RWANDA
Agricultural
Survey
2006

National Institute of Statistics of Rwanda
Ministry of Finance and Economic Planning

Unit of Planning, Policy and Capacity Building
Ministry of Agriculture and Animal Resources

June 2007

FOREWORD

Jointly -funded by both the governments of Rwanda and the Netherlands, The Division of Policy, Planning and Capacity Building in MINAGRI, partnered with the National Statistics Institute of Rwanda, (MINECOFIN), has established an agriculture statistics Service in charge of collecting, analyzing and publishing information pertaining to agriculture sector.

In 2006, data collection has covered a representative sample of 1704 farmer households countrywide. Rwanda agricultural profile is extrapolated from results set forth by this survey.

This publication describes the methodology used, essential characteristic features of farmer households, use of agricultural inputs and manpower, crop productions, land use, animal farming during the 2006 season. Moreover, these results are compared to data of preceding years.

This work is a joint production of a number of people namely:

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The team highly pays tribute to heads of households who gave their time generously, and were cooperative to provide necessary information. They should be sure of our deep gratitude.

We cannot forget 69 investigators of whom 14 controllers worked tirelessly on field for a quality work. May 11 data typists feel this token of gratitude for a wonderful task accomplished in quite short time.

Finally, the team would like to reiterate appreciation to international consultant (David McGill), the MINAGRI and INSR staff, as well as staff who took part in this work. Agriculture Survey Team.

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CHAPTER ONE: INTRODUCTION

1.1 Survey framework.

Agriculture is the most important economic activity of ordinary households in Rwanda. According to the 2002 national census (RGPH), over 90 % declared their engagement in farming. In town and suburban areas, 9,3% of ordinary households are interested in marshland cultivation and other farming activities. At the current employment level, according to the integral survey on household living conditions (EICV) in 2000-2001, farming is the main income source in rural areas and in 2003; the agriculture share of the GDP was 46 %.

Nevertheless, agricultural GDP evaluation does hold some weaknesses, as it relies on agricultural production estimated annually on basis of results of agricultural survey carried out in 1990. However, it is now obvious that Rwanda's 1994 events impacted on the whole production system and agricultural sector in particular. Ever since, notably after 1994, the government of Rwanda is faced with the problem of lack of reliable agricultural statistic, incomplete data series, agricultural information access and diffusion. By contrast, those data are essential for achieving the follow up and evaluation of both rural development policy and programs.

What is more, the implementation of poverty reduction strategies and food security needs a better knowledge of rural areas as they are home to most of people faced with hunger and poverty. Due to the fact that off -farm revenues are deemed almost inexistent, rural inhabitants depend only on agricultural production. Currently, arable spaces owned by household become gradually limited owing to combined effects of the population pressure and soil erosion. Besides, the decline in soil fertility and livestock make those rural populations more vulnerable. The availability of agricultural data will lead to evaluation and orientation of poverty alleviation and food security programs.

However, due to the Strategic Plan on developing the national statistic system, Rwandan authorities are to establish regulations conducive to synergy between statistic data suppliers and users.

1.2 Background

Since 1983, the Ministry of Agriculture and Animal Resources started data gathering on basis of representative sampling in agro-climatic regions and provinces. An agricultural survey was carried out countrywide for a better reference base.

Since then, minor researches were carried out over 5 successive years, with a representation at the province level. Those studies ceased in 1992 due to the national insecurity.

The collected data enabled the rating of the achievement of investment in rural areas as long as the external investments were oriented mostly in rural development. Agricultural statistics were intended also for locating regions faced with food deficits in order to proceed for urgent interventions in case of drought, food shortage and other natural disasters.

MINAGRI, in partnership with FRSP, resumed statistics activities in 1999 and worked on the basis of a representative sample of 1584 households. Their work was focused on land size and use and agricultural productions. Unfortunately, this exercise concluded in 2002.

Confronted by this situation, the FAO representative to Rwanda initiated a project supporting both information system and agricultural statistics and the project ended in December 2004. It is in this framework that a pilot survey was carried out in Kigali Ngali, KIBUYE and UMUTARA for an agricultural study countrywide.

1.3 Justification

The government needs a lot of data on agricultural industry for realistic and sound agricultural policy which takes into account local, national and external resources as well as population needs in terms of food. Equally, the level of satisfying needs in food and poverty reduction will be assessed thanks to data collected in rural areas. The said information is also used for evaluating the impact of interventions of the government, NGO, donors etc.

With reference to estimates on agricultural production, some divergences appear between MINAGRI's assessment, which emerges as an official one, and FRSP estimates. A number of other surveys were carried out, and covered the rural sector but none met information needs both in terms of quality and representation, this is notably the case of the FRSP estimates in 2003. Agricultural estimates require information on land under cultivation, pastoral areas, yield, livestock etc.

Therefore, it is essential to collect information on rural sector if the government targets to know the share of agriculture in the national economy and the impact of efforts engaged in poverty reduction and food security.

1.4 Survey objective

The major objective is to provide reliable data on vegetable and animal production, intermediate consumptions (manure, pesticides, etc.) and the extent of intensification (use of improved seeds, organic / green fertilizers, the soil protection...).

The survey will address the huge and frequently- expressed demand in agriculture sector. Agricultural production from two main seasons will be specifically determined as well as the cultivated space size, yields, livestock inventory and structure, rural employment…

In addition to good GDP estimate, which would arise from the agricultural survey, the latter will enable the Ministry of Agriculture and Animal Resources to have information necessary for short, medium and long- term planning. To achieve these goals, two successive surveys are envisaged. The first will be emphasized on the estimate of the agricultural sector contribution nationwide. The second one, on one hand, will be more focused on thorough results at the province level and, on the other hand, investigating into the share of agricultural sector in poverty reduction efforts and food safety.

CHAPTER II - METHODOLOGY

2.1 Introduction

Census and surveys are 2 major sources of agricultural-related data. Censuses are very expensive to run. Not only tiresome coordination and preparatory work are at stake, but still enormous financial and human resources have to be in place. There is no any justification behind holding census as the same results with as much precision can be obtained through surveys with a good random sample.

A census consists of an exhaustive study of the population on basis of a questionnaire where appear various questions about parameters pertaining to the population which we seek to comprehend. While either survey or sampling aim to investigate a population on basis of a portion of it or `sample', in this case, statistical inference methods will be used to extrapolate the whole population from survey results.

Both methods hold advantages and disadvantages. Census is exhaustive, however with a long and costly implementation. The survey bears the advantage of being cheaper and quicker. This is worth a consideration if urgent information is needed

The choice between the census and survey methods depends on, besides financial and human resources available for the operation, practical implementation and the degree of accuracy, which is targeted. With reference to precision which is often subjected to criticism by users or other people interested in the statistics, it depends on:

- Quality researchers, quality questionnaire, quality supervision;
- Sample selection;
- Interviewee Participation;
- Quality transcription;
- Extrapolation of the data.

It is important however to emphasize that in case of survey failure, this happens much more because of observation error rather than sampling errors. Observation errors are more serious in a survey than they immerge in a census. Their influence on the results is equally more important if observations are less numerous. With reference to survey, the precision appreciation is evaluated by examining sampling error. For a survey to bring about satisfactory description of the studied population, the following points are essential:

- To choose judiciously the sampling device (units Selection);
- To have a good base of sampling;
- To make exact observations on sample individuals;
-To extrapolate the population correctly and effectively from sample observations. Thus, ideal choice of an estimator is linked to sampling devices.

2.2 Survey Scope

This work is focused on agricultural sector and thus will cover the whole country except for the urban ZD, which have less than 70 % of households involved at least in farming activity. As for the temporary coverage, the survey is undertaken during the two agricultural seasons in Rwanda and is scheduled to cover actually the whole agricultural year. The sample households remain the same all year round

2.3 Sampling

2.3.1 Base Unit

The observations are made on technical-economic production units in rural areas i.e. farming households. They include household devoted to farming activities in general (agriculture, animal farming, fishing and pond-farming, bee-keeping, tree-growing...). The listing form (first questionnaire in appendix) is used to identify this type of household. Households are gathered in listing zones established during the 3rd General Population and Housing Census held in 2002. The listing zones (ZD) are established as, relatively, homogeneously- populated geographical entities. However, atypical ZDs are often identified on basis of their lowest or highest size of farming households. To correct the imperfections on sampling base, ZD of low size are integrated into regular ZD, which are nearest, geographically speaking.

2.3.2 Sampling base

On the basis of agricultural module of the 2002 RGPH, it was possible to constitute a sampling base on the agricultural sector. This base enables to draw samples of all surveys on agricultural activities. Rural areas are characterized by a strong space variability on socio-economic features and production factors. Sampling in this sector will take account of those features. Thus, the stratification proves to be essential especially for survey precision and thereby reducing means required for its implementation. Administrative divisions (12 provinces) were retained like stratification criterion. The data from Kigali city are integrated into those obtained from Kigali Ngari province. However, most processed stratification, agro-ecologic zones in particular, will enable to define more or less homogeneous layers as far as agricultural activities are concerned and consequently, leading to the betterment of estimates.

2.3.3 Selecting sample household

Within the framework of this work, the households to be investigated are selected according to a double sampling diagram. Primary units are listing zones (ZD) and the sample households (second degree unit) are drawn from sample ZD. The option of drawing the sample in two phases requires the presence of a minimum number of second-degree units in the first-degree units i.e. the ZDs. On the first sampling level, selected were 120 Primary Units corresponding to listing Zones (ZD) established during the census of 2002 (RGPH). The total number of ZD (120) is distributed between the provinces proportionally with their total number of farming households listed in August 2002. For each province, the ZD are selected according to probabilities diagram proportional to their size (exploitation number) and in a regular way.

Sample- ZDs were listed to constitute updated lists of households residing in these ZD and to identify the agriculturist household. Thus, the operation enabled to identify farmer households. The lists obtained are used as bases of the sampling for systematically or regularly selecting 15 farmer households per ZD with equal probabilities. Among them, 12 households will be interviewed and 3 others constitute the substitution reserve in case of impossibility or refusal to be investigated.

2.4 Data Extrapolation

For calculations on observations weighting, it is essential to remember that sample was drawn according to following procedures':
- in each province a variable number '**r**' of ZD was drawn with probability proportional to the number of ordinary households obtained in 2002 RGPH following a systematic sampling;

- In each selected sample ZD, 12 farms were selected with the same probabilities according to sampling, which is equally systematic. In each ZD, ` j will stand for any observation.

For each province, consider y the analyzed variable, for instance the population, space, production, etc. ` Y_{ij} will stand for any observation, as ' i ' stands for ZD number (i = 1, 2, 3....., N) and J (= 1, 2, 3..... e_i.) for the observation number in ZDs where e_i is the number of actual households covered in the ZD. The total T_Y from the province for this variable is obtained by multiplying the average $\bar{\mathbf{y}}$ per household of the province with the total households number (P) in the province.

This is based on the following formula:

$$T_Y = P\,\bar{y}$$

let

D_i be the number of farms listed in ZD i during the survey;

P_{i0} be the number of households in ZD i for RGPH 2002 ;

P_0 be the number of households in the provinces for RGPH 2002,

y_{ij} be the value of variable y for farm j in ZD i ;

T_{y_i} be the sum of values of variable y of individual ZD i ;

T_y be the total of variable y in the province ;

$\bar{y}$ be the average value of variable y in the province ;

$\bar{y}_{ij}$ be the average value of variable y in ZD ;

The estimator $\hat{T}_Y$ of total T_Y of y is provided by:

$$\hat{T}_y = \frac{1}{n}\sum_{i=1}^{i=n}\frac{D_i P}{P_{i0}}\sum_{j=1}^{j=ei}\frac{y_{ij}}{e_i} = \sum_{i=1}^{i=n}\frac{D_i P}{nP_{i0}e_i}\left(\sum_{j=1}^{j=ei} y_{ij}\right) = \sum_{i=1}^{i=n}\frac{D_i P}{nP_{i0}e_i}T_{y_i} = \sum_{i=1}^{i=n} C_i T_{y_i} \text{ with } C_i = \frac{D_i P}{n\,P_{i0}e_i}$$

The estimate of the total variable in a province is obtained through the sum of data obtained on sample exploitations balanced by a coefficient C_i specific to their ZD , i.e. the ZD extrapolation coefficient.

Thus, the precondition for extrapolation data on various forms, is the calculation of the extrapolation coefficient C_i which must base on the number actually-investigated exploitations, on the sample- ZD number, the number of households of the ZD and the province at the last census, and on the counting of ZD during the survey. The extrapolation coefficient is obtained from the formula below:

$$C_i = \frac{E_i P}{nP_i e_i}.$$

Later on, all the data will be balanced by extrapolation coefficient of the ZD from which they were collected. This is valid for all forms (form 1, form2.1, form 2.3, Form 2.4, Form 3, Form 4.2, Form 5.1, Form 5.2, and Form 7).

2.5 Yield calculation and farm commodities density

The data on form 6 are intended to estimate the yield and average commodity densities. In a ZD, '*n*' ` is put on yield and space squares, ` Si` (I = 1..., N) in m2. If the production (quantities harvested in kg) is ` Pi' (I = 1..., N), the average yield per hectare in the ZD is then provided by

$$R = 10000 \text{ x } \frac{\sum_i P_i}{\sum_i S_i}$$

As for obtaining the density of seedling (a number of feet per ha), the following formula is used:

$$D = 10000 \text{ x } \frac{\sum_i d_i}{\sum_i S_i}$$

with ` di' which stands for the number of feet  tufts or feather-grasses counted in each square ` i'.

CHAPTER III – DATA COLLECTION

3.1 Survey Questionnaire Description

The survey questionnaire is made of 15 separate forms. The separation of forms offers advantages, as the form treatment is done independently, without waiting for the end of the survey. Thus, the partial results exploitation becomes possible. These forms are portrayed as follows:

Form 0	Counting of farms in sample ZD;
Form 1	Characteristics of farm ownership members;
Form 2.1	Identification of farm blocks;
Form 2.2	Makeshift blocks sketches;
Form2.3	Field form;
Form 2.4	Farm commodities form;
Form 3	Purchases of agricultural inputs;
Form 4.1	Daily harvest records;
Form 4.2	Monthly Recapitulation of daily harvest record;
Form 5.1	Livestock inventory;
Form 5.2	Monthly animal productions Flow;
Form 6	Yield square/ density;
Form 7	Fishing and fish breeding activities;
Form 8	Bee-farming activities;
Form 9	Forestry

Most of answers to questions are codified for an easy filling in and computed data exploitation. The Codes to use are featured on the form except for administrative divisions whose codes are endorsed on the questionnaire

3.2 Survey Organization

Collecting data on sample households implies that investigators go through several stages. Initially, the contact visit is meant for introducing the work to people whose cooperation is critical for information provision. The exercise requires, among other action, meeting grassroots or civil servants for their help in relating with households in question. Then talks with household heads are held to gather information about the farmer's family and farm in general.

Finally, the identification of land blocks is carried out after the interview with household heads. Thus, the block sketches and list of block fields are established. Moreover, fundamental information on current agricultural commodities is recorded.

Yield and density squares are placed in identified fields. Therefore the difficulty lies in the fact that visiting distant blocks requires a whole day or transportation means.

The household head helps in recording his production. Hence, the daily harvest record is used for reporting on the production of agricultural commodities currently found in the farm. Information on the production is collected on some commodities (beans, wheat, sorghum, Soya, groundnut, pea, maize, cassava, Irish potato, banana, sweet potato). For the weighable products, harvest is evaluated in terms of buckets. As for countable products - maize, sorghum and banana –one simply resorts to counting bunch or ears per commodity.

At end of each month, the investigator makes an addition of buckets, ears or bunches per product to have the monthly production.

3.3 Analyzed Parameters

1. ***Involvement in farming activities***: farming, animal farming, Fishing and fish breeding, bee-keeping and tree growing.

2. ***Production factors***:

a) Land

- Blocks, fields and farm Space;
- Site;
- Farm division (plot division);
- Time spent to reach field from home;
- Farm acquisition mode;
- Typology of commodities;
- Mode of cultivation;
- Anti-erosion system;
- Position;
- land Quality;
- Use of the manure and mulching;
- Use of the phytosanitary products;
- Use of the ordinary and improved seeds.

b) Manpower:

- A Number of people classified by age, sex, capacity and educational level and reading and writing ability;
- Off- farm employment for household members;
- Division of the manpower per types of agricultural activities

c) Capital - Material:

Farm implement and other agricultural equipment
- Animal farming: cattle, goat, sheep, poultry, rabbits, guinea-pig

3 Productions:

a) Plant

- Quantity harvested per commodity

b) Animal:
- Animals sold, consumed, given in gifts - dairy production - eggs production.
- Fishing and fish breeding - Bee-keeping

c) Forestry

3.4 Concept definition

It is critical that terms used and various headings are understood in the same way by anyone involved in the operation. Thus, here below are the definitions of certain concepts in use:

Agriculture household

The agriculture household is the whole assembly of people with or without family ties, dwelling on a farm, under the authority of an individual called ` "household head". Their resources and expenses are mostly common; they generally share their housing or in the same enclosure (urugo).

Farm

A Farm is the whole land or any other mean used by the household, during one year or season, to produce, on its own, food commodity, in the general sense, such as food, fish, honey, wood, etc. It is a technical-economic unit of production. Some members of farmer household can be involved off-farm activities. In the case of polygamist households where women live separately and are responsible of the management of agricultural activities, they are too considered as household heads.

Blocks

The block is the entire continuous land belonging to the same farmer. A block can comprise one or more fields.

Fields

The field is a homogeneous land portion which is part of the block. No, one or several agricultural commodities (seasonal or permanent) can be planted on one field and harvestings are not necessarily carried out the same time.

Fallows

The fallow is a field which was formerly farmed but is temporarily rested (less than 5 years).

Principal agricultural commodity:

A principal agricultural commodity abounds in the field, in terms of vegetation density.

3.5 Proceeding

a) Pilot survey

This phase was carried out during the agricultural year 2004 in the provinces of Kigali Ngari, Kibuye and Umutara, thanks to the TCP/RWA/2904A project financed by FAO. It aimed essentially to the adoption of methodology for the sample drawing and questionnaire setting.

b) The survey

b1) Preparatory Phase

Sampling; Selection and training investigators; Sensitizing local authorities and the population;

b2) Work Completion

- Compiling guidance manual for enumerators and supervisors;
- Complete questionnaire test;
- Personnel evaluation;
- Measuring instruments test;
- Data processing programs;
- Compiling analysis tables,
- Development of programs on data collecting and processing
- Development of the data analysis methods and results interpretation
- Publication of final results

3.6 Practical Organization

The survey is manned by a multidisciplinary team from MINAGRI and MINECOFIN. The team works on questionnaire design, on total survey methodology, developing technical documents, training of field agents in charge of the national supervision of data gathering, typing, processing as well as the results analysis.
On the field, information gathering is carried out by 14 teams. Each team comprises 1 controller and integrates from 2 to 4 investigators. The collected data are checked by the supervisors prior to be sent to Kigali for data entry.

