data of temperature and precipitation. Ministry of Forest and Soil Conservation, Ministry of Agriculture Development and ICIMOD having the data base of land and forest. For the energy and water, WECS and AEPC are regularly publishing the available data. For the waste management sector Metropolitan, Sub Metropolitan and Municipalities are providing the data.

5.4 Present data collection system of environment statistics by CBS

Environment statistics synthesize data originating from a wide range of source types. The data used for the production of environment statistics are compiled by many different collection techniques. Now, Central Bureau of Statistics collecting and compiling the environmental data by (i) Censuses and surveys conducted by CBS (ii) The surveys and research conducted by other government and non-government agencies (iii) Administrative records of government and non-government agencies. CBS is conducting Climate Change Survey in fiscal year (2073/74) and planning to implement SEEA in Nepal which will be the crucial for the development of environment statistics.

5.5 Challenges for the development of environment statistics in Nepal

Environment statistics is the cross cutting and draws data from a wide range of different sources. To effectively produce environment statistics, statistical and environmental expertise, institutional

development capabilities, and adequate resources are equally necessary. Within this relatively new statistical domain, methodological resources, tools and good practices are being developed and systematized progressively but in Nepal we are very weak in this matter.

We have challenges of adding questions to existing censuses and surveys conducted by Central Bureau of Statistics is that (i) there can be limited space available for additional questions in existing surveys (ii) the survey frame and stratification of the population and sampling selection may not be ideal for environment statistics (iii) the data may need to be reorganized or reclassified in order to be used in environment statistics and (iv) respondents may not be familiar with environmental terms nor the information needed to answer environment-related questions. In briefly, the following are the major challenges of the development of environment statistics in Nepal.

- It is very challenging to collect reliable, valid environment data regularly and maintain its database
- To conduct new surveys related to environment issues in the context of limited or absences of statistical frames
- Focus the stakeholders attention towards the significance and utility of environment data
- Adopting valid methodology in production process of environment statistics
- For the secondary source of environment statistics there is the challenge to examine the quality of such statistics in terms of accuracy, reliability, validity and timeliness.

6. Recommendations

Some important recommendations have been mentioned to overcome the challenges and for the overall development of the environment statistics in Nepal as follows.

- Establishment of National Environmental Information System
- Development and implementation of environmental data sharing policy
- Development of Inter-agency coordination mechanisms
- Establishment of sufficient data generation stations across the country (temperature, rainfall, air quality, etc.)
- Institutional and human recourse development
- Capacity development for environment statistics
- Culture of sharing data on public platforms/web and
- Development of the mechanism to regular conducting environment-specific censuses and sample surveys

7. Conclusion

Environment statistics is an integral part of official statistics system. Its importance and demand has been growing in the context of sustainable development at national as well as international levels. International agencies like UNSC have given more emphasis in producing environment statistics. Following the track of international guidelines, Nepal is also attempting towards as per the user's requirements and as recommended by international guidelines due to its diverse nature and constraints in the collection and compilation. Hence, quality of environment statistics can be ensured only on the base of strong statistical infrastructure in the country.

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CONSTRUCTION, SERVICE AND OTHER ECONOMIC STATISTICS

Jishnu Mohan Bhattarai (PhD)*

Abstract

This chapter reviews international practice of data collection as well as country specific source of construction, service and other economic data. Construction statistics includes the information related to construction of buildings, civil engineering and specialized construction activities. Alternative method of data collection for the compilation of GDP for the construction sector is commodity flow approach due to lack of strong information from broad classification of ISIC rev4.0. National Census of Manufacturing Establishment and Survey of Small Scale Manufacturing Establishment are the main sources of information for the domestically produced construction materials. Price Section of Central Bureau of Statistics provides annual as well as quarterly information on level of production of some construction materials through Manufacturing Production Index and Index of Industrial Production. Likewise, IPICS provides details accounts of quarterly changes in the input price of construction materials. Most of the coefficients and indicators used for the compilation of construction sector GDP are traditional and need to revise through a number of surveys and studies preferably at the time of rebasing of national accounts series. The data source for the service sectors are explored in details.

1. Introduction

International Standard Industrial Classification (ISIC) revision 4.0 has recognized the construction activity as one of the important activity among varied activities for the economic growth. The entire economy can broadly be divided into agriculture, industry and service sectors. In this broad classification, construction activities belongs to industry sector. The construction activity intersects many sectors of the economy. The increasing output of the construction sector implies increased employment and a push for economic growth. Economic growth or downfall first hits the construction activities in an economy.

Defining construction in real sense seems challenging. Construction is the process of expenditure through the involvement of human beings on the erection and completion of free standing, statics buildings, or other types of structure generally on the permanent foundation, bedding or location (Canada, 2010). In national accounting purpose, the purchase of land by owner is not included in the construction of building but expenditure on the site preparation and land servicing are included in

* Director, CBS

the construction activities. The definition will not be complete if boundary of construction activities is limited on the construction of new building or similar structure. The major renovation, addition or modifications of structure which increase the life of assets beyond the normal life is also the construction activities. Thus, the construction activities includes the expenditure on the erection of building or structure below or above the land surface. The construction activities comprise both informal and formal construction. The data source of the service and other economic activities are discussed in detail in context of Nepal.

2. Objectives

The overall objective of this chapter is to provide the data sources of construction, service and other economic statistics in Nepal. This chapter also reviews the data sources of construction materials both domestic manufacturers and industries and imports from aboard. It discusses the detail classification for construction industries, current practices of data collection for service and other economic statistics in Nepal. It also aims to provide policy recommendation and way forward to collect the related quality information.

3. Broad classification of construction activities

The ISIC classification defines construction industries in three divisions 41, 42 and division 43 as follows:

41 : Construction of Building

42 : Civil Engineering, which includes

- Construction of road and railways
- Construction of utility projects; and
- Construction of other civil engineering projects such as individual facilities (Other than buildings), waterways, harbor, dredging of waterways, dam etc.)

43 : Specialized construction activities, which includes:

- Demolition and site preparation
- Electrical, plumbing and other construction, installation activities;
- Building completion and finishing; and
- Other specialized construction activities.

The construction of building is the primary objective defined in the activities in division 41. The expenditure for secondary activities such as plumbing, wiring, railing in stairs are also counted under the same division. The general contractors contract the special contractors for plumbing, wiring, formation of railing inside and outside the buildings, etc. So, there are some possibilities of double counting from output of construction activities in national accounting. To avoid such situation, the value of revenue to be used for calculating output should be subtracted from values payable to the contractor (Viet Vu, 2008).

The divisions 41 and 42 represent construction of permanent structure such as hotels, railways, roads, bridges, schools, hospitals, canals, damps, powerhouses etc. It is necessary to define in details the engineering construction. Many people assumes the mixture of cements, sand, stones, iron, etc., as construction. However, construction activity such as engineering construction of steel or iron pillar for distribution of electricity goes beyond the above concept.

The division 43 includes the capital construction such as the minerals exploration, site preparation, production capacities, etc.

Division 41 of the construction sectors can be divided broadly into following two categories.

A. Residential building:

1. Own Home 1.1 Pakki 1.2. Semi Pakki and 1.3. Kachhi

2. Community Building such as old age home, Hostels, Child home

B. Non-residential buildings:

1.1 Hotel and similar buildings; 1.2. Office buildings;1.3 Business building; 1.4 Telecommunication building; 1.5 Storage and Manufacturing Building;1.6 Public Amusement Building such as Cinema Hall, Drama Hall, General Assembly Building; 1.7 Library Building;1.8 School and University Building; 1.9 Hospital, Stadium; 1.10 Livestock and Agriculture Building ; 1.11 Religious Activities Building such as Temple, Masked, Church, Buddhist Stupa, etc. ; 1.12 Historical building

Division 42 in the case of civil engineering construction activities includes:

1. Highway: 1.1 Kachhy 1.2 Gravel 1.3 Pakky

2. Local Highway: 1.1 Kachhy 1.2 Gravel 1.3 Pakky

3. Railways; 4. Airport; 5. Tunnel; 6. Dam; 7. Irrigation Canal; 8. Long distance communication line; 9. Long distance electricity distribution line; 10. Long Distance pipe line; 11. Local Electricity distribution line; 12. Local FM communication distribution line; 13. Local water pipeline; 14. Electricity generation plant; 15. Sport place; 16. Bridge; 17. Other civil engineering activities

4. Methodology of data collection for construction sector

4.1 Indirect source

System of National Accounts 2008 mentioned that many producers try to conceal their economic activities from public authorities. For output of these illegal or informal activities, it may be possible by using commodity flow method to make satisfactory estimate of total output of the industry without being able to identify or measure that part which is not observed. The commodity flow method is considered as the best methods where separate estimates cannot be made for non-observed economy that occupies significant part of the total economy (SNA2008). The commodity flow method

is powerful tool to measure the product balance of total supply of construction materials which is equal to the total use of the same materials (ADB, 2011). The commodity flow method works better when the estimates of output from ISIC "41" construction of building, "42" output of civil engineering and "43" output of specialized construction activities is not reliable. Hence, many National Statistical Offices uses this method for the compilation of GDP of construction sector. In general, value of construction materials generated in an economy can better be estimated using the commodity flow method instead of collection of data from above three broad classifications.

4.1.1 Construction materials flow from rest of the world

The main sources of trade statistics in Nepal are administrative records from Central Bank, Department of Customs and Trade and Export Promotion Center (TEPC) along with ad-hoc trade surveys. The Central Bank or Nepal Rashtra Bank (NRB) releases through its website (nrb.org.np) data on imports and exports of major commodities every first week of each month related to the trade of previous month.

