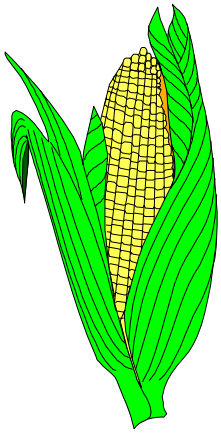
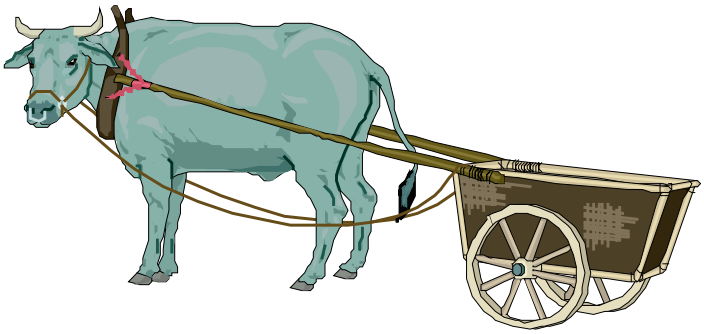
Republic of Zambia

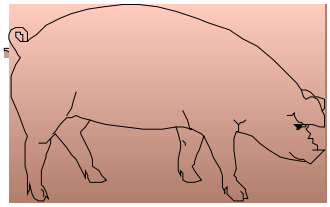
Central Statistical Office

AGRICULTURAL AND PASTORAL PRODUCTION

Structural Type and Post Harvest Data 2002/2003 For Small and Medium Scale Farmers







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Structural Type and Post Harvest Data For Small and Medium Scale Farmers

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Preface

Central Statistical Office (CSO) through the Agriculture and Environment Statistics Division conducts on annual basis sample surveys covering the Small and Medium Scale Farms Sub-sector of Agriculture. Similarly, information on all Large-Scale Farms is collected during the same period when the Small and Medium Scale Farms survey is being undertaken. The data collection activities on Small, Medium and Large Scale Farms are usually undertaken during the months of October and November of each year.

This report covers only the operations of the Small and Medium Scale Farmers in the country. Information contained in this report relates to the Agricultural Season, which commenced on 1st October 2002 and ended on 30th September 2003.

The analysis of agricultural households by type of agricultural activities is done in this report. The information presented includes, among other statistics: number of rural households and type of agricultural activity they are engaged in; crop production and input use, livestock and poultry rearing and use of draught animals and farm equipment.

I would like to thank the Ministry of Agriculture and Cooperatives (MACo), Food Security Research Project (FSRP) for their valuable technical and financial contribution towards the preparation and eventual undertaking of these statistical activities. In particular, I would like to thank members of staff in the Agriculture and Environment Division for having ably executed these statistical activities in a timely manner.

Last, but not least, we wanted to pay tribute to our respondents who have been supportive over the years.

Dr. Buleti G. Nsemukila
DIRECTOR OF CENSUS AND STATISTICS

December 2004

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Executive Summary

Below is a summary of the findings from the 2002/2003 Post Harvest Survey (PHS)

Demographic Characteristics of the Population

- There was increase in the number of rural agricultural households between the 2001/2002 and 2002/2003 agricultural seasons.
- There were more male than female-headed households recorded in both agricultural seasons.
- With regards to the age of the head, overall, there were more heads in the age group 24-35 and least in the age group 15-24.
- The survey indicates that more household heads reported to have completed Primary Education, with 62.1 percent reported at national level, followed by those with no education at 14.9 percent.
- The proportions of heads having completed various levels of education reduce progressively with increasing level of education, with only 0.1 percent having acquired Bachelors' and Higher Degrees.
- Southern Province recorded the highest proportion of males in polygamous marriages at 16.5 percent, followed by Eastern Province, with 12.0 percent. Polygamous marriages among the male household heads were less common in the highly urbanized provinces of Copperbelt and Lusaka, with 0.5 and 2.1 percent, respectively.
- In terms of agricultural activity, the highest proportion of rural households involved in agricultural activity during the 2002/2003 Agricultural Season undertook crop production.
- All provinces recorded more than 90 percent of households engaged in crop production with an exception of Lusaka Province with 87.1 percent. Eastern Province recorded the highest proportion of households that were engaged in crop production (97.7 percent).
- Southern Province recorded the highest proportion of households involved in livestock rearing and in poultry production (48.2 percent and 86.8 percent respectively.
- Of the total number of household heads who earned income from labor wages, 82.2 percent were male and 17.8 percent were female.
- Copperbelt Province recorded more male (91.1 percent) and Western more female (27.2 percent) household heads that earned income from labor wages.