The data entry is carried out by 11 agents supervised by one cadre from the Institute of Statistics under the supervision of a MINAGRI Computer specialist. CSPRO software is used for data entry and it is incorporated in each form. As for checking, it is focused on assessing data coherence and accuracy. After the checking by a computer specialist, data are analyzed through SPSS software by following a tabulation schedule worked out by the Statistician and Analyst from MINAGRI.

CHAPTER IV RESULTS 2006

4.1. Characteristics of households : 2006

1.1 The total number as it is shown in annexe 1.1 of households in 2006 A was 1.524.424 compared to 2005A which was 1.597.264. The difference is only 0.5 % which is acceptable. This shows that in two seasons, the number of households is similar.

1.2 The annexe 1.1 shows that in 2006A the biggest number of households in Ruhengeri is 192.216 people followed by Kigali Ngari and Kigali Ville with 183.129 households. The lowest number of households is in Umutara with 79.332 households and the main reason is that this region was recently occupied.

1.3 The average age of household is 44 years and the maximum age of household is 99 years and the minimum age is 15 years. When the head of household is a man the average age is 41, the minimum is 15 years and the maximum is 99 years. When the head of household is woman, the minimum age is 17 years, the maximum age is 99 and the average age is 50 years; this table shows that there is no difference between age when the head of household is man or a woman.

1.4 In 2006 the number of households headed by men represents 72% and those headed by women are 28%. The same annexe 1.1 shows that the highest number of households headed by men is found in Kibuye with 78% when the highest number of households headed by women is found in Ruhengeri with 34%. The main reason can be the consequences of Genocide.

1.5 When the head of household is a man, the majority of households are between 18 years and 45 years. When the head of household is a woman, the majority of households are between 45 years and 45 years and more than 70 years. This shows that since the young age, man is the head and in the old age woman is the head. In general women live longer than men...

1.6 The same annexe 1.2 shows that total agricultural population is 7.567.443 in 2006 A when in 2005 A, it was 7.965.664 and the difference is 0.5% which means that the two results are similar. In terms of distribution between men and women, men represent 48% of the population and the women 52%. The biggest number of

agricultural population is found in Kigali ville and Kigali Ngari with 964.766 followed by Ruhengeri with 932.954 people. As in the previous table, the lowest population number is found in Kibuye with 425.187 people followed by Umutara with 435.509 people.

1.7 The annexe 1.3 shows that the average age of the head of household for the entire country is 41 years for the men heading households and 50 years for women who head households, this means that women live longer than men even though women work hard particular in rural areas. The minimum age for the men heading households in average is 15 years when it is 17 years for the women heading households. The difference is very small. The minimum age for households headed by men is higher in Gikongoro, Kibuye and Byumba, these old provinces are among those who suffer the most of food insecurity. It would be good to do more analysis to see the determinant factors. The lowest minimum age for households headed by men is found in Gisenyi 15 years and the maximum is found in Butare and Byumba of 99 years.

1.8 When the head of household is a woman, the minimum age is 17 years and is found in Butare and the highest minimum age is in Kibuye with 30 years. The maximum age is 99 years which is found in Kibungo. The table 1.2 shows a high standard deviation which is between 30 and 37% of the mean. This variable needs to be analyzed with cautious.

1.9 When the head of households is a man, the category between 18 years and 49 years represents 75% of the households, and when the head of household is a woman, the categories between 18 and 49 years represent 55, 6 %. The difference is 20% which is significant. This confirms the fact that women tend to leave longer and because those women head of households are widows and tend to be older. Indeed because men head of households tend to live shorter and their wives become widow and head of households. This confirms the previous conclusion.

1.10 The annexe 1.5 shows that when the head of household is a man, 5% of the households are headed by single, 59% of households are legally married, 33% live together and are not officially married, 3% are divorce, and 1 % of household is headed by a widow. The number of men and women living unmarried is important and the main reasons generally are a lack of labour, a lack of money to pay dowry and other requirements for the wedding.

1.11 In case the head of household is a woman, 6% of households are headed by singles, 6% are officiallly married, 9% live together and

are not officially married, and 1% is headed by a divorced, 73% by widow and 5% by a separated.

1.12 The same annexe shows that when the head of household is man the majority are officially married 53%, followed by households who live together but not officially married 33%. This means that households headed by men have difficult to pay the requirements to be come officially married but still need woman to have a family and to help her husband in all kind of family activities. When the head of household is headed by a woman, the majority of households are headed by a widow 73%.

1.13 The annexe 1.6 shows that in Rwanda, when the head of household is a man, 83% of households have the agriculture as the main activity, other activities such to provide labour in other households in agriculture or non agricultural activities, handcraft activities, trade or work in public or in private sector, 17% of households practice those activities.

1.14 When the head of household is a woman, 91% of the households have agriculture as the main activities and 9% of households practise other activities. This shows that there are very few opportunities outside of agriculture in the county side which is a big constraint when with the vision 2020, the agriculture sector should stay with only 50% of the rural households.

1.15 The annexe 1.11 shows when the head of household is a man 83 % of households have at least one person who can read and when the head of household is woman there are 16.9 % This annexes shows an important difference, illiteracy rate is higher when the head of household is a woman than when the head of household is a man

1.16 The annexe 1.12 shows that in the average when the head of household is a man, 28% of the heads of households didn't go to school 34% went in primary school but didn't finish the primary school and 26,8% completed the primary school. When a household is headed by a woman, 58,6% of heads of households didn't go to primary school, 27,7% went to primary school but didn't finish it; In average, 37,2% of heads of households didn't go to primary school, 32.7% didn't complete primary school, and 22,2% completed the primary school.

When the head of household is man 5.3% of households are headed by singles, 43, 8% of heads of households are officially married, 25, 5% of households live together unofficially, 22, 7% of households are headed by widows, this indicates that less than 50% are officially married,

number of widows is high because of genocide and households live together unofficially because of means to meet the requirements for a weedding.

4.2. Land size

1.17 The annexe 2.1 shows that the average land size per household is 0.72 ha in season A and 0.70 ha in season B, the biggest farm size is found in Umutara with 1, 14 ha per household which is the last region to be occupied followed by Gitarama with an average of 1, 09 ha per household and Byumba with 1, 04 ha of land per household. The smallest land size is found in Cyangugu with 0, 34 ha followed by Butare province with 0, 36 ha. Those three provinces are the most insecure of the country and it will be interesting to see how the land size is correlated with the level of food security in Rwanda. The total land for agriculture was estimated to be 1.062.881 hectares in 2006 B.

1.18 In 1983 the average land size was 1,00 ha after 24 years, the average has declined by 30%, the question is what will happen in the coming 20 years if the same trend persists. Land reform policy needs to be implemented in order to solve the land constraint. In any case new technologies have to found and applied. There is no big difference with 20006 B

1.19 **Labour utilization**

Average land size : 0.72 ha
Number of active per household: 2

Main farming activities:

1stPloughing: 1 Are for 1.5 days of work,
72 Ares will require 108 days /active or 52 days per household
2nd Ploughing: 1 are for 0.75 days of work, this will require 52 days for 72 ares or 26 days
Spreading: 5 days
Planting: 5 days
1st weeding: 5 days
2nd weeding: 5 days
Harvesting: 5 days
Total days: 103 days/season or 57% of 180 days

1.20 The Annexe 2.2 shows that 35,2% of land was obtained from heritage, 23,3% of the land was bought, 24,9% of the households received their land as a gift, 7,1 % of land from the rent which was

paid in kind and 4.3 % from rent paid in cash, free use and other mode of acquisition. Heritage is a common mode of land acquisition and the rent system is not common, indeed, the rent is used in 11.4 % of the case. The main reason is that there was a regulation to stop renting.

1.21 The table shows that the largest proportion of land obtained through heritage is found in Gitarama with 63, 8% followed by Butare with 62, 4%, Gikongoro with 53, 6% and Kibuye with 47, 5%. All these provinces are among the most food insecure and have been occupied by farmers for a long period. For land which is bought, when the national average is 23, 3%, the highest number of purchases is in Ruhengeri which is 34, 6% followed by Umutara with 30%, and 4%. The main characteristics of those provinces are Umutara which is the lowest densely populated province and the high demand for land especially for livestock. Ruhengeri is the highest densely populated province. In those provinces land is highly marketed than in other regions of the country in Ruhengeri for agriculture, indeed the soil is so good and potato highly marketed and is main source of income when in Umutara, land is used to develop livestock which is the major source of income. In terms of land obtained as a gift, the national average is 24, 9% and the highest is found in Byumba with 40, 9% and Kibungo with 32, 8%. Indeed Kibungo and Byumba are located near Umutara where a part of old national park was distributed to those who recently came back in the country. The smallest proportion of land obtained as gift is found in the poorest provinces which are Butare with 4, 0% of the land, followed by Gitarama with 11, 1% and Gikongoro with 6%. In those provinces there is neither land to be distributed nor to be bought. Land for free utilization, paid in kind, in cash and others represent a small percentage.

1.22 The annexe 2.3 shows that 97, 16 % of the land depends on rainfall 1.64 % of the land is under irrigation, 1 2% of the land are under drainage. This means that basically, agriculture in Rwanda depends on rainfall, irrigation and drainage are still at the very low level, this is a big opportunity for agriculture to be developed, and there is still a big room for improvement. Water should be a major input

1.23 In Rwanda 98, % of the land are cultivated in traditional way when 1.4% of the land is cultivated using animal traction and 0.1% uses machinery. Rwanda is among few countries which use very rare the animal traction or machinery.

1.24 The annexe 2.4 shows that in average in 2006 A, 29% of cultivated land have no erosion protection structure when only 12, 5% of land

have terracing, 25, 7% of the land are protected using ditch to control soil erosion. In all the provinces, Cyangugu has more unprotected land with 55,9% of total land in the province followed by Kibungo with 45,6% of unprotected land and Butare with 43,8% of land which are not protected and Umutara with 40,4% of the land which don't have any anti- erosion control system. Although in the past, the control system was heavily supported by the GOR in general and MoA in particular, until now there are provinces which have more than 50% of the land with no protection which is inconsistent with national agricultural policy. It is time to look at the best way to implement this policy because it was estimated that 10 MT of land per ha are lost each year or 10 million metric tons lost.

1.25 The same annexe shows that in 2006 B all the land was protected there was radical terracing on 36.9% of the land, the most soil protected with radical terracing is found in Cyangugu with 68.8% of land followed with Kibungo province with 65.2% of soil with radical terracing. The less protected soil with radical terracing is found in Gisenyi with 20.7% of the land followed by Byumba with 21% of soil with radical terracing

1.26 Progressive terracing is found on 12% of the land, this system of soil protection is found on 37.4% of land and almost inexistent in Butare and in Gikongoro

1.27 Trenches are found in average on 40.7% of the soil, those are applied in Gitarama on 62.6% of soil followed by Kigali ville and Kigali Ngari with 61.3% of soil protected with trenches. This system is used only on 18% of the soil in Cyangugu

1.28 It is clear that an important effort has been invested in soil protection in the second part of 2006 indeed unprotected soil was 29.9% of the soil in 2006 A and 0% in the second season of 2006 B

4.3. Agricultural inputs

4.3.1 Number of households using improved seeds by crop:

In Rwanda in 2006, improved seeds are used to grow bush and climbing beans, maize, rice, cassava and Irish potato. Beans and Irish potato are characterized by a high demand for domestic markets; maize cassava and rice are produced for processing for urban demand. Farmers in general buy improved seeds however few of them get a donation from NGO's .Because of the importance of the market in Kigali ville and Kigali Ngari, improved seeds are found there for bush and climbing beans, maize and rice The second province to use improved seeds is Gikongoro

however one third is a donation . Improved seeds are used to climbing and bush beans and on Irish potato. There are provinces where no farmer uses improved seeds, these are Gitarama, Ruhengeri even though production of Irish potato is the highest, Byumba, Umutara and Kibungo. All the farmers know that the use of improved seeds is highly recommended by the extension services. The table below shows that the highest numbers of households using improved seeds are those who grow maize, however these represent only 0.5% of the total number of households in rural areas. In average in 2006 A and 2006 B Irish potato is the first crop where 41.137 households use of improved seeds followed by maize where 33.004 households use the same seeds. Households who grow voluble and bush beans use also improved seeds in both.

4.3.2 Number of households using the ordinary seeds by crop

In Rwanda the majority of households use the ordinary seeds for bush beans indeed in 2006 B. Almost 76.3% of households use the ordinary seeds to grow bush beans,37.3% of households who grow maize use ordinary seeds and 32.5% of households who grow Irish potato use ordinary seeds. This shows how important the ordinary seeds for bush beans is, indeed those are grown across the country, 89% of the households in the country grow beans although yield is very low, farmers don't apply any fertilizer because beans are is mainly grown for self consumption.

4.3.3 Number of households using improved seeds by crop

RWANDA	Bush beans	5019	822	5841
	Climbing beans	3975	0	3975
	Peas	1417	0	1417
	Peanuts	0	0	0
	Soya	0	0	0
	Sorghum	0	0	0
	Maize	5470	899	6369
	Wheat	0	0	0
	Rice	2756	0	2756
	Cassava for cooking	0	0	0
	Manioc for flour	1417	0	1417
	Sweet potatoes	0	0	0
	Irish potato	5772	0	5772
	Taro	0	0	0
	Banana for cooking	0	0	0
	Banana for wine	0	0	0
	Apple banana	0	0	0

4.3.3 Number of households using inorganic fertilizers

The most important type of fertilizer used in agriculture is NPK with 70.964 households however, those represent all who apply it, followed by DAP which is used by 18.379 households, urea used by 14.014 households and lime applied by 4.740 households. Among households who apply fertilizers, 73% live in Gisenyi and Ruhengeri provinces; this is understandable because of the intensive production of Irish potato, vegetables and pyrethrum. Among households who use DAP, 80% of households live in Gisenyi. DAP is used in vegetable production. Gisenyi is the first province to produce all kinds of vegetables and farmers export to Congo. Among households who use lime, 100% are found in Gikongoro province which has an indication of areas with high level of acidity in the soil.

4.3.4 Number of households using pesticides

The most popular pesticide in Rwanda is dithane, indeed 249.942 households use dithane and represent 50% of the households who are in agriculture sector. Sumicombi and ridomil liquid are used by 33.730 and 33.645 households respectively. Dithane is mainly used in Ruhengeri province by 77.212 households or 40.2% followed by Gisenyi with 53.318 households who use dithane or 31.8% and Kibuye with 39.710 or 46.1%. Dithane is used by the Irish potato producers; This is why it is used in the northern part of the country.

4.3.5 Agricultural labour:

The average minimum cost of labour is between 150 frws and 400 frws per day for temporary work paid in cash or in kind. The majority of the work at that price is in the agriculture sector. However the table 3 shows that permanent work is highly paid, between 400 the minimum varies between

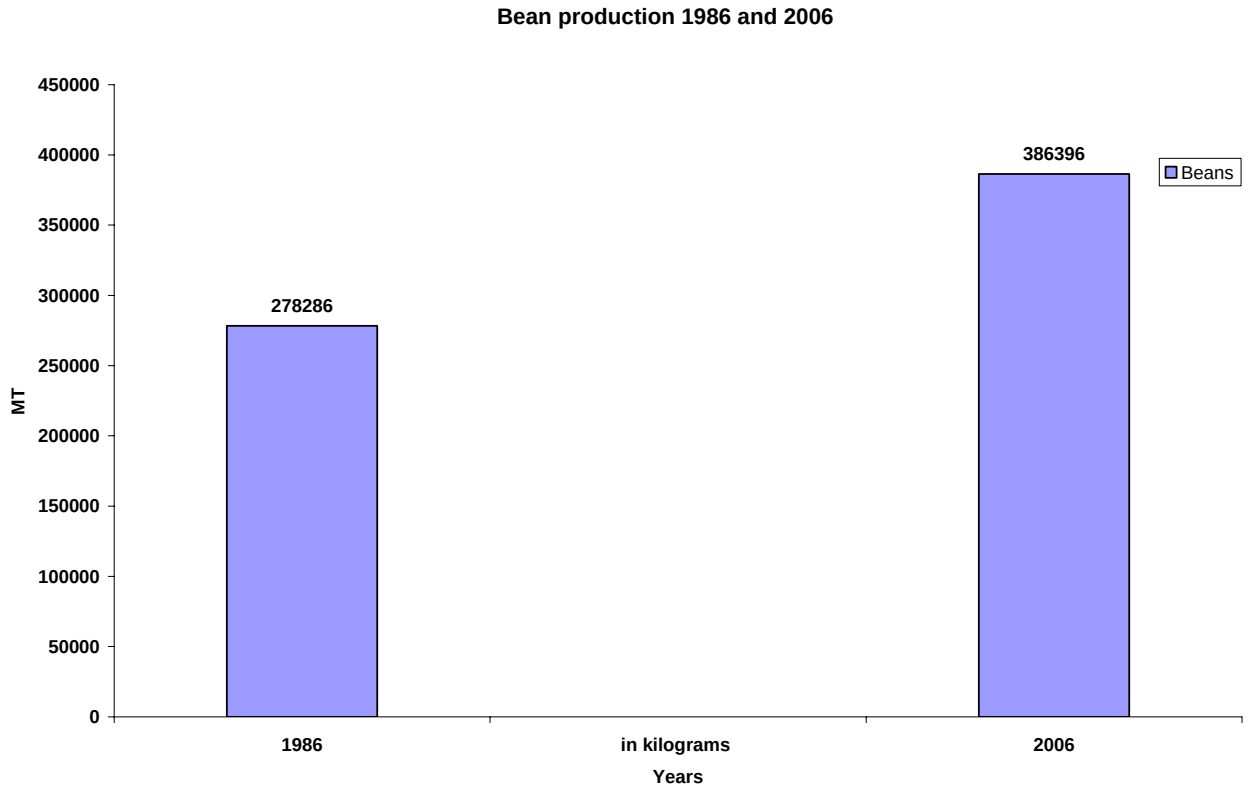
4.4. Production in MT of Major Agricultural Crops in 2006

4.1 Bean production in 2006 was equivalent to 389.396 MT, in 1986, twenty years earlier, bean production was equivalent to 278.286 MT which gives a difference of 28.4 % less than the current production. This crop is mainly produced in Ruhengeri with 58.852 MT which represents 15.1 % of total production of beans in the country. Kigali Ngari is the second province to produce beans with 54.122 MT which represents 13.9 %. The third province is Umutara with 13.3 % and Gitarama with 47.205 MT which represents 12.1 %. In those four provinces in 2006, beans production represented 55, 6 %.

The lowest bean production in 2006 was found in Gikongoro with 8.173 MT which was 2, 1% of total beans production. Bean is an important crop in the volcanic area especially the climbing beans of which the yield is twice compared to bush beans

which are found in the rest of the country. Indeed 80% of the households in Rwanda produce beans and the reason is that bean is the major source of proteins. In terms of policy bean crop should be one of the priority crops as it is considered as the meat of the poor people.

Compared to 1986 beans production, the difference is 28% which is not significant in 20 years because it means an increase of 1.4% per annum. This change may be explained by a good annually or seasonally production.