From NRB information, the following total supply can be estimated:

Construction material from India + Construction materials imported from China + Construction Material imported from other countries = Total import of construction materials

equation (1)

Construction material exported to India + Construction materials exported to China + Construction material exported to other countries = Total export of construction materials

equation (2)

Net Construction materials supply in economy = Total import of construction materials - Total export of construction materials

equation (3)

4.1.2 Construction materials flow from domestic market

The construction materials are supplied in any economy from the rest of the world and domestic production. So, it is necessary to account these materials in the national accounts statistics to estimate the GDP.

Total construction materials supplied = Equation (3) + Domestic production of construction materials

equation (4)

Source: The main source of data for the domestic construction materials is the census of manufacturing Establishment (CME)– conducted every five years and Small Scale Manufacturing Establishments (SSME) conducted every ten years by CBS.

Table 2: Construction Materials production from domestic manufacturing industries (CME & SSME)

CPC CODE	Product Name	CPC CODE	Product Name
3110	Chiran Wood	3755	Structural Component of Building
3121	Wood Strip	3756	Other article of cement
3122	Wood Flour & Wool of Wood	3761	Marbles
3141	Plywood	3769	Roda
3180	Builder's Joinery and Carpentry	4124	Iron rod
3151	Veneer	4125	Angles, Shapes of Iron
3511	Chemical Colour	4126	Drawn and Folded Product of Iron
3632	Plastic Pipe	4127	Iron Pipe
3693	Sanitary Ware of Plastic	4211	Bridge Part of Iron or Steel
3711	Glasses Mirror	4212	Door, Windows and their Frames
3735	Bricks	4219	Sheet of Aluminum Steel
3731	Other Ceramic of Siliceous EA	4291	Domestic Metal Product
3736	Non Refractory ceramics pipes	4612	Electric Transformer
3742	Lime	4631	Insulated Winding Wires
3744	Cement	4653	Lighting Equipment
3754	Cement Tile, Block		

Census of Manufacturing Establishments (CME) provides a total supply of 31 construction materials from domestic manufacturing industries which are shown in above table. The Small Scale Manufacturing Establishment (SSME) identified only five among 31 construction materials. The Chiran Wood, Bricks, Cement tile and Block, other article of cement, Angles & shape of Iron are only the five construction materials found in SSME. The last CME was conducted in 2011/12 and SSME in 2008/09.

4.1.3 Price of construction materials

The Price Statistics Section of CBS produces quarterly and annual Input Price Index of Construction Sector (IPICS) since 2000/01. IPICS depicts the change in the price of construction materials and construction labor wages rate. The section also collects rental price of machinery and heavy construction equipment in order to expand the coverage of the index.

CBS collects prices under 17 categories of construction materials ranging from cement, brick to paint and electric wires from at least five different outlets of 33 districts. A detailed specification of the materials to be collected has been prepared and the enumerator collects based on the specification the price of same materials from the same outlets throughout the year. Similarly, the bureau collects the wage of 8 different categories of human resources ranging from engineer, mason and painter to labour. Also, CBS collects producer price of some construction materials quarterly for compiling producer's price index of the related commodity group.

4.2 Direct source

There are five direct sources of construction statistics for division 41, 42 and 43 in Nepal.

i. Establishment Survey

ii. Nepal Living Standard Survey

iii. Survey of Household Unincorporated Enterprises

iv. Own Account of Corporation

v. Own Account of General Government

4.2.1 Establishment survey:

The Construction Company or construction related company survey is the source of information in this section. Many *"Pakky"* construction activities in rural and urban areas is informal in Nepal. Instead, Government construction is solely formal type of construction. Output of *"Pakky"* construction activities in national accounts statistics is determined using commodity flow approach which has already been discussed above.

4.2.2 Nepal living standard survey in own account construction

The increase in number of houses between National Population Censuses is the main source of information for own account construction.

Output of *"Kachhy"* construction materials = Growth rate of house from Population Census * growth from wage index of construction workers * total value obtained from NLSS.....equation (5)

Nepal Living Standard Survey (NLSS) provides the information of home improvement and additions in non-food expenditure section. The CBS used the own account construction from the information of construction of houses. The related question in the NLSS III questionnaire is given below:

The questionnaire Section 6 is:

319. What is the money value of the amount purchased or received in kind by your household during the past 12 months for the home improvements and additions?

The total residential construction constitutes *"Pakky"* and *"Kachhy"* construction in both urban and rural areas.

4.2.3 Survey of household unincorporated enterprises

Construction of own household is quite significant in developing countries (Viet Vu, 2009). Few formal household construction companies seems involved in the construction of houses in the urban area but it is almost zero in the rural area in Nepal. Usually, a group of unskilled or semi-skilled contractors involves in the construction of house and most of them are not registered in any legal authorities. In such a situation, large amount of taxes from such informal activities are not seen in the

economy and information for unincorporated enterprises is not available. Hence, survey of household unincorporated enterprise is necessary to acquire the related data.

4.2.4 Own account construction of general government and NPISH

The construction activities in the government sector includes building construction and capital improvement, civil construction and its capital improvement and capital repair. The Financial Comptroller General Office (FCGO)/Ministry of Finance provides detailed information under the international functional classification namely Classification of Function of Government (COFOG).

The main data source for Non Profit Institution Serving Household (NPISH) is the survey on NPISH (INGO and NGO) which was conducted in 2001 and 2008 by CBS.

4.2.5 Land construction and farm improvement

The gross output of land construction and farm improvement is measured from the gross output of agriculture sector. Likewise, the intermediate consumption is computed from the ad-hoc studies related to intermediate consumption

4.2.6 Own account construction by corporation

The own account construction by corporation is also the capital formation and system of national accounts treats this types of construction as a transaction (SNA2008, para 2.22) between two institutions.

5. Services and other economic statistics

The International Standard Industrial Classification (ISIC rev4.0) divides the economy into 21 industries. The main aim of the classification is to collect and report according to the nature of economic activities. There are many activities in services statistics such as:

a) Wholesale and retail trade; repair of motor vehicles and motorcycle;

b) Transportation and storage

c) Accommodation and food service activities

d) Information and communication

e) Financial and insurance statistics

f) Real estate activities

g) Professional, scientific and technical activities

h) Administrative and support service activities

j) Public administration and defense; compulsory social security

k) Education

l) Human health and social work activities

m) Arts, entertainments and recreation

n) Other services activities

l) Activities of households as employers; undifferentiated goods and services producing activities of households for own use

k) Activities of extraterritorial organizations and bodies

5.1 Source of data for wholesale and retail trade; repair of motor vehicles and motorcycles

The Department of Customs (DoC) is the main source of information for the international trade statistics. MIS of Department of Custom provides the customs trade statistics every day. Similarly, Central Bank and Trade and Export Promotion Center also publish information on trade. The statistics of international trade in goods and services is discussed in separate chapter in this book.

CBS collects and publishes the information of trade statistics from three different sources viz. i) domestic manufacturing industries, ii) agriculture products and iii) imported. The trade activities can be occurred in different layers such as dealers, wholesalers and retailers.

The details information including the number of repairing workshops of motor vehicles and motorcycles center is not available and most of these activities are operating informally. CBS in 2014/15 for the first time prepared the sampling frame of these activities to find out their contribution in economy.

5.2 Transportation and storage

The transportation services includes the land transportation, air transportation and service incidental to transport. Land transportation among the three categories occupies a significant contribution in total transportation sector. Annual report published by Department of Land Transport Management is the only source of statistics for the registration of new vehicles and renewal of existing various types of vehicles. The department publishes the above statistics every month through its website.

Air transport statistics: Civil Aviation Authority provides annual report of airlines consisting of the number of air passengers' statistics along with the profit and loss accounts. Likewise, the annual reports of airlines operating in Nepal release the information of number of flights, number of passengers, cargo in kg, fuel and other expenses, etc.

Service incidental to transport are classified into cargo, travel and trekking services provided by establishments. Association of trekking, travelling and cargo also keeps the records of the number of trekking agencies, travelling agencies and cargo agencies. CBS conducted the travelling, trekking and rafting agencies survey (TTR) in 2014/15 that provides the macroeconomic statistics under these activities.

Annual report of Nepal Warehouse Ltd. provides the financial statement and related statistics. The information on Cold storages in the country is estimated based on the bench-marking survey conducted 2003/4 by CBS.

5.3 Accommodation and food services

Monthly and annual report of Nepal Tourism Board are the main source of statistics for hotel and restaurant sector. Report provides information on the number of tourists' arrivals from both land and air.

Ministry of Tourism and Civil Aviation also releases monthly data on bed occupancy in hotels., Also, CBS uses collects monthly sales of restaurants using Annual Business Enquiry form compiled by District Statistics Offices. The list of registered restaurants can be obtained from District Cottage and Small Industries Office. The information on informal type of restaurants is not available. However, Nepal Living Standard Survey could be one of the sources of the monthly income from these informal type of restaurants.

5.4 Information and communication

The companies which are involved in data processing and hosting activities are counted under information subsector for National Accounting purposes. The Company Register Office (CRO) or the Department of Cottage Industries Registration Office provides the number of institutions involved in "information" activities that includes webhosting, web designing, software designing and other activities related to information technology.

MIS of Nepal Telecommunication Authority (NTA) provides the information on number of mobile users, data and internet services users, Internet Service Provider (ISP) agencies operating in Nepal. The annual report of major telecommunication company such as Nepal Telecom Company, NCELL, UTL, etc. also provides very useful communication related information.