Agricultural Activities

- An estimated 1,021,128 rural agricultural households were engaged in some agricultural activity of one type or another.
- Out of the estimated 812,945 rural agricultural households, 94.9 percent were engaged in crop growing, 32.3 percent were raising livestock, while 73.1 percent were engaged in poultry production.

Maize Production

- An estimated 760,515 households were reported to have grown maize during the 2002/2003 agricultural season compared to 648,050 households during the 2001/2002 agricultural season.
- This represents a 17.4 percent increase in the number of households reporting to have grown maize.
- The total area planted to maize during the 2001/2002 agricultural season was estimated at 581,982 hectares compared to 646,450 hectares during the previous season. This represents a decline of 10.0 percent.
- However, despite a decline in area planted, the quantity of maize produced increased to 869,964 metric tonnes compared to 664,116 metric tonnes during the 2002/2003 agriculture season. This was an increase of 31.0 percent.

Sorghum Production

- According to the findings 86,388 households were reported to have grown sorghum during the 2002/2003 agricultural season compared to 66,705 households during the 2001/2002 agricultural season. This represents an increase of 30.0.
- The total area planted to sorghum during the 2002/2003 agricultural season was estimated at 44,257 hectares compared to 33,872 hectares during the previous season. This represents an increase of 30.7 percent.
- Production of sorghum increased to 27,895 metric tonnes compared to 18,639 metric tonnes. This was an increase of 49.7 percent.

Rice Production

- During the 2002/2003 season, 34,895 households reported to have grown rice compared to 33,864 households during the 2001/2002 agricultural season. This represents an increase of 3.1 percent.
- The total area planted to rice during the 2002/2003 agricultural season was estimated at 11,869 hectares compared to 13,050 hectares during the previous season. This represents a decrease of 9.1 percent.
- The quantity of rice produced decreased to 14,703 metric tonnes compared to 19,210 metric tonnes the previous season. This was a decrease of 23.5 percent.

Millet Production

- An estimated 130,331 households reported to have grown millet during the 2002/2003 agricultural season compared to 133,881 households during the 2001/2002 agricultural season. This represents a decrease of 2.7 percent.
- The total area planted to millet during the 2002/2003 agricultural season was estimated at 58,055 hectares compared to 61,347 hectares during the previous season. This represents a decrease of 5.4 percent.
- The quantity of millet produced was 35,463 metric tonnes compared to 40,282 metric tonnes. This was a decrease of 12.0 percent.
-

Cassava Production

- About 377,765 households reported to have grown cassava during the 2002/2003 agricultural season compared to 343,616 households during the 2001/2002 agricultural season. This represents an increase of 9.9 percent.
- The total area under cassava during the 2002/2003 agricultural season was estimated at 228,199 hectares compared to 278,759 hectares during the previous season. This represents a decrease of 18.1 percent.
- The quantity of cassava produced decreased to 189,253 metric tonnes compared to 282,331 metric tonnes. This was a decrease of 33.0 percent.

Groundnut Production

- On the other hand, an estimated 336,194 households reported to have grown groundnuts during the 2002/2003 agricultural season compared to 372,498 households during the 2001/2002 agricultural season. This represents a decrease of 9.8 percent.
- The total area under groundnuts during the 2002/2003 agricultural season was estimated at 114,325 hectares compared to 139,015 hectares during the previous season. This represents a decrease of 17.8 percent.
- The quantity of groundnuts harvested decreased to 67,412 metric tonnes from 75,781 metric tonnes. This was a decrease of 11.0 percent.