4.4.1 Peas production:

Total peas production in 2006 was 41.161 MT. In 1986, twenty years earlier, peas production was 19.036 MT which represents 53.8. % less than the actual production. The highest production was found in Ruhengeri province with 8.902 MT, followed by Byumba with 7.307 MT in 2006 which represented 21.6 % and 17.8 % of total peas production of the country. The lowest production is found in Cyangugu and Kibungo with 560 MT and 1.070 MT or 1.4 % and 2.6% of national peas production in 2006. Peas is very much concentrated in high altitude areas and considered as minor crop. It requires a good soil with manure or fertilizer.

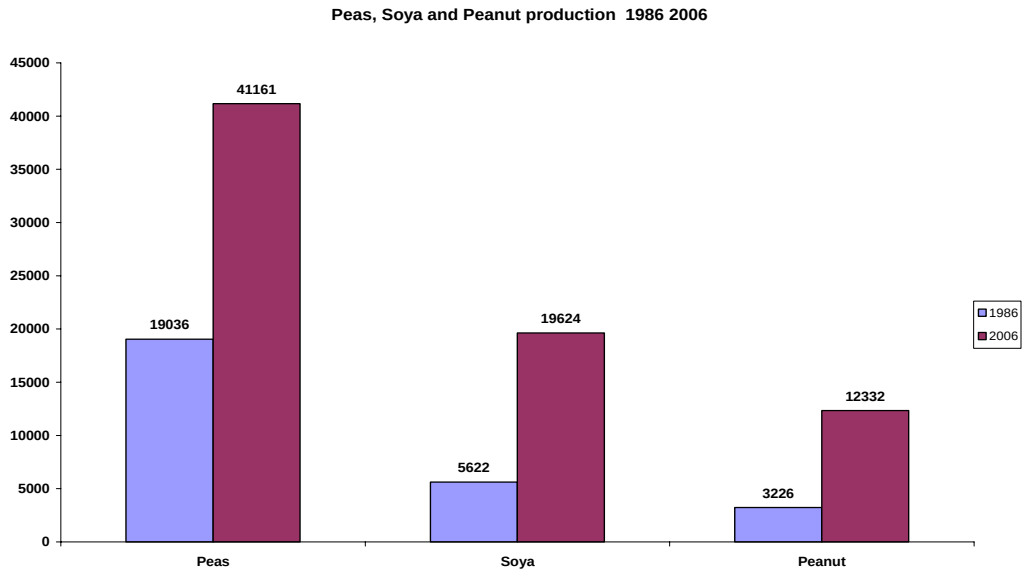
4.4.2 Peanut and soybean production

The total peanut production in 2006 was 12.332 MT of which 4.901 MT are produced in Byumba province or 39.7 % of total peanut production. Peanut is a minor crop even though it is one of the sources of vegetable oil in Rwanda after soybean of which the national production in 2006 was equivalent to 8.680 MT. However fat availability in Rwanda is very low that is why oil imports are huge from Uganda, Congo and Burundi even from USA as food aid. The majority of the rural population suffers from fat deficit which is a real challenge for Minagri policy to increase fat intake.
Total production of soy was in 2006 equivalent to 19.624 MT of which 9.010 MT are found in Gitarama or 45.9% . Indeed in that province the extension of that crop has been so intensive that soy is processed and by-products such as soy milk, tofu have a high demand in Gitarama province. In the nineties, the policy was to replace beans by soy where soil was poor.

Compared to 1986 production, the current peas production is 54% higher than the production of peas in 2006 which means 2.7% increase annually. This is high and requires more land under peas cultivation especially in high altitude zones. Indeed late in eighties and early in nineties, because of the population pressure, most of the forests were invaded, this is the case for Nyungwe forest, Gishwati forest and more land allocated in peas because of the increase of demand from urban areas.

For soy production, the current production is 71% higher than twenty years ago which means a growth of 3.6% annually. Indeed soy now is processed into soy milk, tofu and flour. The second reason for the growth is the in that poor farmers replace beans by soy which means more land allocation to soy beans.

For Peanut, the current production is 74% higher than twenty years ago which means an average of 3.5% higher. This is high and one of the reason is that peanut was one major source of oil in Rwanda. However recently, sunflower is becoming more and more important and the trend is to expand this crop in order to increase production of oil on local market.



4.4.3 Sorghum:

Sorghum is a second season crop that is why, total production in 2006 was only 206.520 MT, in 1986 , twenty year earlier, the sorghum production was 158.878 MT which represents 23.1% less than the current production of sorghum. In the second season, the production was 5.8 times than the first season. The highest production is found in Kigali Ngari with 44.461 MT which represents 21.6 % followed by Kibungo province with 37.1 MT or 17.9%. Because the production of sorghum is important in the second season, it will make sense to see the trend. These two provinces have 55% of total sorghum production. This means that sorghum is concentrated in those two provinces. Sorghum production is high in the first season in Ruhengeri, indeed moisture is permanent during the whole year, it seems not to be for Umutara which has low rainfall during the first season. Umutara has the largest land size per household which means that in the first season land under sorghum cultivation is the largest in the country and this can be the reason.

4.4.4 Maize production:

Maize is a second season crop in almost all the provinces with a production of 94.145 MT. In 1986, twenty years earlier, the production was 135.003 MT which was 1.4 times higher than the production of 2006

The largest quantities are found in Ruhengeri province with 16.129 MT (17.1%) followed by Umutara with 13.899 MT (14.7% %). The third province is Gisenyi with 11.966 MT (12.1%) In these two provinces, maize production represents 43.9% of the total production. In other provinces, maize is not an important crop. The Government would like to boost maize production, indeed according to the preliminary import data, of cross border trade; maize flour is a major commodity from Uganda. Another factor is that there is a company called " Minimex" of which capacity of processing can reach 300 MT a day. Because national maize production

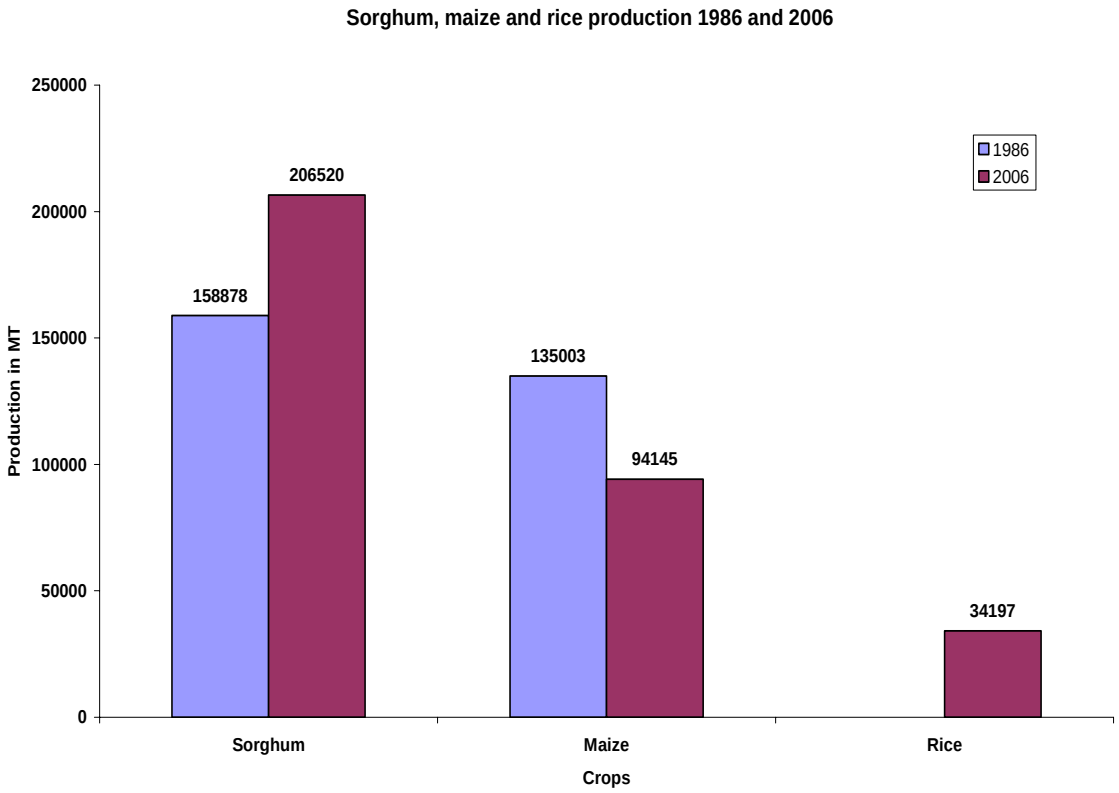
is still low, there is a room for more local production and currently maize import represents a major share. Indeed if total maize production had to be processed in MINIMEX, it will take 123 days a year which represents one third of the year.

4.4.5 Rice production:

Rice production in Rwanda is picking up in the last five years thanks to the government policy of reducing the imports. Total demand is estimated to reach 30.000 MT, the current production is 34.197 MT based on agricultural surveys of 2006. The major production areas are Butare with 13.680 MT or 40.0% followed by Cyangugu with 12.604 MT or 36.9%. The two provinces produce 76.9% of total rice production. Because rice is located in specific wetlands, this sampling may be not the appropriate method to get accurate production information According to trans-border trade survey, rice is exported to Congo from Bugarama towards Kamanyola.

The current production of sorghum is 23% higher than the production in 2006 which means 1.2% annual increase. This is so low that it may depend on seasonal and annual fluctuations.

Rice production is still in the promotion stage



4.4.6 Cassava:

Cassava production in 2006 was 323.981 MT. In1986 twenty years ago cassava production was 361.899 MT which represent 10.5% higher than the current situation. Cassava is mainly found in the south of the country, such as Gitarama with 92.114 MT or 28.4% followed by Butare with 39.574 MT or 12.1 %, Kigali Ngari mainly Bugesera and East of Kigali Ngari Province with 39.508 MT or 12.1.5%. Rwanda currently exports cassava flour to Europe and this is an opportunity to increase cassava production through improved technologies. Rwanda, after fighting cassava mosaic, should target two times the current production for domestic market and exports. One of the major constraints to increase cassava production is mosaic virus which now destroys most of the production in the eastern and the southern regions and this limits opportunity for more exports and local consumption. Cassava in the south is considered as a cash crop, indeed cassava flour price is increasing every year on local particularly in urban area because of little energy required for the preparation for home consumption.

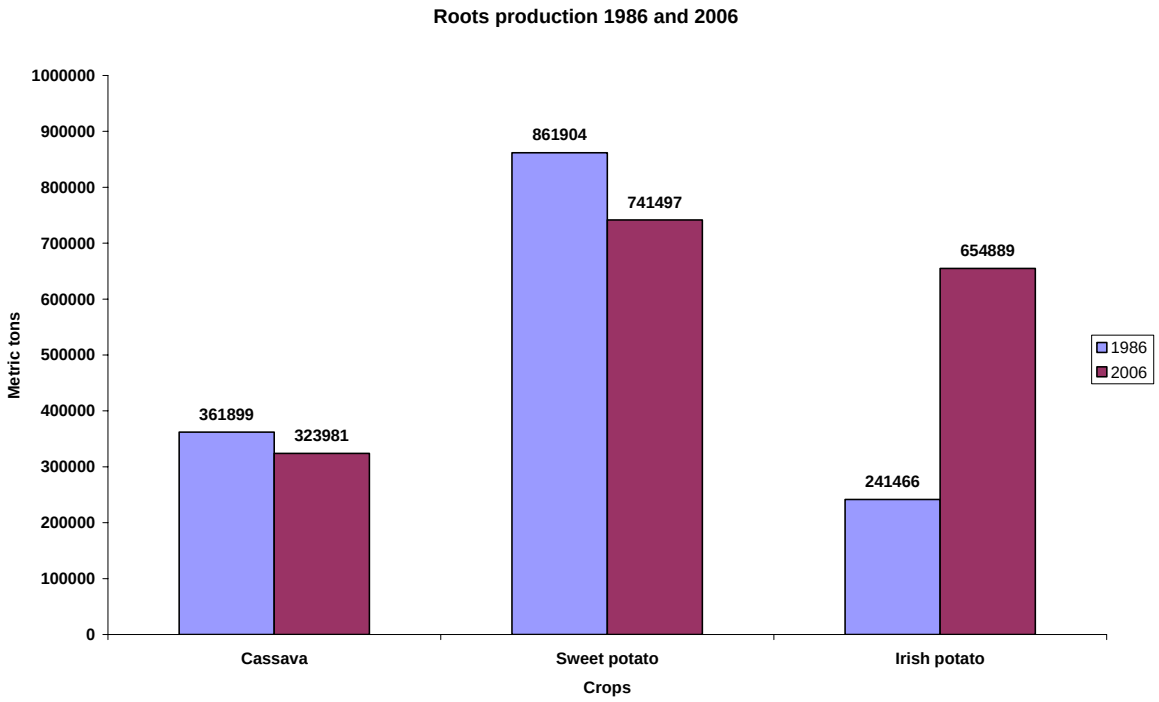
4.4.7 Sweet potato:

Sweet potato production in 2006 was estimated to reach 741.497 MT. in 1986, twenty years earlier, the production was 861.904 MT which represent 16% higher than the current production. This big difference comes from the fact that swamps and marshland are used for rice production. This crop is produced throughout all the provinces. Sweet potato is found in the south of the country such as in Ruhengeri with 107.193 MT or 14.4% followed by Gitarama province with 105.081 MT or 14.1 %, Gisenyi with 99.451 MT or 13.4%. Sweet potato is considered as a food security crop because it contains a lot of cheaper calories for poor population and grows in all the agro-ecological zones of the country. As the data show it, sweet potato is produced mainly in the south where the population is food insecure. The competition on land becomes so high between rice, sugar can, flowers and vegetables in the marshlands and this affects price of those commodities. Now it is very difficult to find sweet potato vines and this affect price of sweet potato due to decline of the supply. As a policy, it is better to grow other crops because those commodities have more value than sweet potatoes but this needs a balance between cash crops and food crops such as sweet potato to avoid food insecurity and malnutrition in southern areas where there are high potentials for sweet potato for the poor.

4.4.8 Irish potato:

Irish Potato production was 654.889 MT in 2006. In 1986, twenty years earlier, Irish potato production was 241.466 MT which represent 2.7 less than the current Irish potato production. This big difference in the production comes from distribution of land located in Gishwati forest to Rwandese who came back in 1994 and grew mainly Irish potato.

This crop is concentrated in the northern part of the country, indeed in Gisenyi, Irish Potato production is 291.504 MT or 44.5 % followed by Ruhengeri with production of 178.045 MT or 27.2 8%, these two provinces produce 72.3 % This crop has an important opportunity unfortunately, the processing is almost inexistent, the crop is marketed without any value added, and this has been the case since long time ago. The good will is there but until now no technology has been developed on big scale, even though those technologies exist in the region. According to the first results of trans-border trade data, Irish potato is exported to Burundi through Bugarama and Kanyaru in the southern borders.



4.4.9 Banana:

Banana is the major crop in Rwanda, indeed in terms of volume, cooking banana, banana for making wine and apple banana was 1.305.564 MT in 2006 of which banana for wine represents 834497 MT (63.9 %), cooking banana production was 385.186 MT (29.5%) and apple banana production was 85.881 MT (6.3%). In 1986 twenty years ago, banana production was 2.398.379 MT which represents 1, 8 times higher than the production in 2006. There is a major drop in banana production. The main causes are the banana diseases, the old clones which need to be replaced. The main production area was Kibungo with a production of 317.278 MT which represented 24.6%,

a) Banana for wine was 834.497 MT in 2006 when in 1986 twenty years earlier, it was 1.596.038 MT which represent 1.9 higher than the production in 2006. Banana for wine is distributed across the country; the highest volumes are in Gitarama with 124. 859 MT or 14.9%, followed with Gisenyi with 119.221 MT or 14.2 %

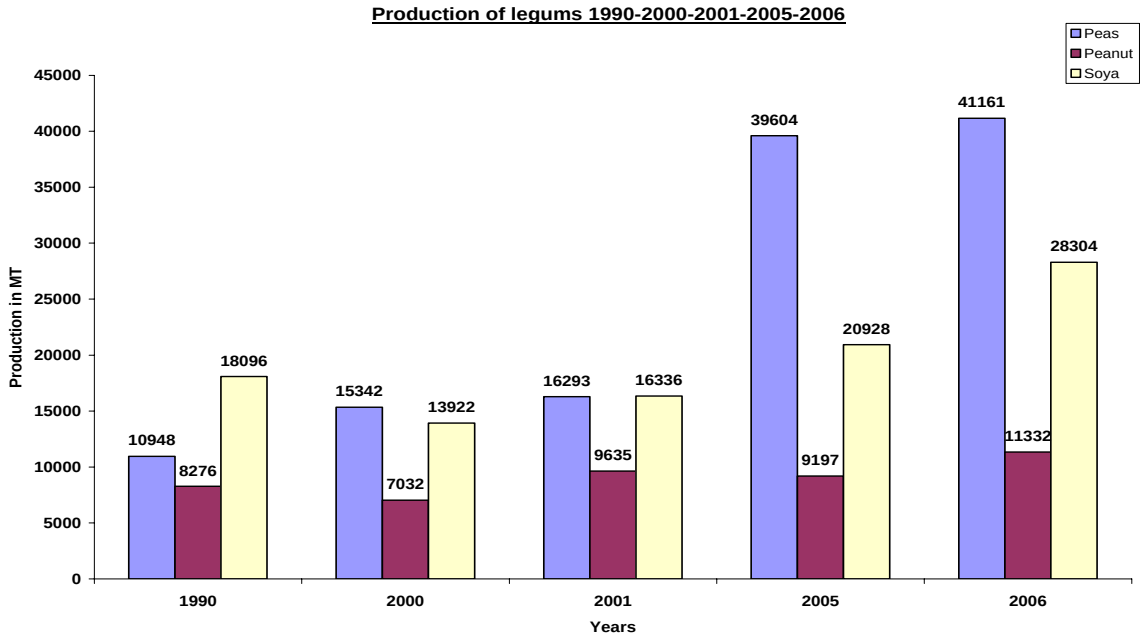
b) Cooking banana production was 385.186 MT in 2006, while it was 554.635 MT which represent 1.4 times higher than the actual production. Cooking banana is found in Kibungo with 85.402 MT or 22.1 % followed by Umutara with 59.298 MT or 15.3%, those two provinces represent 40.4% which is high. Cooking banana is mainly for domestic consumption and according to cross border trade information, cooking banana is imported from Congo via Kibuye for Kigali market

c) Apple banana production in 2006 was 85.881 MT while it was 247.408 MT in 2006 or 2.8 times higher than in 2006. This drop confirms the negative impact of banana disease. Apple banana is found in Ruhengeri with 14.894 MT (17.3%) followed by Gisenyi with 13.654 MT (15.9 %) Kigali ville /Kigali Ngari with 13.500 MT (15.7%) According to preliminary results of cross border trade Rwanda imports a lot of bananas from Congo and Uganda to increase supply and to respond to a big demand particularly for urban population.

4.5 Trend of major agricultural production 1990-2000-2001- 2005-2006

The same technical procedures were used in 1990, 2000, 2001, 2005 and 2006 which consisted mainly of random sampling approach. Even though, sample sizes were slightly different in 1990, 1192 households were selected, in 2000 and 2001 and in 2005, 1440 were taken, while in 2006, the sample size included 1740 households.