5.5 Financial and insurance statistics

The Central Bank of Nepal provides the number of commercial banks, development banks, finance companies and micro cooperatives with their annual reports, number of branches etc. The Insurance Board (Beema Samittee) is the regulatory body of life and non-life insurance company that provides status information about insurance company in Nepal.

5.6 Real estate statistics

The statistics of buying and selling of different size of land and buildings is studied under the real estate. Similarly renting and operating of self-owned land/buildings, land development are also the activities accounted under real estate. The main source of the real estate activities is the Land and housing tax provided by Financial Comptroller's General Office (FCGO). Also, the data collected from NLSS can be used to estimate the output for informal type of real estate. The yellow page can be the next source of information for the number of housing companies involved in the real estate activities.

5.7 Professional, scientific and technical activities

This industry includes the activities related to the legal and accounting, activities of head office, management consultancy, architectural and engineering, technical testing and analysis, scientific research and development, advertising, photographic and veterinary activities.

Nepal Bar Council provides the number of legal service establishments. Similarly, Institute of Chartered Accountants of Nepal (ICAN) and Association of Chartered Accountants of Nepal (ACAN) provide the number of license holders of registered auditors' under three categories namely Class B, Class C, and Class D. The number of chartered accounts which is categorized into Class A auditors is also available. Publication of Nepal Engineer's Association, Nepal Engineering Council and society of consulting Architectural and Engineering Firms (SCAEF) are the sources of information for architectural and engineering activities.

The research and development is the part of manufacturing industries. CBS conducted a survey on research and development establishments in 2004/05 for the first time and uses the estimates based on that survey for NA purpose.

Annual report of Advertising Association of Nepal provides the statistics of advertising agency in the country. The Photographic Association of Nepal provides information related to photographers. The statistics of veterinary can be obtained from Nepal Veterinary Association.

5.8 Administrative and support service activities

This industry includes many activities which support administrative and services such as rental and leasing activities, employment activities, travel agencies, tour operators, reservation services and related activities, security and investigation activities, service to buildings and landscape activities, support service for office administration.

The Yellow Pages and the concerned websites are the main sources for collecting information on vehicles rental services operating in the country. The Nepal Association of Foreign Employment Agencies (NAFEA) provides the foreign employments statistics. Moreover, the Ministry of Labor and Employment and Department of Foreign Employment are two sources of employment statistics. Nepal Tourism Board, Ministry of Tourism and Civil Aviation, Department of Tourism are the government of source of statistics for travel agencies and tour operators. Nepal Association of Tour and Travel Agents (NATTA), Trekking Agency Association of Nepal (TAAN), Nepal Association of Rafting Agents (NARA) are some of the non-government association that keeps records of their members and theirs' renewal.

Nepal Home Page provides the statistics of security service provider agencies operating in Nepal.

5.9 Public administration and defense; compulsory social security

The Financial Comptroller General Office (FCGO) is the main data provider for public administration and defense. The FCGO provides the information in all sub-sectors such as expenditure in general administration, police, defense, education, health, drinking water, local development, housing, economic services under 10 different Classification of Function of Government (COFOG).

Annual consolidated financial statement of FCGO office provides the information in compensation of employees such as salary, allowances, transfer travelling allowance, clothing and staff training and compulsory social security service (e.g., pension). Also the office provides information related to office operation and services expenses such as water, electricity, communication, general office expenses, rent, repair and maintenance, fuel and oil, consultancy and other services fee and miscellaneous according to COFOG.

5.10 Education

The information released by Department of Education is the main source of education information for number of students at each level, number of class-rooms, number of teachers, number of public and private school in the country. The education statistics is separately described in details in other chapter of this book.

5.11 Health and social services

The information provided by Nepal Health Research Council, Ministry of Health and Department of Health are the sources of health statistics. Health Management Information System (HMIS) and Nepal Demographic Health Survey are another important sources of information for health statistics.

5.12 Arts, entertainment and recreation

The Mandala Theatre and Nepal Art Gallery provides important information in this sector. There are limited sources of information in this sector, so it is difficult to obtain the details statistics in this sector.

5.13 Other service activities

The Nepal yellow pages and the annual publication of Federation of Nepalese Chamber of Commerce and Industry (FNCCI) are the main sources of data for the membership organization, business, employer and professional membership organizations, trade unions, religious organizations, political organization, repair of computers, personal and household goods.

5.14 Activities of households as employers; undifferentiated goods and services producing activities of households for own use

National Population and Housing Census (NPHC), Nepal Living Standard Survey (NLSS), Nepal Labor Force Survey (NLFS) are the key sources of information for activities of households as domestic personnel.

5.15 Activities of extraterrestrial organizations and bodies

The annual report of international organizations such as World Bank, United Nations System, diplomatic and consular missions are the source of data for this sector.

Despite the identification of various sources for compiling the contribution of activities related to construction, services and other economic sectors, there could be many activities that has not been accounted in the national economy. This problem will hopefully be addressed to some extent after completing the national economic census in the country.

6. Sustainable development goal for construction activities

Member States of United Nations in September 2015 has declared 2030 agendas for the Sustainable Development Goals which include 17 goals and 169 targets. Most of the goals are directly or indirectly

related with the construction, services and other statistics. Investment for the development of infrastructure is considered indispensable to achieve the higher and sustained economic growth. Strategic investment in manufacturing establishments is necessary for the production of construction materials. The sustainable development in construction and other industries will also create employment and entrepreneurship skilled that helps to reduce poverty. The Sustainable Development Goals 8 aim to encourage sustained economic growth by achieving higher level of productivity through the technological innovation. This goal focus to develop the macroeconomic indicators for different industries including construction, service and other economic statistics.

7. Policy recommendations/way forward

Department of Customs, the Central Bank, TEPC, and CBS are four custodian agencies to produce construction materials statistics in the country. CBS conducted "A study of cost of construction structure 2004/05" to determine the cost structure in construction sector. The following are the recommendation in this sector:

i) An appropriate survey and studies need to be conducted regularly in coming days since there has been frequent changes in cost-structure, utility modality and hence weighting pattern of materials in construction.

ii) Revision of weighting considering the use and cost of construction materials need to be managed in accordance to the ISICrev4.0 classification of construction sector viz. construction for pakky, kachhy building, civil construction, NPISH and Business.

iii) Execution of surveys, proper use of administrative and censuses data along with customized studies are required for many economic activities within the service and other economic statistics to measure the sectoral contribution in the economy.

iv) Separate and dedicated service statistics section within the National Statistical Office is desirable which will identify the sources and methods of data collection and conduct studies/ surveys regularly to provide necessary data in this sector.

8. Conclusion

Construction statistics can be broadly classified into three categories i) building construction ii) civil engineering and iii) specialized construction activities. There are mainly five direct sources of data for construction statistics in Nepal. They are i) Establishments Survey ii) Nepal Living Standard Survey iii) Survey of Household Unincorporated Enterprise iv) Own Account of Corporation and v) Own Account of General Government. The commodity flow method is considered as the best indirect method where separate estimates cannot be made for non-observed economy that occupies significant part of the total economy and this method can be used when estimates of output from construction is not reliable. The changes in the price of construction materials can be derived from IPICS and PPI which is compiled quarterly by CBS. However, CBS need to conduct few surveys/studies in order to revise the commodities and weights in accordance to the utility pattern and changed modality of the construction. Also, the scope of the survey need to be expanded in order to cover the construction

activities in civil engineering and specialized construction. The revision activities through surveys and studies can effectively be conducted at the time of rebasing of national accounts series.

Even though CBS has identified various sources for capturing the contribution of activities within the service and other economic statistics, there could be many activities which has not been accounted in national economy. The conduction of National Economic Census can address such issues to some extent as the economic census will principally identify all the economic activities conducted in the countries. In addition, more remedial statistical activities can be devised and executed at the time of implementation of National Strategy for the Development of Statistics.

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MEASURES OF DATA QUALITY IN NATIONAL STATISTICAL SYSTEM OF NEPAL

Ram Hari Gaihre*

Abstract

The quality of the data produced by the national statistical agencies has not drawn much attention in National Statistical System (NSS) of Nepal. The reliability of the data which can be quantified numerically by the value of the standard errors of estimates has not been produced and analyzed in many sample surveys carried out by different statistical agencies including CBS. The best practices adopted globally to maintain the quality has been mentioned in this paper with reference to the UK Office of National Statistics (Guidelines for Measuring Statistical Quality), International Monetary Fund (Data Quality Assessment Framework) and Australian Bureau of Statistics (Data Collection Framework).

The relevance, accuracy, timeliness, accessibility, comparability and coherence of data produced are the indicators to assess the quality of the statistics. The timeliness has been maintained in most of censuses in Nepal; however the sample surveys are not carried over as planned in Nepal. The assessment of validity of the results has been discussed and the reliability has not been accounted in Nepal. The accessibility and clarity of the statistics is increasing, the comparability in terms concepts, definitions and has been maintained in standard sample surveys following the international practices and the status of coherence in the data production needs to be improved significantly in National Statistical System (NSS) of Nepal. The National Strategy for the Development of Statistics and proposed Statistical Act can contribute significantly to preserve the quality of the data if they come into action. Preparation of survey calendar, adoption of data sharing culture and coordination of statistical activities are of urgent need to improve the data quality to making planning document more realistic in Nepal.

1. Introduction

Quality measurement for statistical outputs is concerned with providing the user with sufficient information to judge whether or not the data are of sufficient quality for their intended use(s)[56]. Quality[57] means fitness for use. It is inversely proportional to variability.

The fundamental principles of official statistics emphasize on the preservation in the quality of the statistics collected and make aware of the use and interpretation of the statistics.