The trend of production of legumes of five years mentioned above shows an increase of 21% between 1990 and 2000, which means 2.1% increase annually. The explanation is that more land was put under peas production, because if one of inputs was used to increase production, the rate would be higher than 2.1% increase per year. Between 2000 and 2001 there was no increase of peas production. However, in 2005 and in 2006, the production of peas were 2.4 times higher between 2001 and 2005-2006. The only explanation is that because peas are produced mainly in high altitude, new land in Gishwati forest was cultivated indeed, about 7.000 ha

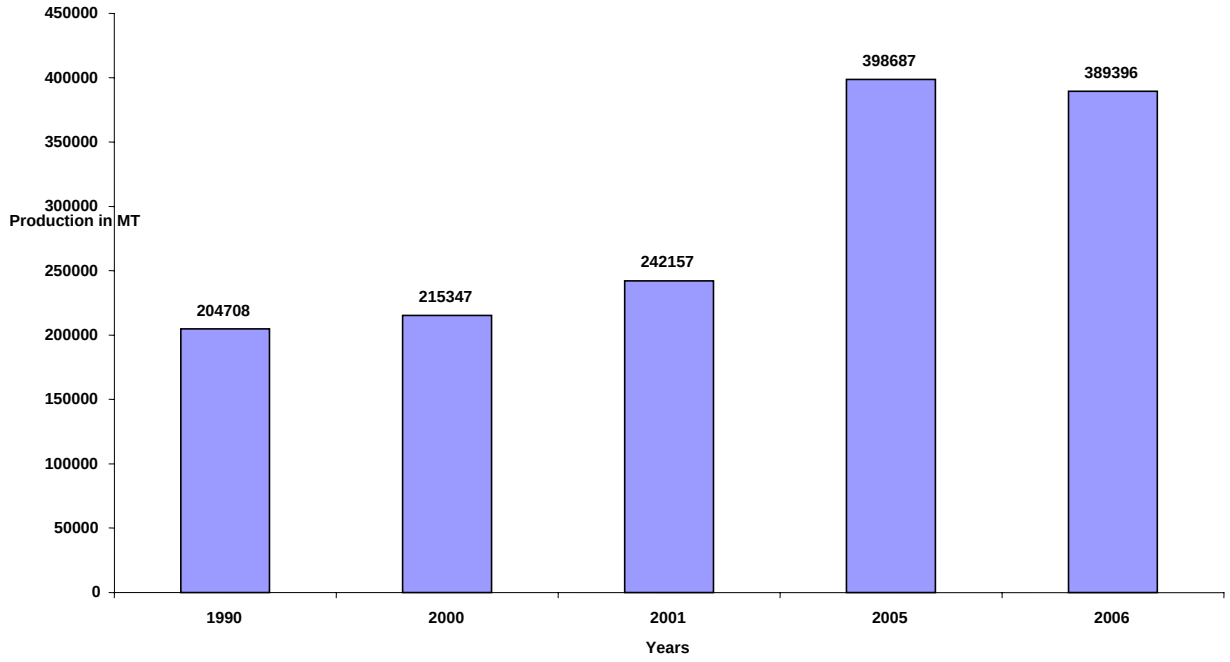


The production of peanut never changed in 1990-2006, this crop is minor and because it requires good soil, deep and well drained. Peanut has been replaced by sunflower which is less demanding in terms of chemical fertilizer and manure. Small rural entrepreneurs process sunflower, oil is now on local market and very well appreciated.

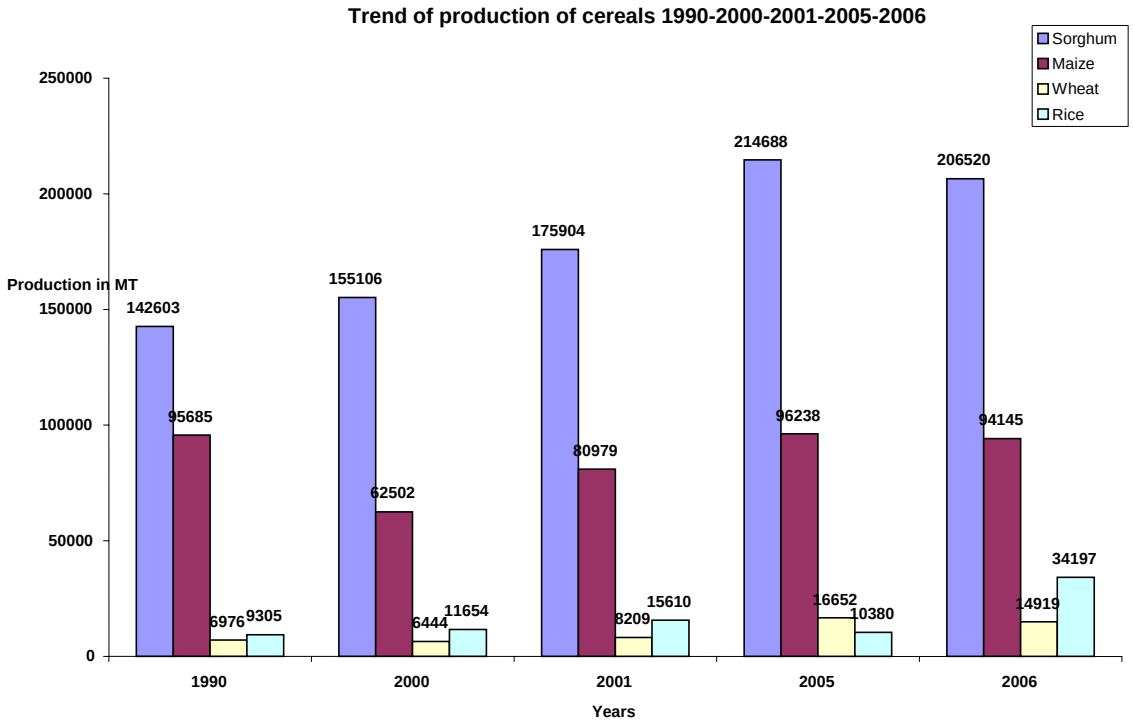
The production of soy has two trends, a little decline between 1990 and 2000 followed by a small increase between 2000 and 2001. The period between 2005 and 2006 shows an important increase of 26% and 42% between 2001 and 2006. Because of rainfall fluctuation in 2005 and because beans are very sensitive to those changes, farmers prefer to grow more soy than beans. In general during the above periods, peanut production didn't change there was a light increase of soy production and an important increase of peas.

The trend of beans production shows two cycles, one cycle is between 1990 and 2001 and is almost constant and the second cycle between 2001 and 2006 which shows an increase of 38% in 4 years. This requires more data to confirm or to infer this trend.

Beans production trend 1990-2000-2001-2005-2006



The production trend of cereals shows a light increase of sorghum during the period between 1990, 2000, 2001, 2005 and 2006, a more stable trend of maize during those periods and an important increase of rice of which the production tripled between 1990 and 2005-2006. This was an effect of government policy which makes an important investment in the last five years. Wheat is a priority crop like rice for import substitution policy and the trend shows that between 1990 and 2005-2006, there was an important increase of production of 100%. Even though maize is among the priority crop, it is still difficult to see the farmers' responses; indeed maize production in 1990 is almost equivalent in volume of maize production in 2006.

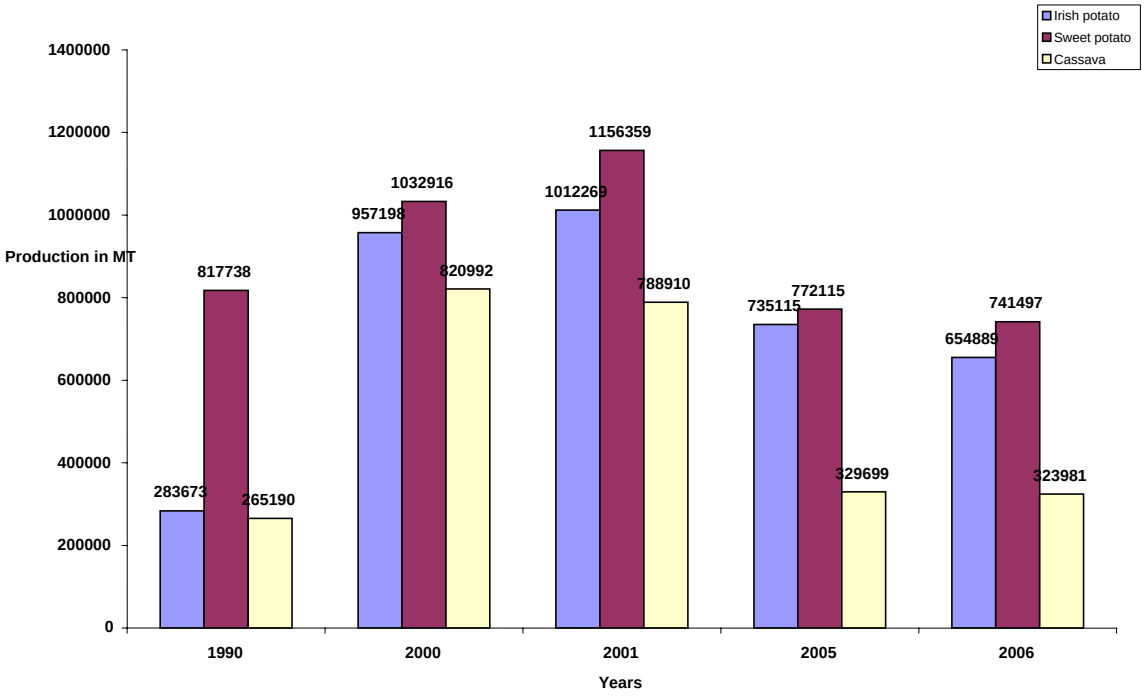


The trend of tubers production during the period of 1990-2006 has two periods, an increase from 1990 to 2001 and a decline from 2001 to 2006. An increase of Irish potato in 2000-2001 could be explained by more land in Gishwati for Irish potato, indeed compared to 1990, Irish potato production was 4 times more in 2000. However this trend was the opposite in 2005, this can be explained by the decline in production and also by policy measures which aim at the protection of the forest. Indeed the production of Irish potato was 1.4 times less in 2005 than in 2001

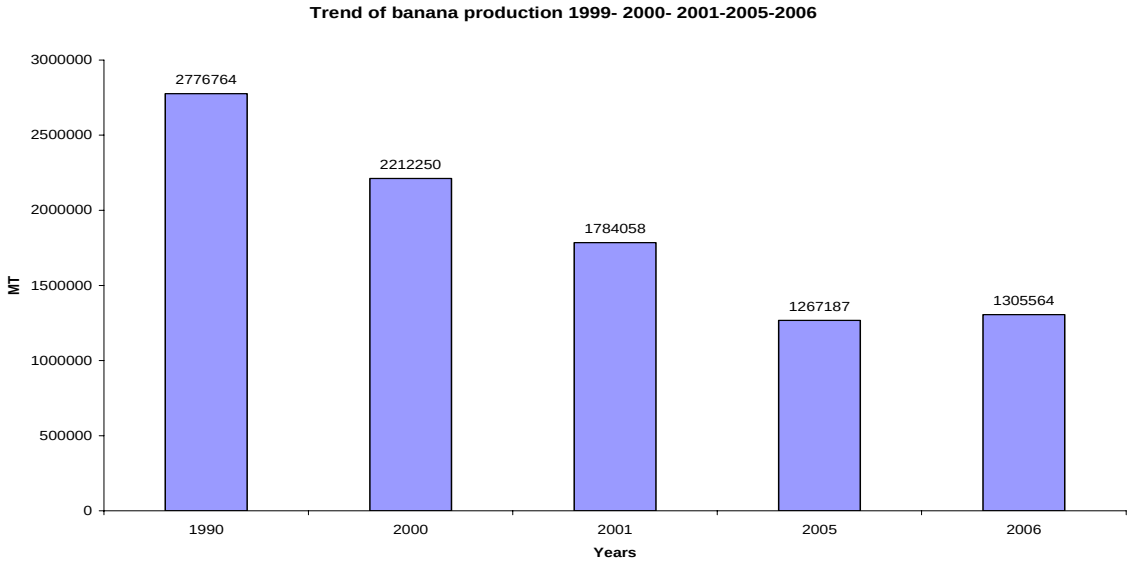
For the sweet potato, there was a positive trend during the period between 1990 and 2001. People tend to produce more sweet potatoes to meet their calories requirement however the slope is negative from 2001. Indeed one of the reasons is that there is a high competition between rice and sweet potatoes in marshland. Indeed the government policy is to invest in rice as a commodity for import substitution, rice production is increasing every year and sweet potato production is declining. This can have a consequence on total calorie availability for farmers if the money generated by rice is not invested in food consumption. Cassava shows an increase during the period between 1990 and 200, production in 2000 is 4 times more than in 1990 however there was a decline from 2001 and the production of sweet potatoes in 2006 represents 67% of the production in 2001 which means 16.7% decline annually.

Cassava is one of the important cash and food crop, indeed, cassava is processed and flour is exported to Europe. However cassava is facing a big problem of virus and this has been translated in production decline during the recent years. Indeed between 2001 and 2006, the production of cassava has declined by 49% which

means a decrease of 9.8% annually. This requires a particularly attention and needs a strong program of disease control.



Banana has suffered the most in the recent years, indeed in 1990 the production of all combined types of bananas was 2.776.764 metric tons and in 2005 the production of banana was only 1.267.187 metric tons which represents a decline of 55% and in 2006, the production was 2.1 lower than in 1990. The main reason is the banana wilt disease which is on the increase in the region.

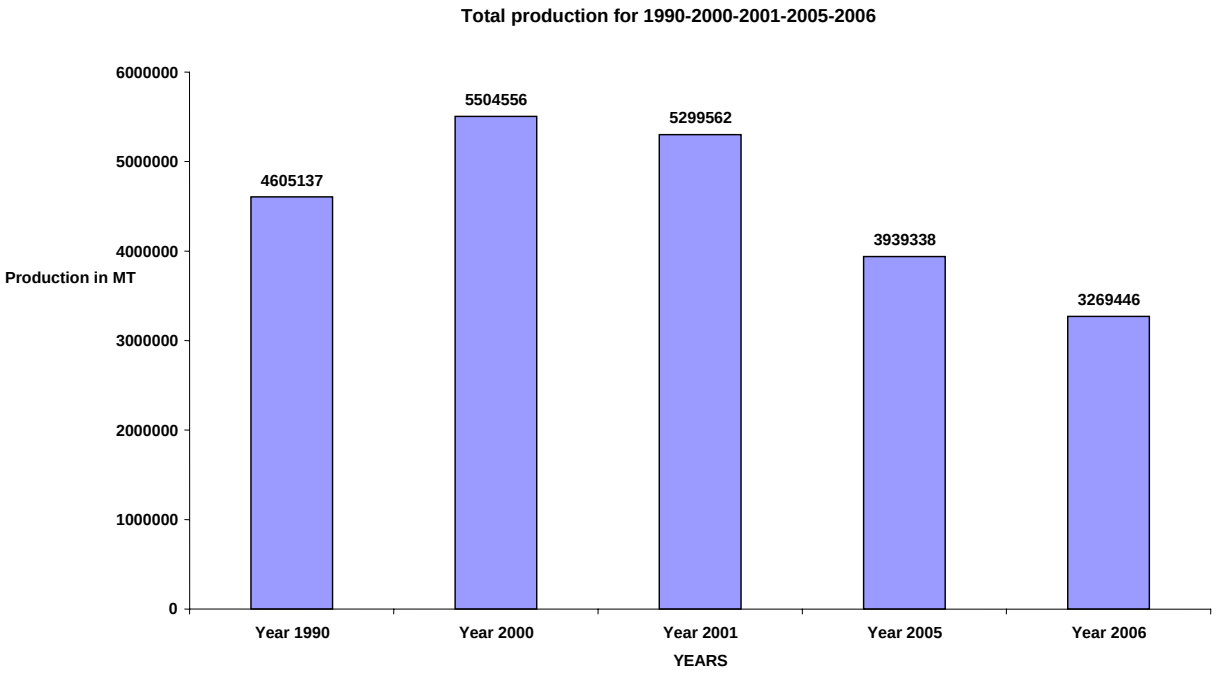


4.6 Availability of food per capita and per year

The estimate of food availability doesn't include rice, fruits vegetable, neither imports which represent an important part of food for domestic production. Calculations are made based on results of agricultural surveys of two seasons. Methodology is mainly based on random samples. In 1990, 2000, 2001, 2005 and 2006, methodology was the same, samples were randomized and the sizes varied between 1200 and 1740 households

Results in 1990 shows that the total quantity of food per capita per year is 1378 KG, the population was estimated to be 5.700.000. In 2000 there was an important decline of total food per capita per year, indeed the quantity of food was 786 KG which represents 57% of food per capita per year in 1990. This shows that the population growth rate is less than the agricultural production growth rate or that there was decline of agricultural productivity. In 2001, food availability per capita per year is almost the same as 2002 or 757 kg per capita per year. In 2005, there was a big decline, indeed food availability per capita per year was 492 KG which represent 65% of quantity of food per capita per year in 2001. However the difference is big compared to 1990 food situation. In 2006 food availability per capita per year was 594 KG and this shows an increase of 18 % compared to 2006.

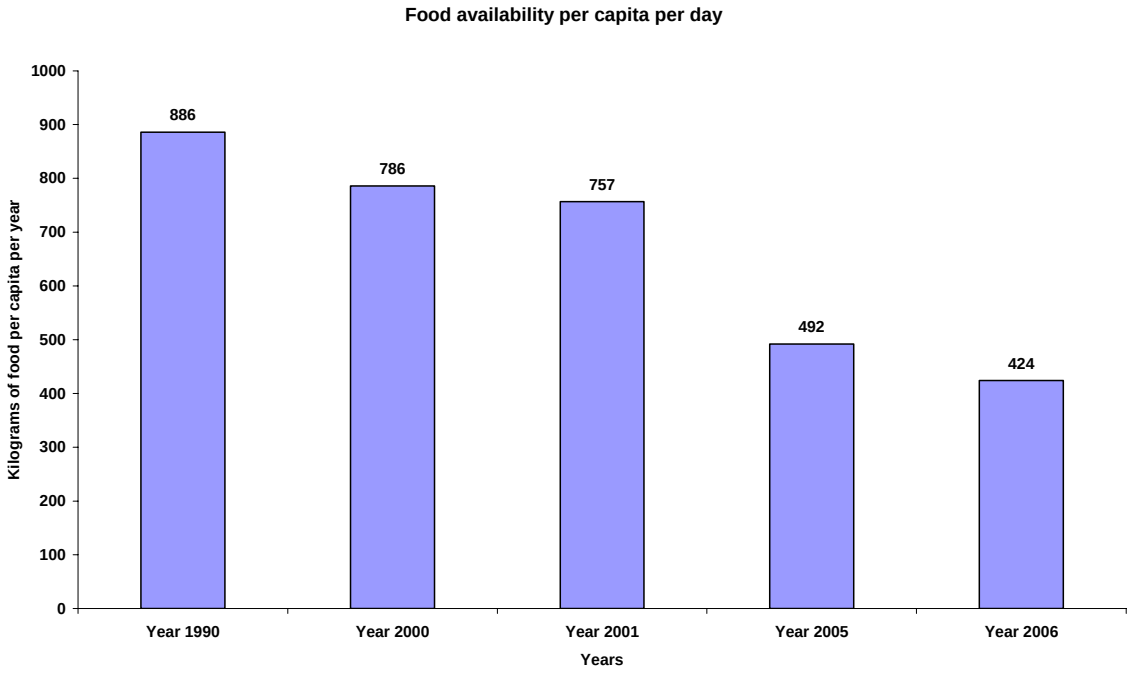
In conclusion, there is continued decline of food availability per capita per year however as it was mentioned before, food availability doesn't include fruits and vegetables neither imports which will be available in one week, this will help to improve the analysis. The declines come from the decrease in banana production



Food availability per capita per year in KG

Crops in MT	1990	Food av./cap/year	2000	Food av./cap/year	2001	Food av./cap/year	2005	Food av./cap/year	2006	Food av./ cap/year
Beans	204708	39,37	215347	30,76	242157	34,59	398688	49,84	346045	44,94
Peas	10948	2,11	15342	2,19	16293	2,33	39603	4,95	19062	2,48
Soya	5622	1,08	13922	1,99	16336	2,33	20928	2,62	14243	1,85
Peanut	3226	0,62	7032	1,00	9635	1,38	9197	1,15	8749	1,14
Sorghum	141638	27,24	155106	22,16	175904	25,13	214687	26,84	224968	29,22
Maize	95625	18,39	62502	8,93	80979	11,57	96238	12,03	121594	15,79
Rice			11949	1,71	16662	2,38	55881	6,99	36554	4,75
Cassava	265191	51,00	820992	117,28	788910	112,70	329699	41,21	271222	35,22
Sweet potato	817740	157,26	1032916	147,56	1156359	165,19	772115	96,51	529415	68,76
Irish potato	283673	54,553	957198	136,74	1012269	144,61	735115	91,89	592048	76,89
Apple banana Cooking banana Banana for wine	257372	49,49							47340	6,15
Total banana		533,99	2212250	316,04	1784058	254,87	1267187	158,40	1305564	169,55
Total production	**4605137**	**886**	**5504556**	**786**	**5299562**	**757**	**3939338**	**492**	4575010	**594**

Since 1990, food availability per capita is declining and this means that the population growth rate is less than the agricultural production growth rate. However this can be compensated by fruits and vegetables production and imports from neighbour countries. This will be added to the existing information shortly.



4.7 Contribution of crops to nutritional requirements.

In 2006 A, the contribution of the rural production showed that in average kcal/capita/ day was 1.351, which represents 64% of the required standard, which is 2100 kcal/pers/day. This shows a big deficit, however this doesn't include food imports neither animal products. In terms of contribution of crops to nutritional requirements, beans are important and contribute to 37.70% followed by sweet potatoes with 16.82%. In southern areas of Rwanda, the menu is composed of beans and sweet potatoes. By grouping crops in different categories, the table show that legumes contribute to 37.7% of total calories followed by tubers with 34.13%, cereals with 14.4% and banana with 12.82%. Among the legumes, beans contribute 31.51% and among the cereals maize brings 6.12% and among the tubers sweet potatoes contribute 16.82% and among bananas the biggest contribution is from cooking banana with 8.16%;

National average for proteins per capita per day is 46 grams/pers/day while the required standard is 59gram/pers/day (which represent 78%). The minimum requirement is 80% and this shows that the national average is below that. One of the implications is the rate of malnutrition which can be high. Indeed in a study conducted in PDCRE zone project in November 2006, with a sample of 216 households from 11 districts in which there were 157 children less than five years old, WAZ was 28.3% of which 13.% were severe , WHZ was 7.4%, of which 5.4% was severe, and HAZ was 54.1% of which 31.8% represent severe malnutrition.

Crops also provide proteins, the biggest share come from the beans with 60, 1% followed by peas with 7, 05%. Beans are the major source of proteins and important for rural population who have difficult to access to other sources of proteins such as milk , meat and eggs. Meat and milk Those two products are very expensive in rural areas, though the price of an egg is not high, farmers prefer to sell eggs to generate some revenue. When crops are grouped in different categories, vegetables contribute for 72.4% of proteins, cereals 10.32% tubers, 13.78% and bananas 3.03%.

Crops provide fat and national average is 6 grams per person per day when the minimum requirement is 40 grams, the deficit is 85% which is high. Fat is important for the development of children's brain and their mental skills in the school. This requires a special policy to increase fat intake by poor rural population. The biggest share comes from the beans with 31.43% followed by peanut with 16.91% and soybeans with 14.38%. Those three crops contribute to 62.64%. The legumes provide 65.26% of total fat, cereals 19.7% of which maize contributes to 16.04%. Tubers give 11.26% of the fat of which sweet potatoes represent6.21%. Bananas provide 4.21% of the fat

In conclusion Rwanda in average has an important deficit of fat 85%, a medium deficit of proteins of 36% and low deficit of proteins of 22%.
Beans provide various body needs : calories 31.51% of total calories, proteins 60.10% and fat 31.34%. Beans constitute a major crop. Sweet potato is an important source of calorie and contributes 16.82%, peanut and maize are important as sources of fat with 16.91% and 16.04% respectively.

CHAPTER V: LIVESTOCK

5.1 Animal distribution

A) Cattle

1. Number of local breed of cows in 2006 was 1.044.950 when the number of exotic cattle was 109.074. Total number of cattle in the country was 1.154.024. The exotic cattle represents 9.5 % of the total cattle in the rural area, this percentage is still very low. The largest number of cows is found in Umutara with 285.650 cows or 24.7 % followed by Kigali Ngari with 169.144 or 14.6% and Gitarama with 149.821 or 13.5%. The province with lowest number of cattle is Gikongoro with 49.177 heads or 4.2%.

2. The improved cows are 109.074 and the biggest number is in Umutara province with is 25.280 cows or 23.1% followed by Ruhengeri with 21.914 cows or 20.1% and Kigali Ngari with 20.440 cows or 18.3% . Those three provinces have a total of 63.3% of total improved cattle.

3. However very few cows are reared for dairy 144.508 local cows and 12.971 improved breeds which represented 13.6 % of total cows. This is a very low performance. In one year, the milk was estimated to reach 20.283.160 litters in one season which means in six months. Combined dairy cattle produce 20.283.160 litres which means 1.4 litres per cow per day. This is low milk production and it is urgent to improve cattle in rural area to increase the production of milk. However, these figures don't show the urban milk production which is normally high because of the demand from diary and there are more exotic animals;

B) Goat

4. Goat is the most popular small ruminant particularly for low income population. Indeed goat population is 2.828.442 of which 98% are local breed and 2% are improved breed. Goats are well distributed across the country. Kibungo has 418.416 goats or 14.7% of the total goat population Kigali Ngari and ville have 401.377 goats which represent 14.1 % and Butare with 310.340 goats which represent 11.7 %. The lowest population is found in Gikongoro with 162.656 goats or 5.7%. Goat is an animal which presents a lot of advantages, low initial capital investment to raise goat, this animal has a high resistance, few diseases and is fed with basically grass without any supplementary feedings. Raising goat doesn't require specific skills, it is less risky and its meat is well appreciated by all, especially urban population. Goats are exported to Congo which is an opportunity for exchange within region. Goat can be sold anytime and it is a source of income for poor rural population.

C). Sheep, pig, rabbit and chicken

5. The number of sheep was 810.469 in 2006 of which 44.246 5.5 7% represent the improved sheep. Sheep are located in Ruhengeri with 230.052 or 28.4 % in Gisenyi with 135.420 sheep or 16.7 %. In 2006 there were 476.149 pigs and Gisenyi has the biggest number 77.169 pigs or 16.2% followed by Butare with 75.271 pigs or 15.8 %.

6. Rwanda has 517.237 rabbits and 1.921709 chickens. The data show that during a period of six months, chickens gave 12.785.962 eggs

7. In Rwanda in six months there were 155.800 skins

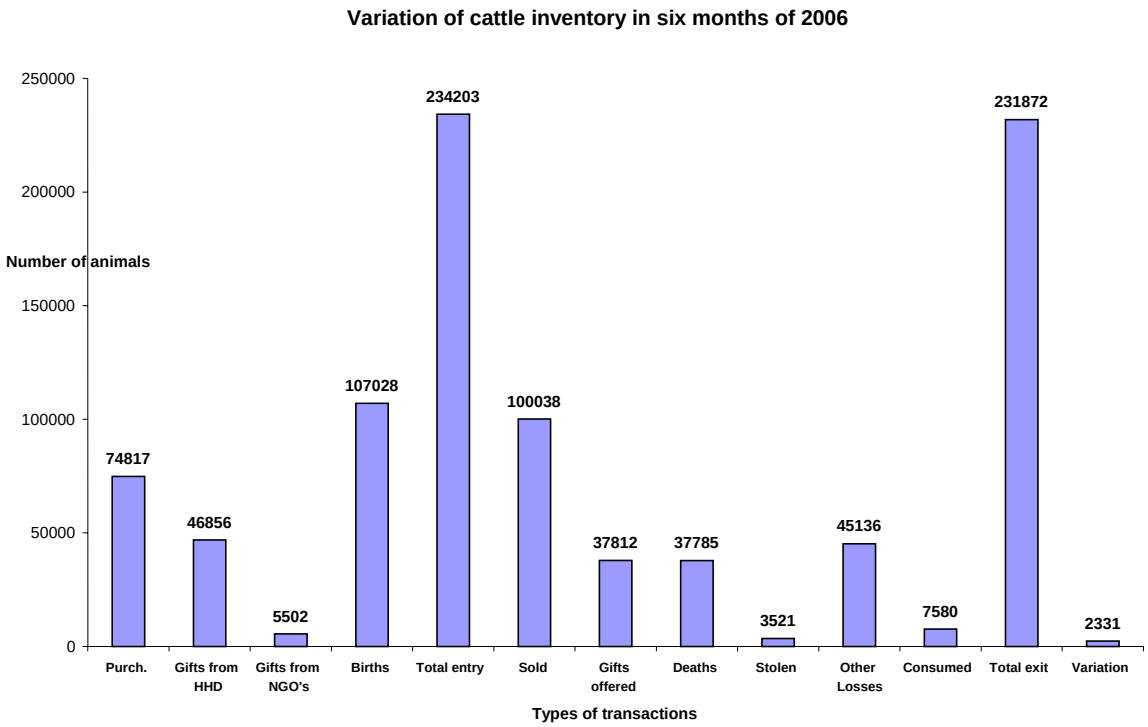
5.2 Variation of animal inventory in 2006

A) Cattle:

8. The variation of inventory in six months was 2331 cows. This is distributed between total gains and total losses. Total gains include purchases, gift from households and NGO,s, births, while losses include sales, gifts to others, deaths, stolen animals, other types of losses and consumption.

9. Variation of cows in six months was 2.331 which seems to be low, total gains were 234.203 cow and total losses 231.872 cows. This last figure is really high. Indeed for 234 .203 gains, there were 107.028 births or 45.7 %, 74.817 purchases or 31.9% and 46.856 gifts from neighbours or 20.0% of the total gains. This shows that births are important in inventory and purchases. Gifts to neighbours are also frequent.

10. Total losses were 231.872 and include 100.038 cows or 43.1% which were sold, 19.5% losses, 16.3% were given as gift, 16.3% were lost by death. This shows that people raise cows primary for sale, they face losses and give cows as gifts. However, losses represent 37.3% of total outputs. This is very high and needs to be considered in terms of interventions to improve animal health. For 107.028 births in six months, there are 37.785 deaths which represent 35.3%, this is high. This loss is important especially when the capital investment is high. In conclusion the variation of cattle in six months is 2.331 cows, this is too low and needs to be deeply analyzed.



B) Goat:

9- In case of goat, total entry is important or 1.399.712 goats and include 907.902 births, which represent 65.9% and 377.455 purchased which represents 27.0%, there are 171.101 deaths or 18. This information is useful for livestock development, it is clear where special efforts have to be invested.

11. For the goats, the variation during six months is 747.840 and includes total gains of 1.399.712 goats and total outputs which represent 651.872 goats. In total gains, births in six months are 907.902 or 64.8% of total gains and purchases are 377.455 or 27% of total gains. Births and purchases represent 91%, this means that people who raise goats increase inventory through births and purchases.
12. The total outputs are 651.872, in six months, sales were 295.171 or 45.2%, number of deaths 171.101 or 26.2% and other types of losses 93.502 or 14.3%, these three components represent 85.2%. People who raise goats sell them and face losses which are equivalent to 40%. This is high and needs appropriate measures to prevent it.

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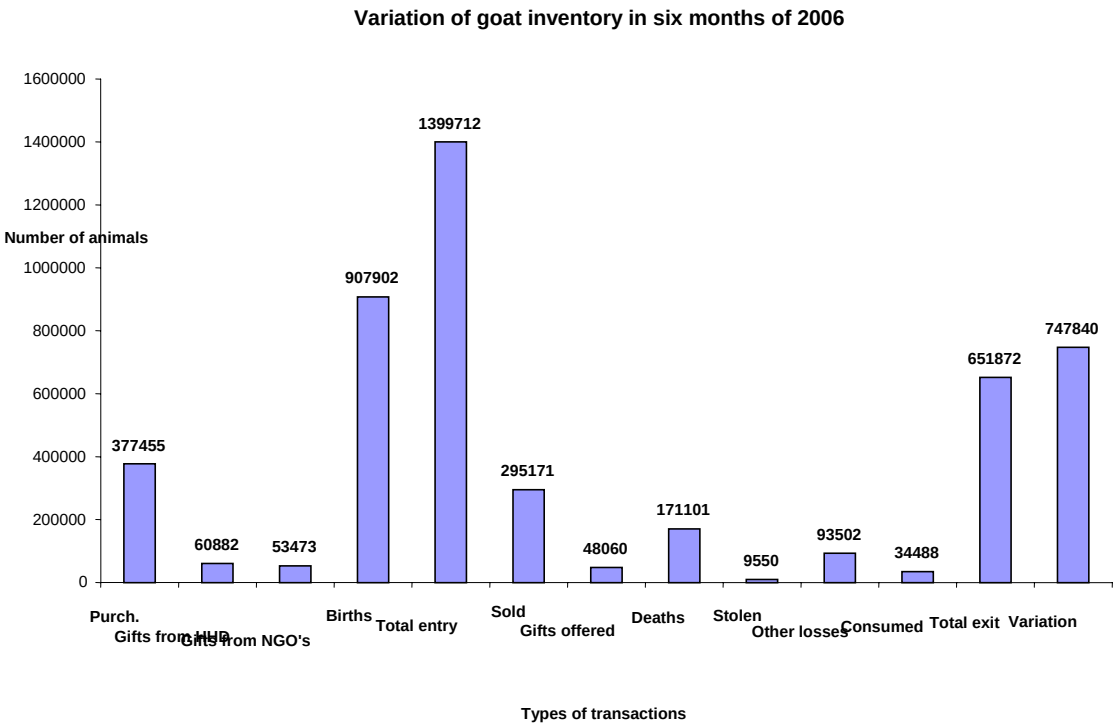
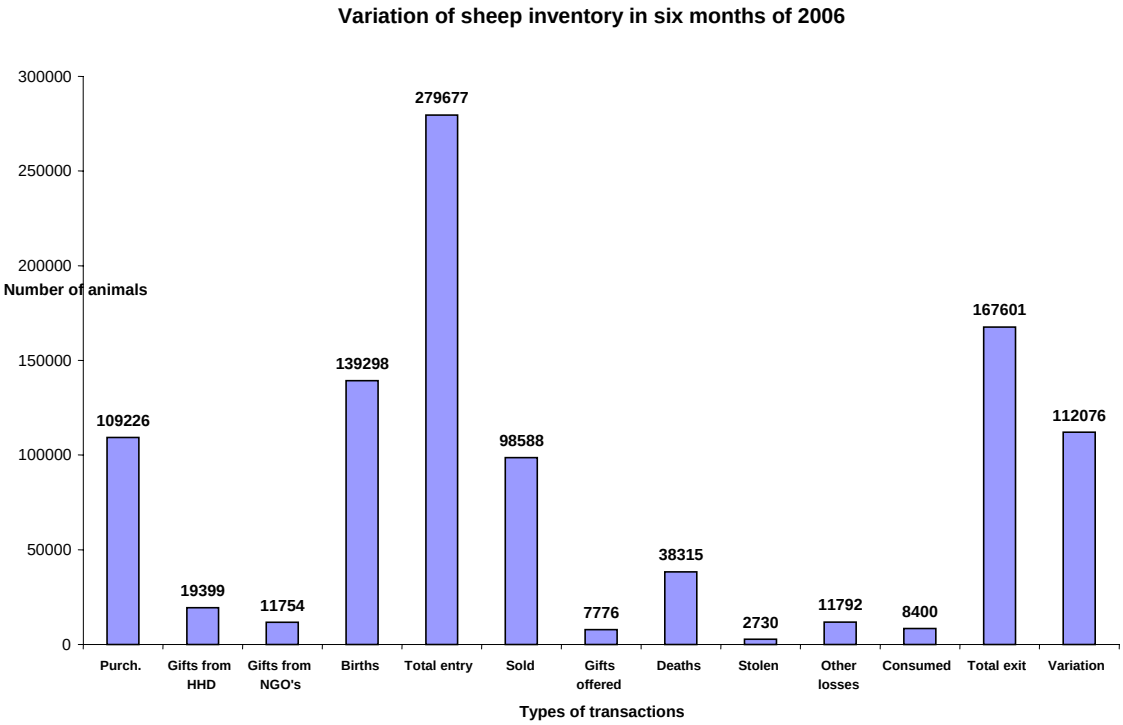


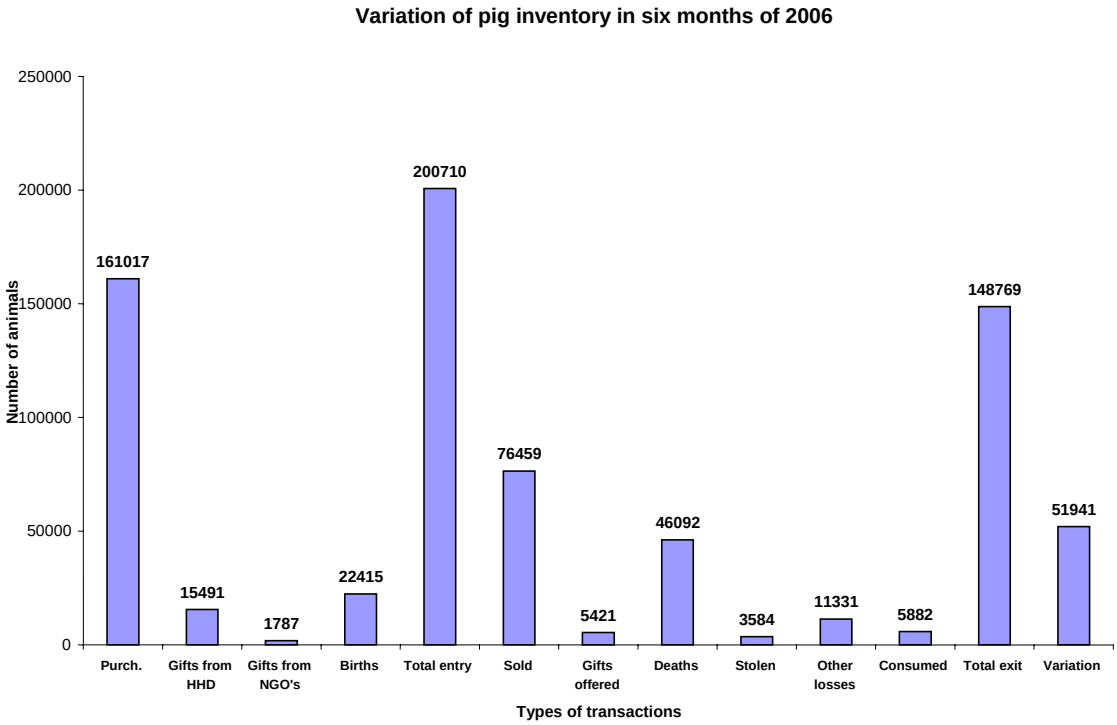
C) Sheep

13. For the sheep of which total population in six months of 2006 A were 659.367, total entry was 279.677 sheep or 42.4%. Total entry includes births which represent 49.9%or 139.298 sheep and 109.226 bought by the farmers or 39.1% of total entry. Total exit represents 167.601 sheep and include 98.588 sold sheep or 58.9% which is the most important component.