* Director, CBS

56 Guidelines for measuring statistical quality, Office of National Statistics, UK

57 Introduction to Statistical Quality Control, Douglas C. Montgomery

Both sampling and non-sampling errors need to be controlled to maintain the quality of the statistics collected. Non-sampling errors in sample surveys arise mainly due to invalid definitions and concepts, inaccurate sampling frames, inappropriate design of the questionnaires, defective methods of data collection, tabulation and coding and incomplete coverage of sample units.

The statistical output used for planning is the basis of the successful implementation of the project. The validity (accuracy) and the reliability (precision) of the estimates are therefore important to gauze the standard of statistics produced. Validity refers to the non-sampling errors occurred at different stages while carrying out censuses and sample surveys whereas reliability (precision) is the measure of error due to sampling rather than enumerating the total population. These two terms are the fundamentals of the quality of the statistics. The validity can be assessed by different levels of precautions; however the reliability can be quantified in terms of standard errors of estimates comparable mathematically.

Nepal is facing gaps of statistics in many sectors. The benchmark studies and surveys or compilation of official statistics are in early stages. The quality of statistics produced has not been accounted or less attention is paid at the quality aspect. The statistical quality has not been made accountable for the failure of the implementation of the plans. Now, it's a time to go ahead for the quality statistics production in Nepal.

2. Objectives

The chapter objective is to document the best practices adopted globally to maintain the quality of the statistics and to assess the situation of National Statistical System of Nepal. The quality of the statistics produced can be assessed with different dimensions where usefulness of data is measured by different angles. The practices developed globally to maintain the quality of statistics and their application in Nepal has been reviewed.

3. Measuring statistical quality

The practices developed globally to maintain the quality of the statistics has been discussed in this paper. The measure of quality is a major concern for the institutions of national system of Nepal while producing statistics. Some practices for the objective measure of the quality of the statistics has been mentioned.

There are multifaceted challenges in the production of statistics in Nepal. Both the duplication and the gap has been experienced in many sectors of data compilation due to lack of strong coordination mechanism. The National Statistical Council is the apex body for the coordination of statistical activities; however, it has not been functional yet. The Consolidated National Statistical Plan (CNSP) of Nepal designed with the technical support of Asian Development Bank was the good initiation to meet the requirements in this aspect but the roadmap and the recommendations of this plan were not implemented. The lack of designated statistics, structural reforms of statistical institutions and career development of the human resources involved in the production of statistics has limited the production of quality in statistics in Nepal. The National Strategy for the Development of Statistics (NSDS) has proposed provisions for the production of quality statistics in Nepal. Also, the proposed Statistical Act has enough provisions of designated statistics which will contribute to maintain the quality of statistics

3.1 Guidelines for measuring statistical quality[58]

The guidelines for measuring statistical quality outlines best practice for measuring and reporting on the statistical quality of General Social Survey (GSS) outputs. In particular, the emphasis is upon helping users to understand:

- the context in which the data were collected, processed and analyzed;
- methods adopted and limitations they impose;
- the reliability of the figures; and
- the way they relate to other available data on the same subject.

The measures and indicators can also be used by producers of official statistics to monitor data quality for the purpose of continuous improvement.

Relevance

The degree to which the statistical product meets user needs for both coverage and content

- Who are the users of the statistics;
- What are their needs; and
- How well does the output meet these needs?

Accuracy

The closeness between an estimated result and the (unknown) true value. Error can be split into sampling error and non-sampling error, where non-sampling error includes:

- Coverage error;
- Non-response error;
- Measurement error;
- Processing error; and
- Model assumption error.

The validity of the statistics are related with non-sampling errors and the reliability is measured in terms of sampling errors associated with the statistics (estimates).

The following are the components of non-sampling error.

- Specification error
- Coverage or frame error
- Non-response
- Measurement error

58 Guidelines for Measuring Statistical Quality , Office of National Statistics, UK

- Processing errors
- Errors of estimation

Assessing non-sampling error, following steps should be considered.

- Consistency checks
- Sample check/verification
- Post-survey or re-interview checks

Timeliness

Timeliness refers to the lapse of time between publication and the period to which the data refer. An assessment of timeliness should consider the following:

- Production time;
- Frequency of release

Accessibility and clarity

Accessibility is the ease with which users are able to access the data. It also relates to the format(s) in which the data are available and the availability of supporting information. Clarity refers to the quality and sufficiency of the metadata, illustrations and accompanying advice. Specific areas where accessibility and clarity may be addressed include:

- Needs of analysts;
- Assistance to locate information;
- Clarity; and
- Dissemination.

Comparability

Comparability is the degree to which data can be compared over time and domain. It should be addressed in terms of comparability over:

- Time;
- Spatial domains (e.g., sub-national, national, international); and
- Domain or sub-population (e.g. industrial sector, household type).

Coherence

The degree to which data that are derived from different sources or methods, but which refer to the same phenomenon, are similar. Coherence should be addressed in terms of coherence between:

- Data produced at different frequencies;
- Other statistics in the same socio-economic domain; and
- Sources and outputs.

3.2 Data Quality Assessment Framework (DQAF)

The IMF Data Quality Assessment Framework (DQAF) identifies quality-related features of governance of statistical systems, statistical processes, and statistical products. It is rooted in the UN Fundamental Principles of Official Statistics and grew out of the Special Data Dissemination Standard (SDDS) and General Data Dissemination System (GDDS), the IMF's initiatives on data dissemination[59].

The DQAF's coverage of governance, processes, and products is organized around a set of prerequisites and five dimensions of data quality[60].

- Legal and institutional environment—The environment is supportive of statistics.
- Resources—Resources are commensurate with needs of statistical programs.
- Relevance—Statistics cover relevant information on the subject field.
- Other quality management—Quality is a cornerstone of statistical work.

Assurances of integrity

The principle of objectivity in the collection, processing, and dissemination of statistics is firmly adhered to.

- Professionalism—Statistical policies and practices are guided by professional principles.
- Transparency—Statistical policies and practices are transparent.
- Ethical standards—Policies and practices are guided by ethical standards

Methodological soundness

The methodological basis for the statistics follows internationally accepted standards, guidelines, or good practices.

- Concepts and definitions—Concepts and definitions used are in accord with internationally accepted statistical frameworks.
- Scope—The scope is in accord with internationally accepted standards, guidelines, or good practices.
- Classification/sectorization—Classification and sectorization systems are in accord with internationally accepted standards, guidelines, or good practices.
- Basis for recording—Flows and stocks are valued and recorded according to internationally accepted standards, guidelines, or good practices.

59 The IMF Data Quality Assessment Framework (DQAF) : A Factsheet
60 The IMF DQAF : Generic Framework (July 2003)

Accuracy and reliability

Source data and statistical techniques are sound and statistical outputs sufficiently portray reality.

- Source data—Source data available provide an adequate basis to compile statistics.
- Assessment of source data—Source data are regularly assessed.
- Statistical techniques—Statistical techniques employed conform to sound statistical procedures.
- Assessment and validation of intermediate data and statistical outputs—Intermediate results and statistical outputs are regularly assessed and validated.
- Revision studies—Revisions, as a gauge of reliability, are tracked and mined for the information they may provide.

Serviceability

Statistics, with adequate periodicity and timeliness, are consistent and follow a predictable revisions policy.

- Periodicity and timeliness—Periodicity and timeliness follow internationally accepted dissemination standards.
- Consistency—Statistics are consistent within the dataset, over time, and with major datasets.
- Revision policy and practice—Data revisions follow a regular and publicized procedure.

Accessibility

Data and metadata are easily available and assistance to users is adequate.

- Data accessibility—Statistics are presented in a clear and understandable manner, forms of dissemination are adequate, and statistics are made available on an impartial basis.
- Metadata accessibility—Up-to-date and pertinent metadata are made available.
- Assistance to users—Prompt and knowledgeable support service is available.

3.3 Data Quality Framework

Quality is a multidimensional concept which includes the accuracy, relevance and interpretability of statistics. The seven dimensions of quality are institutional environment, relevance, timeliness, accuracy, coherence, interpretability and accessibility[61].

Institutional environment

This includes impartiality and objectivity, professional independence, mandate for data collection, adequacy of resources, quality commitment and statistical confidentiality.

61 Australian Bureau of Statistics (ABS) Data Quality Framework, May 2009

Relevance

Relevance of scope and coverage, reference period, geographic detail, main outputs/ data items, classifications and statistical standards, type of estimates available and other cautions are related to the quality of statistics.

Timeliness

Timing and frequency of survey/census are the important aspect of quality.

Accuracy

Accuracy is maintained in terms of coverage error, sample error, non-response error, response error, other sources of errors and revisions to data.

Coherence

Changes to data items, comparison across data items, comparison with previous releases and comparison with other products available are the elements of coherence.

Interpretability

Presentation of the information and availability of information regarding the data preserve interpretability.

Accessibility

Accessibility to the public and make data products available promote accessibility.

3.4 The European statistics code of practice

The European Statistics Code of Practice is based on 15 Principles covering the institutional environment, the statistical production processes and the output of statistics[62].

Institutional environment

- Professional independence
- Mandate for data collection
- Adequacy of resources
- Commitment to quality
- Statistical confidentiality
- Impartiality and objectivity

62 The European Statistics Code of Practice for the National and Community Statistical Authorities, September 2011

Statistical processes

- Sound methodology
- Appropriate statistical procedures
- Non-excessive burden on respondents
- Cost effectiveness

Statistical output

- Relevance
- Accuracy and reliability
- Timeliness and punctual
- Coherence and comparability
- Accessibility and clarity

4. Data quality in NSS of Nepal

4.1 Relevance

The censuses are carried out the Central Bureau of Statistics in Nepal. National Population and Housing Census, National Sample Census of Agriculture, Census of Manufacturing Establishment are conducted by CBS. The censuses are relevant in terms of user demands with sizable coverage and content recommended by the international standards such as World Programme for Census of Agriculture, Principles and Recommendations for Population and Housing Censuses, etc. Nepal Demographic and Health Surveys carried out by Ministry of Health has relevance of major health indicators of Nepal and Household Budget Surveys carried out by Nepal Rastra Bank have corroborated the NLSS information with special focus on the analysis of urban characteristics.

There are numbers of regular sample surveys carried out in Nepal, mainly by the CBS and other government agencies. Nepal Living Standards Surveys follows LSMS methodology developed by the World Bank. It is relevant for the updates of consumption based poverty and many other topics to meet the user demands. Nepal Labour Force Surveys are relevant for the labor status and the labour market information required by the relevant agencies. Nepal Multiple Indicator Cluster Surveys are another series of survey carried out by CBS to provide information on health, education and other social indicators focusing on children and women. The UNICEF and other organizations working with the social structure are benefitted with the results.

4.2 Accuracy

The accuracy is measured in terms of validity and the reliability of the statistics. The errors of the census and surveys are measured by sampling and non-sampling errors encountered during implementation (census and surveys) and estimate (sample surveys) of the statistics collection. The validity depends on many stages of the implementation of the census and surveys. They cannot be measured numerically. However; the reliability of the estimates depends on the standard errors of estimates. They have been measured in the poverty measures derived from NLSS 2003-04 and 2010-11. The reliability of the data has been identified in the agriculture sample surveys in details. Other than these, it's hard to find the test of reliability for the survey estimates.

4.3 Timeliness

One of the problems national statistical system of Nepal facing is the timeliness of the data availability. Population, Agriculture, Manufacturing Establishment censuses are carried out in regular interval of 10, 10 and 5 years respectively preserving the timeliness of the data. Most of the sample surveys are not carried out in a regular interval though there seems to be a schedule of survey period (statistical calendar). The analysis of the censuses and sample surveys are not completed on time due to the lack of processing capacity both in terms of manpower and motivation factors in many cases. All of these create a problem of timely access of the data to the users.

4.4 Accessibility and clarity

Census, sample surveys and administrative records are not easily accessible on time or the form as requested by the users. However, there is improvements in the accessibility in the data in the recent days. There is no clarity to the extent of the use of the census information for other than the producers. This has restricted policy analysts on the exploitation of the huge resource of the information collected by statistical institutions. Recently there is the departure in the data sharing, a sample dataset of the population census and the raw dataset of agricultural census data is being available to the users. Survey data has gained more accessibility through the raw dataset cost differentials based on the users, students are benefitted more.

The census and survey reports are published with relatively enough information and introduction including the metadata. National Data Achieve (NADA) prepared by the CBS has played significant role for the clarity of the content of the data collected mainly through major sample surveys of Nepal.

4.5 Comparability

The surveys and censuses carried out in Nepal have followed standard concepts, definitions and methodology adopted internationally. The comparability within/across countries has been maintained to the greater extent. However; there are some migrations on the content and the methodology adopted due to the change in technology in recent days which has restricted the comparability which CBS has not been upgraded as required.

4.6 Coherence

The coherence in the data is the main challenge faced by the national statistical system of Nepal. This has given rise confusion to some extent on mistrust in statistics. The national statistical council has not been effective to maintain the coherence in the data. Due to the lack of coordination and proper survey clearance system; methodologies, frequencies and outputs are not easily interpretable.

4.7 Quality of the statistics in CBS

Censuses, sample surveys, administrative records and compilation of secondary data from different ministries, and departments, universities and other sources as a product of their administrative records or management systems are major sources of data in CBS.

Quality of the data is a prime issue for the CBS and internationally accepted standard methodologies are adopted in censuses and sample surveys carried out by the CBS to ensure quality. The questionnaires are generally derived from the generic version practiced globally. The wordings, flow and consistency are assessed for each and every question of the censuses and surveys to collect the best possible answer from the respondents consistent with as low burden as possible to them. Explanatory manuals to describe the questionnaires are prepared and intensive training is provided to the enumerators and supervisors. Practical sessions of administering the questionnaires are launched including mock interviews during training. Selecting appropriate enumerators and supervisors for the censuses and surveys is a challenge for the CBS. The quality of the data to some extent depends on the motivational factors of the survey/census and the quality of the field staff. Branch offices of CBS do not have sufficient technical manpower to collect data consequently many staff from the general administration service are deputed for data collection and contracted temporarily for surveys at ad-hoc basis and this, is a major source of quality compromise in surveys. Technical processing to preserve the quality of the dataset is satisfactory due to the use of field-based data entry system to some surveys, and scientific data entry programs with best possible consistency checks.

Maintaining quality in the censuses is more challenging compared to the surveys not only due to the volume of the work, but also due to the implementation process. While hiring the enumerators and supervisors outside CBS, the appropriate choices are not made due to the pressure of different interest groups. The quality of the field staff is reflected in the quality of the data despite the well-organized training.

There is no specified data validation process adopted in the outputs of the census and surveys with some exceptions; prioritized and donor-supported programs of the CBS are accepted as of the high quality such as Nepal Living Standards Survey, Nepal Multiple Indicator Cluster Surveys, etc. compared to other economic surveys. The elements of the quality of the data are met more where there is more training, better motivation for the fieldwork and attractive incentives provided to the enumerators for data collection.

The tangible measurement of the quality of the statistics produced has been maintained in the agriculture census of 1991 and 2011 by producing analytical papers on "Reliability of Data in National Sample Census of Agriculture" in 1993 and 2013. The standard errors of estimates as a result of sampling have been assessed to better track the reliability of estimates of different variables in these two large-scale sample censuses. The standard errors of poverty estimates have been calculated from the NLSS-based poverty estimates as well. These practices need to be extended to other representative sample surveys as well. The other element of quality, the accuracy (validity) of the estimates has been discussed in population census and agriculture census monographs.

4.8 Quality of statistics in other statistical agencies

The quality of the data compiled by many ministries, departments and other sources is relatively poor both in terms of scope and coverage. The formats used to keep the administrative records and the management information system is not as scientific as they need to be. These institutions suffice from statistical manpower to be involved in maintaining the quality of the statistics produced. The coherence and comparability issues are in the surface due to the difference in adopting standard concepts, definitions and classifications in addition to the implementation of the statistical methodologies.

5. Data quality in SDGs

The quality of the indicators produced to assess the sustainable development goals is of prime importance. The relevance, accuracy, timeliness, accessibility, comparability and coherence are to be maintained to gauze the updates in the all SDG indicators to make it more realistic.

Many SDG indicators are designed to compare among space and time, they need to be produced on timely fashion. They have to follow standard concept, definition and classifications for the comparability. Since SDGs are based on the varieties of targets and indicators, all the elements of the data quality have to be maintained to support various data producers and data sources. Otherwise, the policy formulation based on the indicators may not be achieved as envisioned by SDGs.

Nepal has to face more challenges to maintain the data quality to produce SDG indicators. Due to the poor designated system, the data producing agencies are not quality sensitive and they lack relevant human resource to maintain the quality of statistics. The quality of the SDG indicators heavily depend on the quality of primary data, many of them based on administrative records demanding the quality of the statistics from disaggregated level.

6. Policy recommendations

Quality of the statistics is the measuring rod of the capacity of the statistics producing agencies. The duplication, gap and erroneous interpretations all come into the picture where there is a lack in the quality of the data produced. NSS of Nepal has challenge to overcome this. The employment of the statistical manpower in the agencies involved in data generation, be census and survey undertaking or administrative data recording is urgent to understand the value of the data quality. The departure from traditional data capturing system needs to be implemented to improve the quality of the data.

The timeliness of data compilation has to be maintained. There is a need of statistical calendar to carry out sample surveys and censuses on regular intervals. The compilation of statistics needs to done based on the designated system of statistics not to maintain the quality of statistics generating specialization. International concepts, definitions and classifications need to be followed in all sectors of data production by statistical agencies to maintain comparability. Demand driven data collection system needs to be promoted to maintain the relevance. Accessibility of the statistical output and micro-data availability have to guarantee to utilize the data produced and it should be linked with the right to the information (RTI). The design of the data capturing format has to be reviewed by the experienced statisticians to maintain the quality of the data collected to make health, education and other MIS tools. The national statistical council has to be made functional making the structure of the council as a group of professionals to gauze the quality of the statistics.

7. Conclusion

The quality issue on the statistics produced under NSS has not been discussed much. Many survey estimates have been produced without the reliability test of the data produced. This gives rise to the faulty policy formulation and is responsible for the failure of the programs implemented as a result.

Relevance, accuracy, timeliness, comparability, coherence and accessibility are the elements of data quality. The relevance of the statistics will be satisfied only when the collection of data is demand driven. The measure of accuracy decomposed into the components of reliability and validity is more objectively measured and discussed compared to other elements in Nepalese context. However, the mathematical measurement of reliability (standard errors) is rarely observed in the sample surveys carried out by various statistical agencies. The survey calendar has not been maintained to collect data in regular intervals resulting the data gap for trend analysis and program evaluation. The compilation of administrative records do not meet international standards lacking major variables in the dataset so produced. Due to the differences in definitions, the data produced by various institutions differ, e.g. customs data, area and production of crops and livestock, health and education indicators, etc. However, censuses and major sample surveys follow the standards of international institutions (UNSD, The World Bank, ILO, FAO, WHO, UNICEF, UNESCO, etc.). The dissemination of the statistical outputs and micro-data is not effective to raise awareness on the use and interpretation of statistics and data sharing culture has not been institutionalized. The implementation of survey clearance system by the nodal statistical agency is crucial to maintain the quality of statistics produced by various institutions.