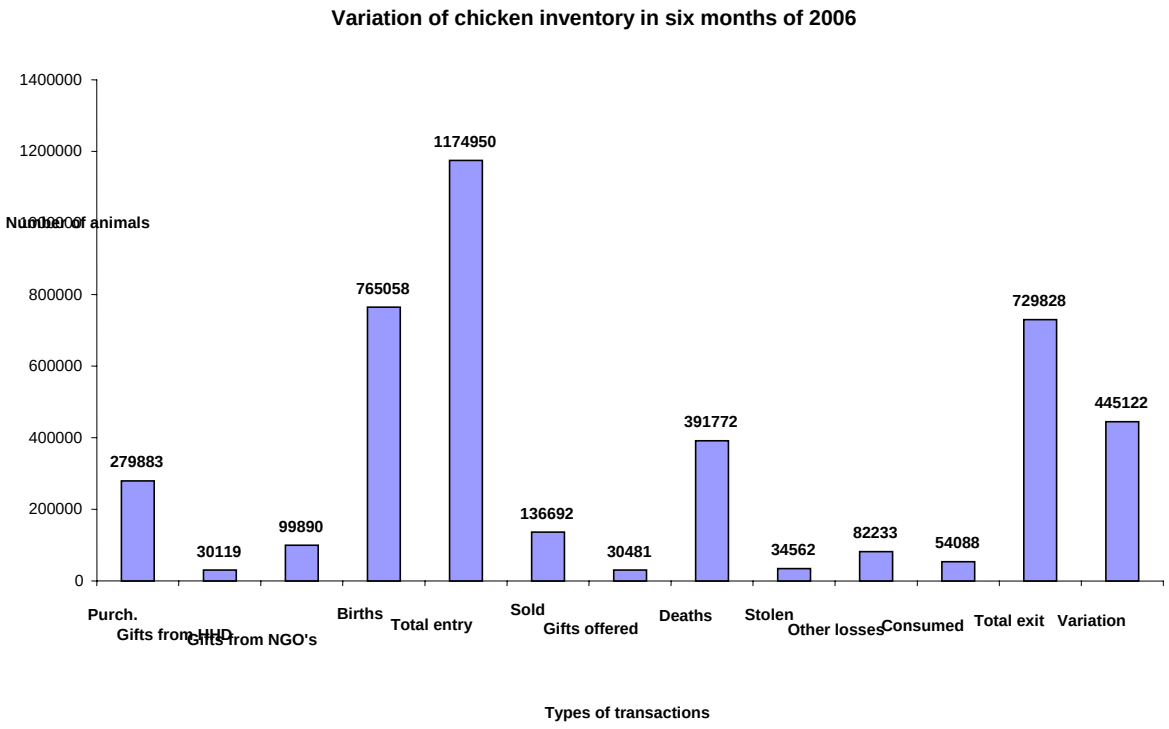
D) Pig

14. Pig is popular in Rwanda because of its high fertility rate and its market. Indeed the number of purchased pig is 161.017 and represents 80.2% of total entry in the inventory while for the total exit number of pigs is 148.769 sold sheep represent 51.4 % of total exit. There is a positive inventory of pigs in six months. This shows that there is a market for sheep and this animal is also a source of income.



e) Chicken

15. For the chicken the variation in six months of observation was 445.122 which include total gains of 1.174.950 and total outputs of 729.828 chickens. Among the gains, births are 765.058 or 65.1% and purchases which are 279.883 chickens or 23.8%, the two major components represent 88.9%. In outputs, deaths represent 391.772 chicken or 56.7% and the sales are 136.692 chicken or 18.7% which gives a total of 75.4%. For people who raise chicken, the death of birds is very high (56.7%). In rural area, chickens are raised by poor people and are sold , with eggs, to raise little money; of the 765.058 chickens which are born, there are 391.772 deaths, i.e 51%, this shows how chicken are less resistant to different diseases and this need to be well considered in terms of promotion of chicken for rural population. It is a source of cash



16. During a period of six months, total cattle population increased by 0.2%, goats by 28.2%, chickens by 2.6%, sheep by 16.1%, pigs by 9.8%; as for rabbits, the inventory was negative which means a decline of 2.6% of total pigs. This shows how goats are important for rural population.

17. The Rabbit is an animal which is easy to raise however because of its high death rate, inventory after six months was negative. Number of births increases the stock which represents almost number of deaths. There is a need to improve health of rabbits.

5.3 Meat Consumption

In six months 2006A, there were 7580 cow consumed, 34488 goats, 8400 sheep, 5882 pigs, 21460 rabbits and 54.088 chickens. If we know that in Rwanda in average, local breed cows have 150 kg of weight, a goat 20 kg, 30 kg for sheep, 1.5 kg for rabbit, 60 kg for pig and 1.5 kg for chicken. This means 1307 MT of meat for a period of six months. This doesn't include the urban consumption which is high and may represent a big proportion. There is need for more data to have realistic figures.

Milk production in six months was estimated to reach 17.671.686 litres which represent 18.537.598 kilos. One litre of milk is composed of 87% of water, 5% of sugar, 4% of fat and 4% of proteins. The contribution of milk is 0.51 grams of proteins per person per day and 0.51 grams of fat per person per day. These numbers are very small.

ANNEXES:

Annexe 1.1 Distribution of households by sex and by province (2006)

PROVINCES	Sex				Total	
	Male		Female		Total	%
KIGALI Ville et KIGALI-NGARI	129 982	71	53 147	29	183 129	100
GITARAMA	113 718	73	42 871	27	156 589	100
BUTARE	108 742	75	35 906	25	144 648	100
GIKONGORO	71 360	71	29 275	29	100 635	100
CYANGUGU	80 600	70	34 924	30	115 524	100
KIBUYE	67 343	78	18 829	22	86 172	100
GISENYI	114 996	69	52 656	31	167 652	100
RUHENGERI	125 904	66	66 312	34	192 216	100
BYUMBA	110 346	73	39 994	27	150 340	100
UMUTARA	56 757	72	22 575	28	79 332	100
KIBUNGO	117 068	79	31 119	21	148 187	100
Total	**1 096 816**	**72**	**427 608**	**28**	**1 524 424**	**100**

Annexe 1.2 Distribution of rural agricultural population by sex and by province (2006A)

PROVINCES	Sex					
	Male		Female			
	Total number of men	%	Total number of females	%	Total	%
KIGALI Ville et KIGALI-NGARI	449332	46,6	515434	53,4	964766	100
GITARAMA	359302	48,3	384633	51,7	743935	100
BUTARE	336932	48,7	354673	51,3	691605	100
GIKONGORO	242474	48,1	261461	51,9	503935	100
CYANGUGU	285800	46,2	332665	53,8	618465	100
KIBUYE	206505	48,6	218682	51,4	425187	100
GISENYI	414480	48,9	433324	51,1	847804	100
RUHENGERI	459232	49,2	473722	50,8	932954	100
BYUMBA	338967	45,9	400063	54,1	739030	100
UMUTARA	207759	47,7	227750	52,3	435509	100
KIBUNGO	332199	50,0	332054	50,0	664253	100
Rwanda	3632982	48,0	3934461	52,0	7567443	100

Annexe 1.3 Distribution of households by age of the head of household and by province (2006)

	Sex											
	Male				Female				Total			
PROVINCES	**Minimum**	**Maximum**	**Average**	**S.D.**	**Minimum**	**Maximum**	**Average**	**S.D.**	**Minimum**	**Maximum**	**Average**	**S.D.**
KIGALI ville et KIGALI-NGARI	19	82	42	15	18	83	50	16	18	83	44	16
GITARAMA	18	88	42	15	22	80	50	13	18	88	44	15
BUTARE	18	99	42	14	17	74	48	14	17	99	43	14
GIKONGORO	21	75	40	13	26	76	48	13	21	76	43	14
CYANGUGU	18	80	41	14	18	85	50	19	18	85	43	16
KIBUYE	21	80	43	15	30	77	54	15	21	80	45	15
GISENYI	15	85	40	16	22	90	48	13	15	90	43	16
RUHENGERI	18	84	41	16	21	80	49	15	18	84	44	16
BYUMBA	21	99	42	17	28	95	55	18	21	99	46	18
UMUTARA	19	78	40	15	25	87	51	15	19	87	43	16
KIBUNGO	19	80	39	15	19	99	46	16	19	99	41	15
Rwanda	**15**	**99**	**41**	**15**	**17**	**99**	**50**	**15**	**15**	**99**	**44**	**16**

Annexe 1.4: Distribution of heads of households by category of age

HOUSEHOLDS BY AGE AND BY CATEGORY OF AGES					Never been in school	Incomplete primary.	Complete primary.	Vacational education.	Incomplete secondary	Complete secondary.	Total
Rwanda	Sex	Male	Age category	Less than 18 years	1152	0	0	0	0	0	1152
				18-24 yrs	21553	35383	56890	0	1140	0	114966
				25-29 yrs	9433	68548	53586	1657	0	0	133224
				30-34 yrs	3848	72344	45538	1065	876	0	123671
				35-39 yrs	4167	57650	45080	998	1806	0	109701
				40-44 yrs	2268	59554	19471	3307	1498	0	86098
				45-49 yrs	0	86796	21869	1656	501	0	110822
				50-54 yrs	778	38870	18306	1249	0	0	59203
				55-59 yrs	0	35777	10368	2474	1654	0	50273
				60-64 yrs	0	26181	5582	1124	0	0	32887
				65-69 yrs	805	22000	7399	2759	0	0	32963
				70 yrs and more	0	32859	13630	9105	912	0	56506
					44004	535962	297719	25394	8387	0	911466
	Sex	Female	Age category	18-24 yrs	10032	0	2031	0	948	853	13864
				25-29 yrs	778	1805	6503	0	3021	1696	13803
				30-34 yrs	4905	0	3001	1236	13801	465	23408
				35-39 yrs	805	3331	5757	0	30522	805	41220
				40-44 yrs	3213	7071	6379	0	43278	4817	64758
				45-49 yrs	0	3225	6130	0	44710	5098	59163
				50-54 yrs	805	1698	761	938	39508	1744	45454
				55-59 yrs	1201	854	1140	687	25782	2404	32068
				60-64 yrs	0	0	1020	0	23299	2014	26333
				65-69 yrs	0	912	1044	0	23609	1044	26609
				70 yrs and more	0	3018	0	0	39686	0	42704
				Total	21739	21914	33766	2861	288164	20940	389384

Annexe 1.5 Distribution of household by category of age by sex and by legal status

HOUSEHOLDS BY SEX AND BY CATEGORY OF AGE			Category of ages	Single	Official married	Non official Union	Divorce	Widow	Separate	Total
Rwanda	Sex	Male	Categ. of age	Moins de 18 ans	1152	0	0	0	0	0	1152
				18-24 ans	21553	35383	56890	0	1140	0	114966
				25-29 ans	9433	68548	53586	1657	0	0	133224
				30-34 years	3848	72344	45538	1065	876	0	123671
				35-39 years	4167	57650	45080	998	1806	0	109701
				40-44 years	2268	59554	19471	3307	1498	0	86098
				45-49 years	0	86796	21869	1656	501	0	110822
				50-54 years	778	38870	18306	1249	0	0	59203
				55-59 years	0	35777	10368	2474	1654	0	50273
				60-64 years	0	26181	5582	1124	0	0	32887
				65-69 years	805	22000	7399	2759	0	0	32963
				70 years and more	0	32859	13630	9105	912	0	56506
					44004	535962	297719	25394	8387	0	911466
	Sex	Female	Cat. of age	18-24 years	10032	0	2031	0	948	853	13864
				25-29 years	778	1805	6503	0	3021	1696	13803
				30-34 years	4905	0	3001	1236	13801	465	23408
				35-39 years	805	3331	5757	0	30522	805	41220
				40-44 years	3213	7071	6379	0	43278	4817	64758
				45-49 years	0	3225	6130	0	44710	5098	59163
				50-54 years	805	1698	761	938	39508	1744	45454
				55-59 years	1201	854	1140	687	25782	2404	32068
				60-64 years	0	0	1020	0	23299	2014	26333
				65-69 years	0	912	1044	0	23609	1044	26609
				70 years and more	0	3018	0	0	39686	0	42704
				Total	21739	21914	33766	2861	288164	20940	389384

Annexe 1.6 Distribution of households by category of age and by type and main activities

HOUSEHOLD BY SEX AND BY AGE				Agricultural household	Family household labor	Non family household labor	Permanent paid labor	Agriculture labor	Non agriculture labor	Handcraft labor	Off-farm handcraft labor	Trader	Civil servant	Student	Domestic personnel	Others	Unemployed	Total
RWANDA	Sex	Male	Less than 18 years	1152	0	0	0	0	0	0	0	0	0	0	0	0	0	0
			18-24	114966	1174	1346	1152	2835	1602	4282	1417	0	1706	0	0	0	0	133209
			25-29	133224	867	0	0	2043	999	1850	2612	4712	1046	1067	0	3248	0	151668
			30-34	123671	0	0	0	5100	2039	4300	4576	1046	2350	1935	0	2690	0	147707
			35-39	109701	0	775	711	4063	2678	6169	1709	2237	0	0	1029	3471	0	132543
			40-44	86098	879	1039	0	4467	1593	9360	558	7613	0	0	0	1843	989	116453
			45-49	111618	1742	1378	0	4885	2556	2105	2803	3926	1841	0	711	4842	1299	141542
			50-54	59203	0	0	0	2506	2051	3862	636	0	923	0	0	0	828	70752
			55-59	50273	999	0	0	1909	636	1622	822	0	0	0	0	0	1986	58247
			60-64	32887	1378	0	0	0	0	1354	769	0	0	0	0	1346	0	37734
			65-69	32963	0	0	0	0	0	0	1039	801	0	0	0	0	431	35234
			70 years and more	56506	998	1814	0	1029	885	1754	0	0	0	0	0	0	7589	70575
			Total	912262	8037	6352	1863	28837	15039	36658	16941	20335	7866	3002	1740	17440	13122	1096816

HOUSEHOLD BY SEX AND BY AGE				agricultural household E	Family household labor	Non family household labor	Permanent paid labor	Agriculture labor	Non agriculture labor	Handcraft labor	Off-farm handcraft labor	Trader	Civil servant	Student	Domestic personnel	Others	Unemployed	Total
RWANDA	Sex	Female	Less than 18-24 year	0	0	0	0	781	0	0	0	0	0	0	0	0	0	781
			25-29 years	13864	0	0	0	665	0	0	0	558	1417	0	0	0	0	16504
			30-34 years	13803	0	0	0	1186	0	0	0	0	0	0	0	0	0	14989
			35-39 years	23408	0	775	0	1846	0	1378	0	0	0	0	0	0	0	27407
			40-44 years	41220	0	0	0	1272	0	0	0	1922	912	0	0	0	0	45326
			45-49 years	64758	0	0	0	1892	0	0	0	853	0	0	775	0	898	69176
			50-54 years	59163	0	0	0	665	0	1811	0	0	1092	0	0	0	0	62731
			55-59 years	45454	0	0	0	0	0	0	0	0	0	0	0	761	923	47138
			60-64 years	32068	0	0	0	822	0	0	0	0	0	0	0	0	0	32890
			65-69 years	26333	801	0	0	0	0	0	0	0	0	0	465	0	2911	30510
			70 years et plus	26609	711	0	0	0	0	0	0	0	0	0	0	0	2369	29689
			Total	42704	1480	0	0	0	0	0	0	0	0	0	0	0	4051	50467
				389384	2992	775	0	9129	0	3189	0	3333	3421	0	1240	761	11152	427608

LAND USE

Annex 2.1 Distribution of land size per household per province 2006

PROVINCES	Average land use per household (ha)	Total land (ha)
KIGALI VILLE et KIGALI NGARI	0,69	127 076
GITARAMA	1,09	178 284
BUTARE	0,36	33 455
GIKONGORO	0,41	41 564
CYANGUGU	0,34	38 935
KIBUYE	0,68	58 250
GISENYI	0,56	94 791
RUHENGERI	0,54	101 111
BYUMBA	1,04	153 400
UMUTARA	1,14	96 122
KIBUNGO	0,95	139 875
RWANDA	**0,72**	**1 062 861**

Annex 2.2: Distribution of land by mode of acquisition and by province in 2006

PROVINCES	MODE OF ACQUISITION						
	HERITAGE	PURCHASED	GIFT	FREE UTILIZATION	RENT PAID IN KIND	RENT PAID IN CASH	OTHERS
KIGALI VILLE et KIGALI NGARI	54109	28638	27255	1890	8438	4005	2739
%	37,3	24,9	19,8	4,1	4,0	7,2	2,7
GITARAMA	142694	9748	15243	3587	3338	3640	35
%	63,8	7,8	11,1	3,9	12,5	0,7	0,2
BUTARE	17742	2315	1161	1650	4013	6440	135
%	62,4	5,6	4,0	9,7	11,8	6,1	0,3
GIKONGORO	15304,34	9910	11471	3326	933	529	90
%	53,6	19,0	13,6	3,6	8,1	1,5	0,7
CYANGUGU	18724,66	6295	9502	80	3620	713	0
%	35,5	22,2	24,5	1,0	14,9	1,9	0
KIBUYE	31982,39	11851	10552	2491	1200	174	0
%	47,5	20,7	16,6	3,9	9,4	1,9	0
GISENYI	22637,97	19324	37969	7867	2687	3839	467
%	31,2	22,4	29,0	3,1	7,9	5,7	0,6
RUHENGERI	30837,67	34313	24718	5982	2933	1163	1164
%	27,6	34,6	27,9	4,3	3,7	1,4	0,4
BYUMBA	59065,69	39348	47643	3096	1235	2214	798
%	17,2	28,1	40,9	4,2	2,5	6,9	0,3
UMUTARA	36792,4	25750	25174	2635	3481	2290	0
%	23,6	30,4	22,9	6,5	7,9	8,8	0
KIBUNGO	36336,0445	29409	47568	7300	10498	7324	1440
%	22,7	20,9	32,8	5,5	7,3	5,3	5,6
RWANDA	466225,212	216899	258255	39904	42376	32332	6869
%	35,2	23,3	24,9	4,3	7,1	4,3	0,9