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LINKAGES AMONG MONITORING, EVALUATION AND NATIONAL STATISTICAL SYSTEM OF NEPAL

Teertha Raj Dhakal (PhD)*

Abstract

A strong monitoring and evaluation (M&E) system is one of the prerequisites for institutionalizing evidence-based development planning and policy processes. National Statistical System (NSS) also aims at providing accurate, adequate and timely information about the economy and society which are useful for M&E and planning purposes. In the context of inclusive development planning approaches Nepal has adopted and also regularly tracking SDGs indicators, demand of quality disaggregated data and evidences have been rising in the country. All types of available data either collected from censuses and surveys or compiled from Management Information Systems (MIS) or administrative records needs to be used in order to meet these demands. Though there are enormous benefits of establishing inter-linkages between M&E and the statistical systems, such linkages are not well established. In order to promote such relationships, an integrated policy and regulatory framework, culture of sharing and using information and building of capacities of both M&E professionals and statisticians are critically important. In this context, this paper aims at highlighting the system and practices of monitoring and evaluation and discusses its linkages with the current national statistical system in the country.

1. Introduction

The institutionalization of evidence-based development process is critical for the effectiveness of overall development efforts aiming at improving the lives of the people. A strong monitoring and evaluation (M&E) system is one of the prerequisites for making development practices evidence-based. Moreover, M&E which extensively uses data generated from various sources and establishes relationship between data producers and users can play significant roles in enhancing quality and effectiveness of development interventions. The effectiveness of any M&E system depends on the consistent availability of quality data generated from the national statistical system. Thus, there are potentially substantial benefits to be gained by improving the linkages and collaboration between monitoring, evaluation and the system of official statistics (Edmunds &Marchant, 2008).

* Joint - Secretary, NPCS

In Nepal, a comprehensive system of M&E was brought into existence only in the 1990s though the practice of reviewing progresses of development actions was commenced when the country initiated development planning in 1956. In regards to the national statistical system, the year 1948 can be taken as a milestone when the Statistics Act enacted and enforced that served a useful basis to formally institutionalize the system.

2. Objectives

This paper aims at highlighting the system and practices of monitoring and evaluation and discusses its connections with the current national statistical system in the country. The overarching objective of this paper is to assess the policy-practice of monitoring and evaluation (M&E) in Nepal. More specifically, it aims (i) to critically review the national level M&E system, *in situ,* taking into account the institutional frameworks, results-based indicators, flow of information and its use in informed decision making processes in the Government of Nepal (ii) to assess the extent of the use of the statistical system in the M&E practices in the country also taking into account of the monitoring and evaluation of SDGs indicators, and (iii) to identify issues on and recommend measures for enhancing the linkages of M&E system with national statistical system to contribute to evidence-based SDG-friendly planning processes.

3. Methodology

This paper is mainly based on the secondary data. Information for assessing the policy-practice of monitoring and evaluation in Nepal came from the medium-term development plans, M&E frameworks, annual programme documents and various progress reports of the Government of Nepal. In addition, the writer's extensive experiences in designing Results and M&E frameworks of periodic plans and projects, designing indicators along with information sources and facilitating evaluation studies as the in-charge of M&E Division/Section in the National Planning Commission Secretariat (NPCS) for over fifteen years have been used in developing this paper.

4. Concept of monitoring, evaluation and official statistics

Monitoring is one of the functions of management that aims at completing any development interventions in anticipated quantity, quality, cost and time. It systematically collects data on specified indicators to show progress on the use of funds and achievements of targets of any programmes or projects. It is used to inform day-to-day management decisions. A more comprehensive definition of monitoring includes the process of tracking progresses, type of data to be collected, indicators to be used and the users of M&E information. Gertler et al (2011) defined monitoring as the continuous process of collecting and analyzing information to assess how well a project, programme or policy, is performing. It relies primarily on administrative data to track performance against targets, make comparisons across programmes, and analyze trends overtime. It usually tracks input, process and output indicators, though occasionally it includes outcomes as well.

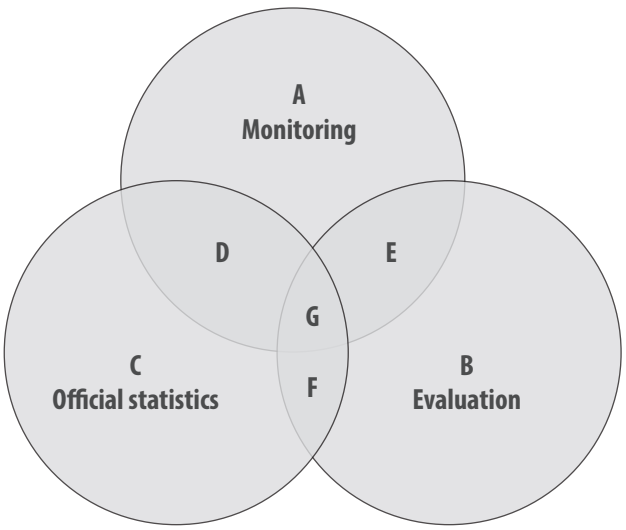
Evaluation is a process of creating evidences generating and analyzing various information of policies, programmes and projects so as to improve future planning and making someone accountable for the value for money. It is a systematic and purposeful undertaking carried out by internal or external

evaluators to appraise the relevance, efficiency, effectiveness as well as the impacts and sustainability generated by the policies, programmes and projects (NPC, 2013). Moreover, evaluations which are periodic and objective assessments of a planned, ongoing or completed project, programme or policy, used to answer specific questions, often related to design, implementation and results (Gertler et al, 2011). Impact evaluations are more comprehensive which try to answer the question of whether a project is responsible for changes in the outcomes and impact as defined in its results framework.

Official statistics are systematically collected, processed and disseminated by the national statistical organization (NSO).As per the UN Handbook of Statistical Organization (2003) all NSOs process raw data, convert them into statistics, apply objective standards to their operations and make it a condition of survival to be impartial, neutral and objective. Similarly, according to Edmunds &Marchant (2008) the management of official statistics involves a spectrum of activities ranging from data collection and processing through to data storage and dissemination. This includes the development and promotion of standard, transparent statistical methodologies and definitions, compilation of data constructs and data analysis. Official statistics are produced as a public good, for others to use and interpret as necessary whereas M&E results are directly feed-in information to policy makers and programme managers.

As defined above, monitoring, evaluation and official statistics are independent, distinct but interlinked disciplines. They can all be treated as distinct and separate domains involving different community of practice, but there are major areas of overlap and synergies which link the domains closely together (Edmunds &Marchant, 2008). The relationships and overlaps among them is visible as presented in Figure 1 (Venn diagram).

Figure 1. Monitoring, evaluation and official statistics



Source: Edmunds & Marchant (2008)

Figure 1 illustrates that monitoring, evaluation and official statistics are separate discipline as the large circles A, B and C respectively. A and B are overlapped in segment E which shows the inter-linkages between monitoring and evaluation making an integrated M&E function. Technically, it can be explained that segment E is a situation where evaluation uses monitoring information to analyze upper hierarchy of the result chain- outcomes and impact. Similarly, F is the section where there is linkage between official statistics and evaluation which can be explained as a situation where one can use data of household surveys in evaluating policies or large national programmes. All the three domains overlapped in segment G complementing each other. Explanation for this can be that official statistics serve the information needs of monitoring and evaluation of complex activities and nation-wide interventions like poverty reduction.

Overall message is that there can be synergies of collaboration and enormous benefits if the three domains work together. The sizes of D, E, F and finally G should be made bigger and bigger if our goal is to further promote such inter-linkages among the three identifying activities where each of these function complement the other.

5. The practice of monitoring and evaluation in Nepal

5.1 Evolution

In Nepal, the practice of tracking and reviewing progress of planned interventions was commenced when the country initiated development planning in 1956. In the absence of defined monitoring and evaluation (M&E) system, the review was not systematic and the focus was merely on tracking expenditure and identifying gaps in achievements vis-a-vis targets. A comprehensive system of M&E was put in place only in the 1990s when the Eighth Plan (1992-1997) identified M&E as one of its priorities. The decision of the then Cabinet on July 22, 1992 (NPC, 2013) was a turning point which put in effect the institutional arrangements to coordinate and implement M&E activities. However, the focus was on tracking inputs and processes and identifying issues that hinder project implementation but not on results.

After 2002/03, several efforts were made to make the M&E system results-based. During the Tenth Plan, NPC enforced a comprehensive Poverty Monitoring and Assessment System (PMAS) where efforts were made to establish linkages between inputs and results- output, outcome and impact. The PMAS aimed at coordinating, consolidating, harmonizing and facilitating analysis of data and also communicating results in ways, which provide effective feedback to the decision-making processes (NPC, 2004). The PMAS developed results indicators and information sources including the sequencing of household surveys, among others. As a parallel effort, a result-based M&E guidelines was also brought into effect in 2010 which could not be functional because of its complexity demanding high level of capacity and resources. Considering the past experiences, the government developed and enforced a result-based National M&E Guidelines in 2013 replacing all earlier frameworks including the PMAS. The new guidelines incorporate results-based indicators and figure out sources of information including household surveys and administrative data to track them.

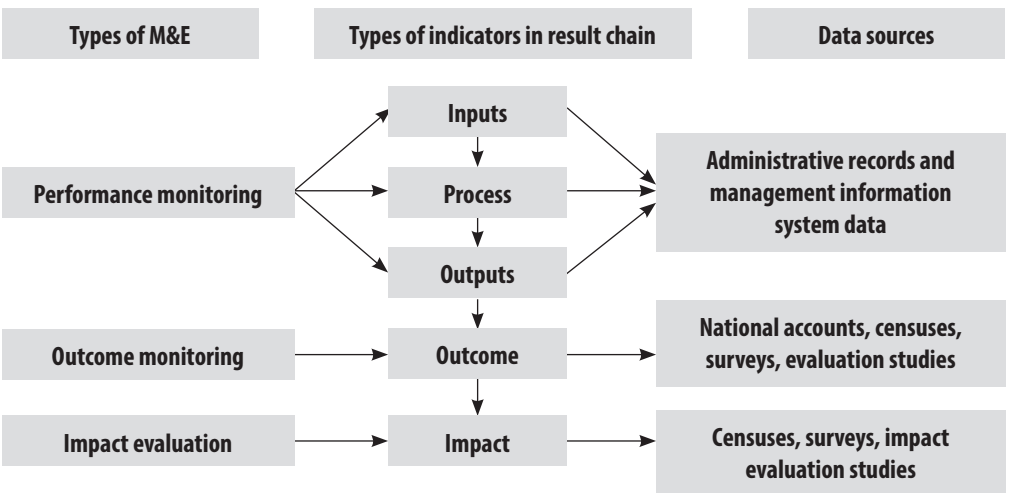
5.2 Types of M&E, indicators and sources of information

The monitoring and evaluation system within the Government of Nepal (GON) can broadly be categorized into three types- performance monitoring, outcome monitoring and impact evaluation.

Figure 2 schematically presents the tiers of indicators along with the sources of information used in these M&E sub-systems. Performance monitoring tracks how policies, programmes and projects are being implemented. It primarily relies on intermediate indicators including input, processes and output indicators. Monitoring of budget allocations and expenditure on projects, tracking contract awards situation and tracking output indicators analyzing gaps between targets and achievements all fall under performance monitoring. As shown in the figure, data sources for tracking the input, process and output indicators mostly come from administrative records and management information system databases.

Outcome monitoring which tracks changes in well-being, outcomes or impacts overtime can be of two types. The first type includes the monitoring of the outcome of projects and programmes where focus is the extent of the achievements of project objectives. The other type of outcome monitoring does not attempt to attribute the outcomes to a particular programme or project. In the first type, outcome indicators come from the logical framework of concerned projects for which evaluation studies are needed for data to assess the achievements of project outcomes. In the case of the second type, indicators are to be chosen to capture the outcomes especially well-being conditions, poverty incidences, human development situation and related education and health indicators. Official statistics mostly generated from censuses and surveys are the key sources of data to track these indicators.

Figure 2. Data sources for M&E at various levels



Source: Developed by the author

The third type of the M&E system is the impact assessment, which is designed for assessing impact and learning lessons to improve future policy and programmes. Impact analysis correlates the outcomes/impact analyzed in outcome monitoring with the programmes, which are monitored under implementation monitoring. It uses a range of analytical techniques to attribute outcomes and impact indicators to specific policies or programmes. Impact analysis has two main objectives: (a) to assess the effect of a specific policy, programme or project on poverty or some other well-being outcomes, and (b) to assess the efficiency of different policies or programmes in achieving a given

well-being outcome. Though separate evaluation studies are needed to assess the impact of policies, programmes and projects, raw data of household surveys can also be used in such studies in order to see relationships among variables of interest.

There is logical linkages among these three types and form a coherent whole of the M&E continuum. Without input-output monitoring, the impact assessment can say little as to why certain outcomes and impacts have occurred. Similarly, without outcome monitoring, one could not know how relevant the inputs and outputs are for contributing to the goal.

5.3 Institutional framework

The GON formally established separate institutions to operationalize M&E system in the public sector on July 1992. The current M&E institutions and their roles as per the national M&E guidelines 2013 are as below.

National Development Action Committee (NDAC): It is the apex body formed under the chair of the Prime Minister, with the objective of resolving exceptional problems and policy issues. The NDAC meets once in every four months, reviews project performances and identifies and resolves issues that are cross-sectoral in nature. Issues which hinder smooth implementation are mostly sent from projects and forwarded by Ministerial Development Action Committee (MDAC) meetings. In order to assist the NDAC, a sub-committee has been formed under the chair of the Vice-Chairperson of the NPC which comes up with various options to resolve the issues submitted by the MDACs after rigorous discussions. The decisions of NDAC though, have been instrumental in the smooth implementation of projects, time and often its decisions have not been well implemented questioning its effectiveness.

Ministerial Development Action Committee (MDAC): Itis formed in all development ministries under the leadership of concerned Minister that should meet regularly once in every two months. The MDAC in which there is representation from the NPC, Ministry of Finance and Ministry of General Administration is primarily responsible for solving the problems development projects under the ministry have been facing during their implementation. A sub-committee has also been formed in each ministry under the chair of the concerned secretary to assist the MDAC which comes up with alternatives to resolve issues after rigorous discussions.

M&E Division in the NPCS and line ministries: The M&E Division in the NPCS serves as the central unit of M&E system, and functions as the Secretariat of NDAC. It is responsible for monitoring of the M&E processes of line ministries and also engages in monitoring the key national level projects at the. Moreover, it also engages in conducting internal evaluation and facilitating external evaluations of projects. It also assesses the need of M&E capacities of public sector agencies and plays roles in strengthening their institutional and individual capacities. Sectoral divisions of the NPCS are also responsible for monitoring projects under their respective sectors.

Some development-related ministries which implement a large number of projects have full-fledged M&E division or sections whereas in others, M&E role is assigned to the planning divisions. Such M&E or planning units are responsible for reporting periodic progress of projects to the NPCS and also for providing secretariat services to implement decisions of the MDAC. There are separate MIS units in some ministries or department which collect, process and report sectoral MIS or administrative data useful in M&E.

In addition to the above institutions, the current Good Governance Act, 2008 has a provision to form a Central Monitoring Committee under the chair of the Chief Secretary of the GON to oversee and monitor policies and the situation of public services delivery. A separate Division has been created in the Office of the Prime Minister and Council of Ministers to provide secretariat services to the above Committee also implement its decisions.

6. Role of statistical system in monitoring and evaluation

The role of National Statistical System (NSS) which aims at providing accurate, adequate and timely information about the economy and society is critical in order to effectively institutionalize M&E system at the national level. The information generated from the NSS and used in M&E provide critical evidences for policy makers to work for improving the well-being or making differences in the lives of the people. As presented in Figure 2 above, a wide range of data is needed for monitoring and evaluation system to track progress, outcomes and impact of development interventions. However, statistical system has its own limitations because it is developed to provide information for general purpose and is made available to all. In addition, it is not designed in order to acquire or generate information on specific policy or programme or project in which M&E is mostly interested in. Thus, the extent of the use of information generated from NSS depends on the types of M&E as discussed in the following paragraphs.

In performance monitoring there is a need to track human, physical, and financial resources in development interventions and how they are converted into outputs. For this, input and output indicators which are comparatively simple to develop are needed and the information sources to track them mostly come from administrative records and the MISs of the implementing agencies. For instance, if we want to track status of educational and health institutions including their human resources, budget allocation and expenditure in projects and programmes, services delivered and immediate outputs achieved, records of education and health institutions and the Education and Health management information systems (EMIS and HMIS) provide enough information. In Nepal, EMIS and HMIS are good examples of extensive data collection that provide evidences to manage performances in the sector. So, for performance or input-output monitoring most of the information do not come from the censuses and surveys but received from internal information systems of projects and programmes.

In outcome monitoring, we monitor the results at the outcome level aiming at providing information that is benefiting from development interventions. At the same time, it is also important to know about the clients who are not benefiting and to understand the reasons behind it. Such data are mostly generated from national statistical system by means of household and facility surveys and very little information comes from MISs and administrative records. In Nepal, as a national statistical organization, CBS is the focal point and legitimized organization to conduct household surveys assuring its quality and to effectively harmonize survey-based results. However, household surveys conducted in the past were not regular and there were some duplication in terms of their timing and indicators used. Thus, there is a need to streamline and sequence household survey system as such that survey-based data will be consistently available for monitoring national level outcome and impact indicators.

In regards to evaluation of programmes and projects, data are mostly collected from separate impact evaluation studies in addition to the use of monitoring information. Both the baseline and post-implementation data of the project beneficiaries and control groups are collected to establish counterfactuals. In such case, data collected from official statistics are rarely used. However, in order

to evaluate some nation-wide policy or programmes, data created from national household surveys or even censuses can be used. Raw data of surveys can be used to check causalities and establish relationships among variables so as to evaluate the effectiveness of certain policies.

7. Monitoring and evaluation of SDGs indicators

The sustainable development goals (SDGs) declared in 2015 envisages transforming the world into more developed and sustainable place by 2030. The charter of SDGs also stresses the review processes that examine progress toward achieving the goals at the country, regional and international levels. Such review processes focuses on identifying achievements as well as challenges, gaps and measures to adopt so as to realize the goals by one and a half decades from 2015. Moreover, evidences created from the periodic review and monitoring and evaluation of SDGs provide basis for enhancing learning and innovation and also ensuring accountability.