Annex 2.3: Distribution of land (in ha) by use of water
And by province 2006

PROVINCES	TYPE OF FARMING SYSTEM			
	RAINFALL	IRRIGATION	DRAINAGE	NOT DECLARED
KIGALI VILLE et KIGALI NGARI	120 322	1479	5274	0
	96,3	1,7	1,9	0
GITARAMA	173 013	135	5136	0
	90,1	1,9	8,0	0
BUTARE	32 701	0	754	0
	97,2	0	2,8	0
GIKONGORO	40 995	369	199	0
	97,3	1,6	1,1	0
CYANGUGU	37 892	744	299	0
	95,1	3,7	1,2	0
KIBUYE	56 560	53	1460	176,8
	95,8	0,6	3,3	0,3
GISENYI	94 175	0	616	0
	97,1	0	2,9	0
RUHENGERI	99 884	1125	102	0
	99,4	0,2	0,4	0
BYUMBA	152 810	413	177	0
	98,2	1,0	0,8	0
UMUTARA	95 641	210	270	0
	97,3	0,8	1,9	0
KIBUNGO	139 763	96	17	0
	99,2	0,5	0,3	0
RWANDA	1 043 756	4624	14304	176,8
	97,0	1,0	2,0	0,0

Annexe 2.4 Distribution of households by agricultural practises and by province (2006)

PROVINCES	TYPE OF FARMING			
	TRADITIONNAL	ANIMAL TRACTION	MECHANIZED	NOT DECLARED
KIGALI VILLE et KIGALI NGARI	126 305	743	0	27,56
	99,0	0,7	0	0,3
GITARAMA	178 256	28	0	0
	99,8	0,2	0	0
BUTARE	33 455	0	0	0
	100,0	0	0	0
GIKONGORO	41 442	122	0	0
	99,3	0,7	0	0
CYANGUGU	38 002	933	0	0
	99,6	0,4	0	0
KIBUYE	58 116	0	134	0
	99,7	0	0,3	0
GISENYI	94 642	149	0	0
	99,7	0,3	0	0
RUHENGERI	101 111	0	0	0
	100,0	0	0	0
BYUMBA	153 265	135	0	0
	99,6	0,4	0	0
UMUTARA	96 122	0	0	0
	100,0	0	0	0
KIBUNGO	136 759	2049	0	1067
	99,3	0,3	0	0,3
RWANDA	1 057 474	4158	134	1094,56
	99,6	0,3	0,0	0,1

Annexe 2.5: Anti -erosion measures per household and per province 2006B

PROVINCES	RADICAL TERRACING WITHOUT FENCE	RADICAL TERRACING WITH FENCE	PROGRESSIVE TERRACING WITHOUT FENCE	PROGRESSIVE TERRACING WITH FENCE	ANTI-EROSION DITCH WITHOUT FENCE	ANTI-EROSION DITCH WITH FENCE	OTHER TYPE OF SOIL PROTECTION	NO PROTECTION	Total in (HA)
KIGALI VILLE et KIGALI NGARI	31891	10686	9415	4177	15494	47318	8202	0	127183
	25.6%	3.4%	2.9%	2.6%	12.5%	48.8%	4.1%	0%	
GITARAMA	33779	2621	33	1950	23102	108696	6201	0	176378
	22.2%	3.0%	0.2%	1.4%	6.9%	55.7%	10.6%	0%	
BUTARE	15977	393	0	0	7205	14651	1324	32	39583
	48.3%	2.0%	0%	0%	19.9%	25.4%	4.2%	0.2%	
GIKONGORO	6257	1331	0	6	11544	22625	17	0	41781
	30.3%	8.2%	0%	0.6%	13.1%	47.3%	0.8%	0%	
CYANGUGU	18610	3995	87	4314	1333	8016	3407	0	39762
	60.3%	8.5%	0.4%	8.4%	3.0%	15.0%	4.3%	0%	
KIBUYE	11769	4271	219	12611	2562	20657	5129	0	57219
	21.3%	5.1%	0.9%	3.3%	8.7%	48.6%	12.1%	0%	
GISENYI	4409	861	587	9812	246	70892	12414	0	99220
	18.0%	2.7%	1.4%	13.5%	0.8%	45.1%	18.6%	0%	
RUHENGERI	31056	3179	527	11130	363	32910	31994	0	111159
	31.0%	3.7%	0.6%	10.6%	0.5%	32.3%	21.3%	0%	
BYUMBA	28171	2217	5311	45441	1534	31934	36651	0	151260
	18.2%	2.8%	5.5%	31.9%	2.1%	23.5%	15.9%	0%	
UMUTARA	37123	1815	7615	4253	5555	16638	2068	0	75066
	55.7%	2.0%	8.9%	0.8%	8.3%	15.2%	4.5%	0%	
KIBUNGO	54502	17066	374	1721	34292	32461	2041	0	142456
	54.8%	10.4%	0.8%	3.0%	16.3%	11.8%	2.9%	0%	
RWANDA	273545	48436	24168	95415	103230	406794	109448	32	1061067
	31.6%	4.3%	1.9%	10.1%	6.8%	33.9%	11.4%	0%	100%

Annex 3 Crop production 2006

CROPS	SEASONS	KIGALI-NGARI	GITARAMA	BUTARE	GIKONGORO	CYANGUGU	KIBUYE	GISENYI	RUHENGERI	BYUMBA	UMUTARA	KIBUNGO	RWANDA
Beans	Saison A	22 999	23 930	10 177	4 340	11 772	7 838	19 453	35 783	30 013	19 881	16 077	202 263
	Saison B	31 123	23 275	18 722	3 833	6 125	1 352	12 250	23 069	13 298	31 820	22 268	187 133
	Total	54 122	47 205	28 899	8 173	17 897	9 190	31 703	58 852	43 311	51 701	38 345	389 396
Peas	Saison A	825	1 803	839	1 582	486	1 659	2 416	5 429	5 743	1 547	277	22 606
	Saison B	1 798	1 842	1 135	938	74	811	1 800	3 473	1 564	4 327	793	18 555
	Total	2 623	3 645	1 974	2 520	560	2 470	4 216	8 902	7 307	5 874	1 070	41 161
Peanut	Saison A	417	272	335	,	84	,	15	,	3 214	1 154	1 018	6 510
	Saison B	681	414	398	,	236	,	8	,	1 687	1 519	878	5 822
	Total	1 098	686	733		320		23		4 901	2 673	1 896	12 332
Soya	Saison A	682	4 777	378	548	694	598	289	79	354	144	138	8 680
	Saison B	2 027	4 233	1 447	511	1 566	10	238	22	271	491	127	10 944
	T**otal**	2 709	9 010	1 825	1 059	2 260	608	527	101	625	635	265	19 624
Sorghum	Saison A	278	455	104	,	28	42	1 391	9 343	4 057	14 353	223	30 274
	Saison B	44 373	12 296	12 716	8 346	527	3 610	3 998	18 348	22 656	12 503	36 872	176 246
	Total	44 651	12 751	12 820	8 346	555	3 652	5 389	27 691	26 713	26 856	37 095	206 520
Maize	Saison A	1 254	2 146	71	127	2 054	8 405	3 624	3 156	6 845	8 204	1 023	36 910
	Saison B	5 238	4 932	7 130	2 261	3 236	,	8 342	12 973	3 542	5 695	3 887	57 235
	Total	6 492	7 078	7 201	2 388	5 290	8 405	11 966	16 129	10 387	13 899	4 910	94 145
Wheat	Saison A	,	,	,	198	75	379	751	1 079	1 084	,	,	3 566
	Saison B	,	,	,	6 454	239	114	1 189	3 021	335	,	,	11 353
	Total				6 652	314	493	1 940	4 100	1 419			14 919
Rice	Saison A	4 292	116	12 505	,	9 881	,	,	286	1 598	301	198	29 177
	Saison B	100	276	1 175	,	2 723	,	,	,	144	409	193	5 020
	Total	4 392	392	13 680		12 604			286	1 742	710	391	34 197
Cassava	Saison A	14 688	33 939	19 349	10 139	11 621	9 916	6 197	6 004	2 145	13 671	11 649	139 318
	Saison B	24 820	58 175	20 225	17 513	22 708	4 841	9 750	10 911	3 068	7 630	5 022	184 663
	Total	39 508	92 114	39 574	27 652	34 329	14 757	15 947	16 915	5 213	21 301	16 671	323 981
Sweet potato	Saison A	19 016	44 264	41 930	33 489	20 379	24 821	31 616	34 401	27 049	12 471	13 355	302 789
	Saison B	46 477	60 817	29 664	50 746	35 201	5 850	67 835	72 792	36 977	12 207	20 142	438 708
	Total	65 493	105 081	71 594	84 235	55 580	30 671	99 451	107 193	64 026	24 678	33 497	741 497
Irish potato	Saison A	7 195	5 755	7 920	12 331	3 391	22 385	148 659	80 331	26 596	17 186	6 388	338 137
	Saison B	6 401	8 777	5 850	17 340	551	4 181	142 845	97 714	13 232	12 232	7 630	316 752
	Total	13 596	14 532	13 770	29 671	3 942	26 566	291 504	178 045	39 828	29 418	14 018	654 889
Taro	Saison A	1 257	13 838	699	438	339	1 016	1 559	876	409	920	819	22 169

	Saison B	6 620	31 155	1 858	2 355	3 035	4 877	10 422	6 019	2 256	1 587	2 823	73 007
	Total	7 877	44 993	2 557	2 793	3 374	5 893	11 981	6 895	2 665	2 507	3 642	95 176
Cooking banana	Saison A	23 060	17 377	10 182	4 968	11 168	12 852	9 139	10 004	19 256	31 358	48 690	198 055
	Saison B	33 745	24 580	12 113	3 009	14 674	2 085	9 755	8 996	13 523	27 940	36 712	187 131
	Total	56 805	41 957	22 295	7 977	25 842	14 937	18 894	19 000	32 779	59 298	85 402	385 186
Banana for wine	Saison A	40 058	55 103	32 683	19 492	44 406	53 737	44 529	40 058	22 650	24 291	14 741	391 747
	Saison B	50 844	69 756	53 753	12 789	45 616	24 963	74 692	48 349	15 326	35 504	11 159	442 750
	Total	90 902	124 859	86 436	32 281	90 022	78 700	119 221	88 407	37 976	59 795	25 900	834 497
Apple banana	Saison A	3 138	1 666	1 209	1 010	870	4 022	4 584	4 650	2 821	1 766	533	26 269
	Saison B	10 362	7 584	2 885	651	2 924	842	9 070	10 243	5 851	3 893	5 309	59 612
	Total	13 500	9 250	4 094	1 661	3 794	4 864	13 654	14 893	8 672	5 659	5 842	85 881

4: LIVESTOCK

Annex 4.1 : DISTRIBUTION OF ANIMALS BY PROVINCE AND BY TYPE OF ANIMALS 2006

TYPES OF ANIMALS	KIIGALI VILLE et KIGALI-NGARI	GITARAMA	BUTARE	GIKONGORO	CYANGUGU	KIBUYE	GISENYI	RUHENGERI	BYUMBA	UMUTARA	KIBUNGO	RWANDA
Cattle :												
Local breed	102028	160094	85396	69674	38608	65164	41834	66467	68722	279869	57546	1035402
Improved breed	18181	5322	0	0	21484	1194	7516	17685	7670	2690	5035	86777
Goat : Local breed	384738	213160	310340	134606	169889	223620	284107	183663	192540	164375	379324	2640362
Improved breed	1291	0	0	0	0	0	6033	5325	1003	988	796	15436
Sheep :												
Local breed	42000	42068	8270	82171	29068	76327	119858	168420	109013	4108	2313	683616
Improved breed	0	0	0	0	0	0	3441	5633	1872	0	805	11751
Pig	41505	60142	43391	68355	53871	38393	93436	77108	10294	21048	19988	527531
Rabbits	23820	87420	6959	53759	49591	30859	52104	52553	60125	431	740	418361
Chicken												
Local breed	310144	295853	148968	98046	94140	86172	167493	190932	147009	33948	142284	1714989
Improved breed	0	0	0	0	0	0	2161	775	0	0	0	2936
Other avian	29412	23956	1972	0	0	7856	0	24286	0	3882	5756	97120
Cobayes	36075	0	0	49583	61699	23094	29211	29124	61806	898	45597	337087

Annex 4.2: Distribution of animals by type and by province.

TYPES OF ANIMALS	KIIGALI VILLE et KIGALI-NGARI	GITARAMA	BUTARE	GIKONGORO	CYANGUGU	KIBUYE	GISENYI	RUHENGERI	BYUMBA	UMUTARA	KIBUNGO	RWANDA
Cattle local breed	13066	22086	7083	4591	4522	5387	1606	8142	9372	64364	10183	150402
Improved breed	4706	1462	0	0	0	0	0	879	0	8335	0	15382
Goat : local breed	0	0	8693	0	0	0	12677	12382	0	14699	3846	52297
Improved breed	0	0	0	0	0	0	0	0	0	0	0	0

Annex 4.2 Animal production: (milk, skins, chicken eggs and other kinds of eggs 2006)

PROVINCES	Cow milk in liters	Other kind of milk in liters	Skins in pcs	Chicken eggs	Other kinds of eggs
KIGALI VILLE et KIGALI NGALI	4115505	1077240	7336	1828651	0
GITARAMA	3145011	49435	51760	2827002	91650
BUTARE	1062831	37926	0	1511268	58248
GIKONGORO	89215	2202	29904	65342	0
CYANGUGU	278460	18384	20300	1076213	0
KIBUYE	117312	10472	0	1131286	8992
GISENYI	919425	3652	0	833225	43076
RUHENGERI	1265038	516414	0	878904	2856
BYUMBA	4577986	122685	22824	1664039	63900
UMUTARA	1642202	643276	0	532044	4158
KIBUNGO	3070175	550908	23676	437988	10230
RWANDA	20283160	3032594	155800	12785962	283110

Annex 4.3: Variation of inventory by province and by type of animals during six months of observation 2006

		ENTRY					EXIT							
PROVINCES	TYPES OF ANIMALS	PURCH .	GIFT FROM A HHD	GIFT SFROM NGO,s	BIRTHS	TOTAL ENTRIES	SOLD	GIFTS to Friends	DEATHS	STOLEN	OTHER LOSSES	CONS.	TOTAL EXIT	VARIATION
KIGALI VILLE et KIGALI NGARI	CATTLE	8179	4397	1164	29793	43533	27843	12813	12287	0	45136	2400	100479	-56946
	GOAT	37729	12483	7410	93879	151501	81015	9105	31948	6151	88513	7989	224721	-73220
	SHEEP	3941	1140	0	5935	11016	7632	0	833	0	8390	0	16855	-5839
	PIG	3448	0	0	3682	7130	9240	0	3658	1109	10476	0	24483	-17353
	RABBIT	7135	0	0	4755	11890	2304	0	8446	2455	6254	0	19459	-7569
	CHICKEN	22845	4533	833	67918	96129	29019	9940	83697	8053	56879	5186	192774	-96645
	OTHER CHICKEN	2775	0	0	13457	16232	7322	0	12726	1105	17341	0	38494	-22262
	COBAYE	1291	0	0	2328	3619	4599	2328	4593	0	4667	687	16874	-13255
GITARAMA	CATTLE	11539	6071	687	20999	39296	5221	2879	929	0	0	1466	10495	28801
	GOAT	9681	2474	687	37796	50638	16992	775	8091	687	0	828	27373	23265
	SHEEP	828	0	0	7305	8133	0	0	2290	0	0	0	2290	5843
	PIG	13472	2867	0	4845	21184	8688	0	2528	0	855	0	12071	9113
	LAPIN	9187	0	0	10347	19534	4486	0	7124	0	0	3787	15397	4137
	CHICKEN	12893	4316	0	55813	73022	12434	2252	46264	2886	5487	2303	71626	1396
	DUCK	1542	0	0	687	2229	0	0	687	0	0	0	687	1542
	TURKEY	2538	0	0	1710	4248	0	0	0	0	0	0	0	4248
	COBAYE	0	0	0	1402	1402	1402	0	929	0	0	1402	3733	-2331
BUTARE	CATTLE	8279	4340	834	3600	17053	9873	2420	3395	0	0	0	15688	1365
	GOAT	9035	5927	0	51729	66691	31911	8521	20476	0	1897	2173	64978	1713
	SHEEP	781	640	0	1140	2561	781	0	0	0	0	0	781	1780
	PIG	13603	2883	0	1806	18292	12541	2030	6922	0	0	1767	23260	-4968
	RABBIT	13556	998	0	6581	21135	7617	2419	10945	1280	0	3310	25571	-4436
	CHICKEN	15898	2255	899	47718	66770	9069	5344	42227	2419	4469	10552	74080	-7310
	DUCK	0	0	0	1946	1946	0	0	1306	0	0	0	1306	640
	TURKEY	1474	0	0	834	2308	0	0	1668	0	0	834	2502	-194
	COBAYE	0	0	0	899	899	0	0	899	0	0	0	899	0
GIKONGORO	TURKEY	2744	1708	0	3783	8235	2707	2003	2825	1020	0	0	8555	-320
	GOAT	5254	2756	1020	17815	26845	9893	4245	9258	0	0	0	23396	3449
	SHEEP	0	0	0	0	0	5150	1804	4448	0	0	0	11402	-11402
	PIG	8444	989	635	12348	22416	4462	0	8880	0	0	0	13342	9074
	RABBIT	5517	2825	0	4121	12463	1811	1639	5272	1978	854	785	12339	124