The GoN has prepared the SDGs national (preliminary) report in 2015 which intends to serve a basis to internationalize SDGs in the country. Moreover, some aspects of SDGs have been internalized in the current 14th plan and introduced codes to each project and programme in the annual budget of 2016/17 indicating which goal(s) the project or programme is contributing to. Further, the government has already initiated to revise the national M&E guidelines with internalizing SDGs. Recognizing the importance of more focus on evaluation of SDGs, EvalSDG forum has already been created where Nepal can also get access and learn the approaches and internalize it in the overall M&E of SDGs.

The SDGs national (preliminary) report proposes list of indicators needed to monitor 17 goals and 169 targets, sets baselines and also targets with periodic milestones. While setting the baselines the report has used the data from national level household surveys- Nepal Living Standards Survey (NLSS), Nepal Demographic and Health Survey (NDHS), Nepal Labour Force Survey (NLFS), Multiple Indicator Cluster Survey (MICS) and also some MIS data. The report identifies data gaps and recommended measures to fulfill those gaps so that there will be adequate and reliable information to track progress of these goals. The report recommends that a large number of surveys have to be done in the next few years to fill the data gaps and create baseline data for the targets that have no databases. Existing surveys should be tailored to the SDG monitoring needs particularly for gender, social groups, class and geographical location-based target-setting, analysis and M&E of SDG outcomes. It also recommends that some SDG-related targets also require intra-household information such as nutrition, hunger, poverty, education, health, consumption and income distribution (NPC, 2015).The role of NSS and official statistics is enormous to create evidences for tracking and evaluating SDGs.

Since one of the values of SDGs is 'leaving no one behind', reviewing SDGs does not only mean simply tracking of quantified figures. It should go beyond the numbers and explore the answers of 'why' and 'so what' questions. It needs to answer why there is progress in some goals and why not in others and what needs to be done to equitably achieve the goal leaving no one behind. There is also need of disaggregated data especially in equity-focused and gender-responsive M&E of SDGs such as; time use in different household activities, employment, informal sector wages and earnings, violence against women, trafficking and data of multiple exclusion etc. Sub-national and geo-spatial data for tracking progress of SDGs and its localization is crucial. The forthcoming National Strategy for the Development of Statistics (NSDS) need to take care of it. Moreover, focus should equally be on evaluations not simply on tracking progresses to answer those questions. Qualitative data also needed to respond some of those concerns and triangulation of evidences be done and quality assurances tools and mechanisms are required to ensure data quality.

8. Issues and challenges

Nepal lacks an integrated policy and legal framework to guide and govern monitoring, evaluation and statistical systems. As a regulatory framework, there is a Statistical Act and it regulations whereas the country still lacks such legal instruments in M&E. NPC has drafted a separate Bill for M&E which is in the legislation process and will serve the purpose once enacted. About policies, there appear some policy statements in the periodic plan documents both for M&E and statistics which only serve as sunset policies which are fragmented and narrow in coverage. The CBS has also drafted the NSDS which has not yet been formally enforced.

In the public sector agencies in Nepal, culture of using information in policy and decision making processes has not been fully developed. Due to this, there is low demand of evidences as well as low level of commitment of policy makers in strengthening monitoring, evaluation and statistical system. Despite this, demand of disaggregated data has been rising. It is because since the Tenth Plan (2002/03- 2006/07) inclusive development has been one of the major development agenda in Nepal which has got more focus after the new federal constitution of 2015. In order to institutionalize inclusive policy processes, the demand for disaggregated data of caste and ethnic-based social groups, geography and gender is on the rise. However, national household surveys collect information from a limited number of samples which are hardly enough to estimate the values of indicators for 103 caste and ethnic groups. It is only the census that can provide dis-aggregation of all the caste and ethnic groups but only to a limited set of indicators mostly demographic and social profiles rather than well-being related indicators. Sectoral MISs also does not provide such disaggregation. For instance, disaggregated data of the coverage of immunization, incidence of diarrhea or similar other attributes are not available in HMIS. It provides recorded information only in six broad ethnic groups. Though EMIS disaggregates some indicators based on gender and broad social-groups it also could not serve the purpose.

There is low level of capacities both at the institutional and individual levels to demand, produce, analyze and use monitoring and statistical evidences in the public sector. In current organization structure, M&E unit does not contain adequate and qualified human resources. Working modality of M&E, Planning and Statistics sections of ministries is not conducive. It looks like these agencies are working in isolation of each other. Compared to M&E officials in the M&E units in the ministries and departments, CBS has developed its institutional capacities and individual competence to collect data especially planning and conducting censuses and surveys. Due to low capacities in ministry M&E units, integrating and improving these data-gathering mechanisms has been an ongoing challenge. There is also capacity gaps at the policy-making levels to demand and use relevant evidences.

9. Policy recommendations

a. An integrated policy framework is needed to establish linkages between M&E and NSS

There are synergies and benefits of linking monitoring, evaluation and official statistical systems. Therefore, institutions responsible in these activities need to work in a collaborative manner in order to avoid duplications and provide continuous and consistent information. In order to establish such linkages and collaboration, a comprehensive and perspective umbrella policy on monitoring, evaluation and statistical system needs to be brought out and implemented.

b. Promote use of M&E evidences and statistical information in policy processes

Robust evidences generated from management information systems as well as reliable statistics are vital for good policy making and its monitoring and evaluation. However, use of such evidences and statistical information in the policy and decision making processes is still very low. In order to promote use of evidences, there is a need to institutionalize a system where there is easy access of quality statistical data and M&E evidences. In addition, policy makers need a comprehensive and consolidated policy briefs which can be easily consumed in their decision processes. For this, linkages between data producers with data users' needs to be properly established which can be done by building analytical capacities in the professional levels in the bureaucracy especially those who are in planning and M&E units of line ministries.

c. Serve the need of disaggregated data for inclusive policy processes

Several measures can be adopted to address the demand of disaggregated data in the country. First, increase the sample size of household surveys so as to provide some attributes by gender and broader social groups in a regular interval. Second, identify key minimum set of indicators for such dis-aggregation by gender and social groups and incorporate them both in household surveys and MIS. Third, introduce sub-national surveys useful for provincial and local level planning where further disaggregation can be done. Fourth, the caste and ethnic groups can be merged into some broader social groups of which household surveys and MISs can provide dis-aggregated figures.

d. Multi-pronged capability building approaches needs to be implemented

Institutional and individual capacities are crucial to institutionalize evidence based policy making processes in the government. Multi-pronged strategic measures both for building capacities of data producers and data users need to be adopted. It should include activities that build institutional capacities of NPCS, planning and M&E units of line ministries and Central Bureau of Statistics and also individual competencies of M&E officials and statisticians. Such measures need to include but not limit on training these officials. Moreover, engaging M&E officials and statisticians in the planning process right from the beginning of designing the sectoral theory of change and results frameworks along with indicators will help them build their confidence and understanding on the M&E methodology and requirements of data. There is also a need to further develop institutional and technical capacity at the sub-national levels. Further, policy makers at various levels need sensitization so as to enhance their understanding on the importance of M&E and statistical information to achieve better results institutionalizing good governance in the country.

e. Promote quality and extensive use of available data including administrative data

Central Bureau of Statistics (CBS) and line ministries/agencies are the key actors for collecting, compiling and disseminating official statistics in Nepal. In order to cater the need of statistical information, line ministries also facilitate surveys and collect extensive administrative data from their management information systems. However, compared to CBS, line agencies, except few who have established statistical units, lack both institutional capacities and individual competence in planning, collecting, compiling and disseminating their statistical information. In order to strengthen the quality of data there is a need to strengthen the institutional capacity of CBS and also the professionalism of statisticians who are in the public sector. In addition, practices have to be developed to regularly share this statistical information among agencies and between line agencies and CBS. Further, as the central statistical office, CBS should have mechanisms of collection and standardization of official statistics

including MIS data generated by different ministries and also provide backstopping support to build capacities of staff of other public agencies. Since surveys are costly and are not practical to conduct in a short periodic interval, maximum use of MISs data will help to cater the sectoral data needs.

f. Sources of information to track SDGs.

In order to regularly track SDGs, some ground works are urgently needed. These include identifying SDG indicators that are relevant for Nepal once the global SDGs indicators are finalized, clustering indicators that can be tracked fully or partially through existing statistical system and identifying indicators that lack reliable sources of monitoring information. This exercise will provide the information where there are data gaps so as to develop proper instruments to get consistent and reliable information including from qualitative sources.

9. Conclusion

A well-established practice of using evidences in policy processes is one of the factors that determine the effectiveness of development results. Such evidence-based policy culture can act as an enabling environment for the effective institutionalization of the monitoring, evaluation and statistical system in any country. Moreover, extensive use of evidences can influence production of information and knowledge creating a demand-driven culture that ensures any data produced is policy-relevant. The lack of established mechanisms to create a demand-driven data environment is a key barrier to rigorous use of data in which Nepal is not an exception.

With respect to the relationship between official statistics and M&E in Nepal, there is a long way to go, though realization about the synergies of collaboration and the benefits have been gradually emerging. In order to develop such relationships effective, systematic drive from integrated policy and regulatory frameworks along with an umbrella institution is highly desired. M&E organizations and statistical agencies need to work in a collaborative way and complement and share information to each other. Since, monitoring and evaluation cannot exist or function without statistical data, any plans to expand and strengthen monitoring and evaluation need to include statistical system as well. Similarly, capacity building measures should capture both M&E professionals and statisticians. M&E and statistical systems collectively contribute to achieve the planned goal of realizing SDGs or graduating Nepal to a middle income status by 2030 in which the country is striving for.

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