	CHICKEN	1465	0	0	7026	8491	4049	0	5792	0	2092	635	12568	-4077
	COBAYE	0	989	0	2090	3079	0	0	1978	0	0	0	1978	1101
CYANGUGU	CATTLE	6294	3070	873	665	10902	7046	873	0	0	0	0	7919	2983
	GOAT	14422	1278	2190	33171	51061	20359	1734	7110	665	0	3157	33025	18036
	SHEEP	1046	1826	0	8267	11139	11269	0	1144	0	0	873	13286	-2147
	PIG	7870	0	0	498	8368	8453	0	3246	498	0	1236	13433	-5065
	RABBIT	4555	0	0	1826	6381		0	2190	0	0	3243	5433	948
	CHICKEN	25993	0	690	17185	43868	10489	1884	18008	2561	0	13314	46256	-2388
	DUCK	0	0	0	0	0	740	0	0	0	0	740	1480	-1480
	COBAYE	0	1046	0	15713	16759	4282	1046	9072	1046	0	2477	17923	-1164
KIBUYE	CATTLE	7788	3136	1506	5320	17750	8528	2008	5900	1124	0	0	17560	190
	GOAT	12826	6028	0	23609	42463	16666	1588	14930	0	0	830	34014	8449
	SHEEP	7940	2837	0	12880	23657	11752	884	4148	0	830	0	17614	6043
	PIG	11515	3732	0	0	15247	2777	0	1643	1124	0	748	6292	8955
	RABBIT	6209	0	0	5016	11225	1124	0	3066	0	0	1194	5384	5841
	CHICKEN	10662	1725	0	25721	38108	7112	884	17565	1714	2652	3442	33369	4739
	DUCK	1124	0	0	2248	3372	1872	0	3372	0	0	1124	6368	-2996
	COBAYE	1124	0	0	9992	11116	830	0	6700	0	1768	0	9298	1818
GISENYI	CATTLE	11810	5573	0	6118	23501	10445	7030	3771	0	0	913	22159	1342
	GOAT	30254	6471	8764	37176	82665	15287	5934	18939	0	0	6473	46633	36032
	SHEEP	16116	2471	3304	22505	44396	14740	853	5416	1774	0	1947	24730	19666
	PIG	17253	1152	1152	3482	23039	12630	1876	10064	853	0	0	25423	-2384
	RABBIT	5433	963	1152	9467	17015	2505	1186	11824	0	963	2372	18850	-1835
	CHICKEN	18885	4915	0	32772	56572	10398	2858	35151	5669	3043	1882	59001	-2429
	DICK	853	0	0	853	1706	853	0	0	1706	0	2039	4598	-2892
	TURKEY	0	0	0	1706	1706	0	0	1766	0	0	963	2729	-1023
	COBAYE	2065	2099	0	12692	16856	0	1674	7253	0	1186	1826	11939	4917
RUHENGERI	CATTLE	6867	6448	1944	19112	34371	10964	3445	1923	912	0	2779	20023	14348
	GOAT	17861	3658	2739	48995	73253	21560	3010	14668	0	0	8387	47625	25628
	SHEEP	16488	3422	2774	48064	70748	39196	3337	12139	0	2572	4752	61996	8752
	PIG	11030	2032	0	4401	17463	12102	775	4550	0	0	2131	19558	-2095
	RABBIT	8924	0	0	4311	13235	5540	0	5185	0	1877	4639	17241	-4006
	CHICKEN	7819	952	889	22606	32266	12414	0	18860	4225	3597	1695	40791	-8525
	DUCK	0	0	0	0	0	0	0	996	0	0	0	996	-996
	TURKEY	0	0	889	0	889	0	0	0	0	0	0	0	889
	COBAYE	1550	0	0	2490	4040	775	0	1880	0	775	2293	5723	-1683
BYUMBA	CATTLE	4512	3958	0	5799	14269	6848	0	867	0	0	801	8516	5753
	GOAT	13716	7736	8417	40192	70061	33000	3961	17838	0	0	1003	55802	14259
	SHEEP	4678	5246	5676	17819	33419	5900	0	5563	956	0	0	12419	21000

	PIG	1341	0	0	934	2275	0	0	1065	0	0	0	1065	1210
	RABBIT	4175	1046	0	5044	10265	4222	0	6500	2911	1046	2130	16809	-6544
	CHICKEN	11327	4536	0	32842	48705	19126	999	49435	999	2422	5497	78478	-29773
	DUCK	2220	0	0	4194	6414	0	1065	2064	0	0	1065	4194	2220
	TURKEY	1065	0	0	0	1065	0	0	0	0	0	0	0	1065
	COBAYE	0	0	0	3998	3998	1868	2130	1999	0	0	1065	7062	-3064
UMUTARA	CATTLE	2810	2074	0	7698	12582	6847	3505	5083	465	0	0	15900	-3318
	GOAT	12572	2395	0	32372	47339	24273	5051	13573	2047	1420	1305	47669	-330
	SHEEP	431	0	465	2363	3259	1363	898	594	0	0	0	2855	404
	PIG	4050	0	0	1133	5183	3080	0	1250	0	0	0	4330	853
	RABBIT	1492	0	0	594	2086	0	0	26927	0	0	0	26927	-24841
	CHICKEN	10999	3954	0	21570	36523	10597	4047	1059	6036	0	4792	26531	9992
	DUCK	501	0	0	594	1095	501	0	0	0	0	594	1095	0
	COBAYE	0	0	0	0	0	0	0	0	0	0	465	465	-465
KIBUNGO	CATTLE	3995	990	0	4141	9126	3716	836	805	0	0	0	5357	3769
	GOAT	14105	9676	2477	41168	67426	24215	4136	14270	0	1672	1705	45998	21428
	SHEEP	805	0	0	672	1477	805	0	1740	0	0	0	2545	-1068
	PIG	3991	0	0	1634	5625	2486	740	2286	0	0	0	5512	113
	RABBIT	0	0	0	0	0	796	0	0	0	0	0	796	-796
	CHICKEN	16097	2933	796	29415	49241	11985	2273	47846	0	1592	4790	68486	-19245
	DUCK	1201	625	0	705	2531	0	0	0	0	0	0	0	2531
	TURKEY	0	0	0	3603	3603	0	0	3207	0	0	0	3207	396
	COBAYE	0	0	0	2508	2508	0	0	836	0	0	0	836	1672
RWANDA	CATTLE	74817	46856	5502	107028	234203	100038	37812	37785	3521	45136	7580	231872	2331
	GOAT	377455	60882	53473	907902	1399712	295171	48060	171101	9550	93502	34488	651872	747840
	SHEEP	109226	19399	11754	139298	279677	98588	7776	38315	2730	11792	8400	167601	112076
	PIG	161017	15491	1787	22415	200710	76459	5421	46092	3584	11331	5882	148769	51941
	RABBIT	69183	4027	1152	52062	126424	30405	5244	60552	8624	10994	21460	137279	-10855
	CHICKEN	279883	30119	99890	765058	1174950	136692	30481	391772	34562	82233	54088	729828	445122
	DUCK	10216	625	0	24684	35525	11288	1065	22210	2811	17341	5562	60277	-24752
	TURKEY	5077	0	889	7853	13819	0	0	6641	0	0	1797	8438	5381
	COBAYE	42739	5425	0	54112	102276	13756	7178	36139	1046	8396	9528	76043	26233

Annex 5**:** RANDOM SAMPLE SITES

01. UMUJYI WA KIGALI

Code	**District**	**Code**	**Sector**	**Code**	**Cell**	**ZD**
03	Butamwa	02	Butamwa	03	Kankuba	018
04	Gisozi	06	Kinyinya	04	Murama	060
07	Kicukiro	06	Rwabutenge	02	Mulinja	055

02. INTARA YA KIGALI -NGALI.

Code	District	Code	**Sector**	Code	**Cell**	ZD
01	Umujyi wa Kabuga	**02**	GASOZI	**02**	**CYARUZINGE**	**024**
02	BICUMBI	13	RUBONA	01	BIDUDU	035
10	GASABO	**08**	JURWE	03	MUKUYU	
				04	NYAMABUYE	004
		02	FUMBWE	10	MUNINI	
				03	BIREMBO	078
03	GASHORA	**10**	RWINUME	06	KATARARA	
				08	RWIMPYISI	015
04	NGENDA	**03**	GAKOMEYE	03	GITWA	
				07	KARWANA	010
		11	RUTONDE	05	KIGARAMA	071
05	NYAMATA	**10**	KAYUMBA	11	RUGARAMA	027
06	SHYORONGI	**10**	RUTONDE	06	MWAGIRO	033
08	RULINDO	**02**	BUMBA	01	BUMBA	008
				02	GIKORO	
INTARA YA GITARAMA						
09	BULIZA	**12**	NGIRYI	06	UWANYANGE	056
Code	**District**	**Code**	**Sector**	**Code**	**Cell**	**ZD**
01	UMUJYI WA GITARAMA	10	SHYOGWE	03	KABUNGO	014
	UMUJYI WA GITARAMA	07	REMERA	01	GASENYI	049
02	RUYUMBA	08	BIBUNGO	01	BYENENE	045
03	NTONGWE	04	GITOVU	04	NYAGASAMBU	043
	NTONGWE	07	KINAZI	09	RUSUNGA	036

04	UMUJYI WA RUHANGO	01	BUNYOGOMBE	05	NYABISINDU	027
	UMUJYI WA RUHANGO	07	RWOGA	04	RWINKUBA	008
05	KABAGARI	18	RWANKUBA	02	BWAMA	018
05	KABAGARI	02	CYABAKAMYI	02	KIGARAMA	066
	KABAGARI	02	CYABAKAMYI	04	NYARURAMA	
	KABAGARI	02	CYABAKAMYI	06	RWABATWA	
06	NTENYO	13	NTENYO	04	NTENYO	097
	NTENYO		NTENYO	05	RUKIRIZA	
	NTENYO	19	RUGOGWE	02	KUMUNYINYA	045
	NTENYO		RUGOGWE	06	RWINYANA	
	NTENYO		RUGOGWE	03	NYAGAKOMBE	
07	MUHANGA	07	KADUHA	04	MURAMBI	076
08	NDIZA	21	SHAKI	03	KARA	058
				05	KIVUMU	
09	KAYUMBU	11	MARENGA	01	BUSHARA	013
09	KAYUMBU	12	MPUSHI	01	GITWIKO	073
10	KAMONYI	08	KARANGARA	02	KAGARAMA	053
	KAMONYI	15	RUGALIKA	02	MUSAVE	104
				06	RUHOGO	
				07	RUTOVU	

04 INTARA YA BUTARE

Code	District	Code	Sector	Code	Cell	ZD
01	VILLE DE BUTARE	03	CYARWA-SUMO	01	AGAHORA	049
				02	AGASENGASENGE	
				03	ICYIRI	
02	SAVE	03	BWEYA	01	KIMINAZI	044
		17	MUNANIRA	01	BAKENDE	005
				02	KIMISHIBU	
03	MUGOMBWA	06	KIBAYI	02	RWAHAMBI	040
04	KIBINGO	24	RUHORORO	03	REMERA	039
	KIBINGO	25	RUSAGARA	01	AGASHARU	071
05	NYAKIZU	02	BUNGE	04	TORANIRO	037
		19	MUKUGE	01	CYAMUTUMBA	083

				02	CYARATSI	
06	MARABA	08	KARAMA	03	KAZENGA	056
08	VILLE DE NYANZA	07	KAVUMU	03	GIHISI	020
				07	MUGANDAMURE	
		13	RUNGA	03	NDAGO	037
				04	RUGARAMA	
09	NYAMURE	03	BUTARA	03	KAVUMU	001
10	GIKONKO	15	MUGUSA	02	KAREHE	052
				03	MUYANGE	
		18	MUYAGA	01	KIBUMBA	009

05 INTARA YA GIKONGORO

Code	District	Code	Sector	Code	Cell	ZD
02	NYARUGURU	21	RUSUSA	06	RUSUSA	002
				02	MURAMBI	
03	SHILI	02	CYANYIRANKORA	02	KABINGO	006
				04	NYARWOTSI	
		06	GITITA	04	RUGANZA	051
				07	RYANYARUJA	
04	MUDASOMWA	04	KIBYAGIRA	04	MUKAKA	027
05	MUSHUBI	07	GIKUNGU	07	RWAMAKARA	054
				06	RUKORE	
		18	RWUFI	03	KABERE	005
				07	NGESO	
06	KADUHA	05	JENDA	03	KABILIZI	038
				02	KABAKANNYI	
		09	KIBUMBWE	01	CYINDIMIRO	061
				04	KIRWA	
07	KARABA	23	NYANZOGA	03	KARUVENYA	033
				06	RUSENYI	
		25	REMERA	04	MWOKORA	070
				07	UWAGISOZI	
				08	UWIMFURA	

06 INTARA YA CYANGUGU

Code	District	Code	Sector	Code	Cell	ZD
01	VILLE DE CYANGUGU	01	GIHUNDWE I	04	KANOMBE	004
				06	KAVUMU	
02	IMPALA	14	MPARWE	03	GASHENYI	128
				05	KARORO	
		19	NKAKA	06	NYABIRANGA	001
		27	SHANGI	03	KABAGA	055
03	NYAMASHEKE	04	KAGANO	04	GITABA	025
		07	MPABE	05	RUDEHERO	073
				03	GATAGARA	
04	GATARE	16	RWUMBA	03	MUTUNTU	033
				05	RUGABE	
05	BUKUNZI	01	GITAMBI	05	RWIHENE	059
06	BUGARAMA	01	BUGARAMA	03	MUKO	007
	BUGARAMA	08	MUGANZA	05	MURIRA	028
07	GASHONGA	06	KIMBAGIRO	04	NJAMBWE	009

07 INTARA YA KIBUYE

Code	District	Code	Sector	Code	Cell	ZD
01	VILLE DE KIBUYE	09	KIBIRIZI	03	KIMANA	038
				05	NDENGWA	
02	GISUNZU	03	GITWA	03	GASEKE	033
				06	MUREMERA	
03	RUTSIRO	06	GITEBE	01	BUNGWE	035
04	BUDAHA	01	BWIRA	04	RUKERI	067
		10	MUSASA	06	RASANIRO	015
05	ITABIRE	05	GISAYURA	01	BIRAMBO	050
				02	GASHARU	
				06	NYAKIRAMBI	
		09	KIGOMA	05	NYAGISOZI	069
06	RUSENYI	15	MUGOZI	04	RUGARAGARA	036
				05	RUSHOKA	

08 INTARA YA GISENYI

Code	District	Code	Sector	Code	Cell	ZD
02	CYANZARWE	01	AKANTWALI	03	MASHINGA	013
		03	BISIZI	01	KABUHINI	045
				03	KIBUYE	
03	MUTURA	04	GIHORWE	04	NGANDO	054
04	GASIZA	01	BIREMBO	03	GASIZA	095
		11	MWIYANIKE	05	RUGOGWE	025
05	KAGEYO	07	KIZIGURO	05	MUBUGA	029
				07	NYAGASAMBU	
06	NYAGISAGARA	02	GITARAMA	01	GISEKURU	066
		06	MIKINGO	04	RUBONA	024
07	GASEKE	04	GISEBEYA	02	GITUMBA	026
				06	NYAMUGEYO	
08	KAYOVE	07	KIGEYO	07	RWUYA	005
		12	NGABO	01	BUGINA	019
09	KANAMA	01	KANAMA	02	NYAGASOZI	008
				03	NYAMUGARI	
		02	KANOMBE	04	KAGESHI	062
10	NYAMYUMBA	11	RUBONA	02	BUHARARA	008

09 INTARA YA RUHENGERI

Code	District	Code	Sector	Code	Cell	ZD
01	VILLE DE RUHENGERI	06	KABAYA	01	BURERA	038
		09	CYUVE	02	KIREREMA	003
				01	BUHUNGE	
				03	RUNYANGWE	
02	BUGARURA	09	KIRURI	06	KIBANDA	021
03	NYARUTOVU	01	BWISHA	07	RUSEBEYA	004
		09	KIRIBA	04	MBOGO	063
04	BUKONYA	18	RUSASA	01	BURINDA	009
				07	RURAMBI	
				08	RWEMARIKA	
		20	TANDAGURA	03	MATABA	071
05	BUHOMA	02	GATOVU	05	RUKONDO	009
06	MUTOBO	03	GIKORO	04	RUTOMVU	042
		15	NYABIREHE	03	KABYAZA	002
07	KINIGI	04	KABWENDE	05	RUHANGA II	020
				02	GIFUMBA	
		05	KAGANO	06	RUKARANKA	058
				01	KABARI	
08	BUKAMBA	11	GITINDA	05	RUHEHE	082
09	BUTARO	04	KANYANGE	01	BUTARO	029
				03	CYASENGE	
10	CYERU	10	RUGENGABARI	01	GATENGA	030
11	NYAMUGALI	04	KIDOMO	03	RUTAGARA	045
		07	MUSHUBI	03	RUHANGA	008

10 INTARA YA BYUMBA

Code	District	Code	Sector	Code	Cell	ZD
01	VILLE DE BYUMBA	04	MUKARANGE	05	NYARUVUMU	009
03	KINIHIRA	09	GITOVU	01	CYASURI	009
				03	NGOMA	
		17	MURAMBI	05	RUSURA I	054
				06	RUSURA II	
04	BUNGWE	08	GISHAMBASHAYO	03	KARAMBO	030
				04	KILIMBI	
05	RUSHAKI	16	NYAGAKIZI	04	KIGARAMA	015

				05	KIRUHURA	
06	REBERO	05	GIHUKE	02	KUMUNINI	009
				03	MUREHE	
		12	NYAGIHANGA	02	MURAMBI	014
				01	KIBARE	
07	NGARAMA	08	MIMULI	04	CYABAYAGA B	008
				03	CYABAYAGA A	
08	HUMURE	04	GITEBWE	03	KANINGA	058
		09	MUHURA	05	RUGARAMA	019
09	RWAMIKO	12	KINJOJO	04	MATYAZO	022
				03	KASERUKENKE	
		13	KOME	03	KINUNGA	077

11 PROVINCE Y' UMUTARA

Code	District	Code	Sector	Code	Cell	ZD
03	KABARE	06	MUSHELI	12	UMUDUGUDU VI	012
05	RUKARA	02	GAHINI	06	UMWIGA	024
		07	MWIRI	01	CYANYABUGAHI	040
		09	NYAMIYAGA	02	NYAMIYAGA	069
06	MURAMBI	12	RWANKUBA	01	AKARAMBO	072
		13	RWIMITERERI	07	KINIGA	046
				04	KABEZA	
07	KAHI	10	NYAKIGANDO	02	KABAYA	012
				04	KANYEGANYEGE	
08	MUVUMBA	02	GASHENYI	03	GASHURA	038
		03	GATUNDA	04	NYANGARA	071
		04	KARAMA	05	NDEGO	002
				06	NYAKIGA	
		05	MUKAMA	01	BUKIRE	062
				06	RUGARAMA	

12 INTARA YA KIBUNGO

Code	District	Code	Sector	Code	Cell	ZD
01	VILLE DE KIBUNGO	02	KABARE I	04	NYAMAGANA	035
02	KIGARAMA	05	GASHANDA	02	NYAKABANDE	036
03	MIRENGE	06	KIBARE	03	GISHANDARO	031
				05	MUGATARE	

		09	MABUGA	02	AKABIRA	071
				09	NYARUHANGWA	
04	VILLE DE RWAMAGANA	02	MWULIRE	05	KABUYA	024
				06	KIGABIRO	
05	MUHAZI	03	GATI	08	UMUNANIRA	025
				05	NYAMABUYE	
06	KABARONDO	18	SHYOGO	04	RUGARI	026
07	CYARUBARE	04	KABARE II	09	RUBIMBA	024
		07	RWINKWAVU	02	NKONDO I	038
08	RUKIRA	05	MURAMA	03	NYAGASOZI	044
				04	NYAKABANGA	
10	RUSUMO	01	GAHARA	09	TARAYI	009
		05	KIGARAMA	13	NYANKURAZO I	108
		08	MUSAZA	11	NGANDA	052
		09	NYAMUGALI	13	BUKORA II	123
				12	BUKORA I	