Soya bean Production

- A total of 21,197 households reported to have grown soya beans during the 2002/2003 agricultural season compared to 17,190 households during the 2001/2003 agricultural season. This represents an increase of 23.3 percent.
- The total area under soya beans during the 2002/2003 agricultural season was estimated at 8,599 hectares compared to 6,820 hectares during the previous season. This represents an increase of 26.18 percent.
- The quantity of soya beans harvested increased to 9,051 metric tonnes from 3,348 metric tonnes. This was an increase of 170.0 percent.

Fertilizer Acquisition

- Out of 968,788 crop-growing agricultural households, 202,950 (21 percent) acquired fertilizers using various modes or channels acquisition.
- The majority of these households (49.7 percent) procured their fertilizers from commercial dealers.
- An estimated 22,378 metric tonnes of basal and 22,522 top dressing fertilizers was acquired during the 2002/2003 Agricultural Season.
- Most of the households obtained fertilizers within 10 kilometers of the their homesteads, that is 58.3 percent.
- All the modes or channels of acquisition reported more than 54 percent of farmers obtaining these fertilizers on time.

Fertilizer and Lime Application

- Approximately 22,475 and 23,497 metric tonnes of basal and top dressing fertilizers, respectively, were applied to crops nationwide.
- Eastern, Central and Southern provinces had the highest quantities of fertilizers applied to crops, more than 20 percent each.
- Most of the fertilizers were applied to maize fields with 94.6 percent for basal and 96.4 for top dressing fertilizers at national level.
- A total of 1,091 metric tonnes of lime was applied to various crops.
- Southern and Central provinces applied most of the lime with each reporting more than 30 percent of the total quantity lime.
- A large amount of lime was applied to maize fields, that is 87.5 percent of the total at national level.

Main Tillage Methods Used

- At national level, in 40.4 percent of all the maize fields, the main tillage method used was ploughing while in 34.7 percent of the maize fields conventional hand hoeing was used. Pot holing and zero tillage methods combined were recorded in 6.4 percent of the total maize fields.

Livestock Production

- At national level, the households raising cattle declined by 14 percent and cattle population declined by 22 percent countrywide.
- Of the total cattle raised, 5.6 percent was sold for cash at national average price of K523, 120.
- A 3.4 percent increase in households raising Goats was recorded countrywide.
- Eastern Province contributed about 60 percent of the total Goats owned.
- Of the 75
- The total number of Goats raised at the end of the season was estimated at 415,665.
- This was 18.9 percent less than the number that was raised at the beginning of the season (512,819).

- A total number of 176, 786 households were estimated to have raised 1,206,642 goats at the beginning of the season as compared to 1,083,162 at the end of the Agricultural Season. During the season, the goat population declined by 10.2 percent.

- The number of households raising sheep was estimated at 9,096. At the end of the season an estimate number of 35,426 sheep were raised. The population of sheep reduced by 26.1 percent over the season.

- A total number of 1,425 households were estimated to have raised donkeys in the 2002/2003 Agricultural Season. The number of donkeys raised at the end of the season was estimated at 3,936. Southern Province had the highest and accounted for 47.6 percent of the total number of donkeys raised.

- Of the 588,621 households that reported raising chickens, 22.7 percent were in Eastern Province while 14.8 percent were in Southern Province. Lusaka Province had the least number of households (11,339 or 1.9 percent of the national total) raising poultry.

Crop Rotation

- The findings in the 2002/2003 Post-Harvest Survey have shown that not many small and medium scale farmers have practiced crop rotation.
- Only about 30.6% of crop growing households at national level reported to have practiced crop rotation.

Agro-forestry and Irrigation

- In the case of agro-forestry and irrigation of maize fields very few small and medium scale farmers reported to have practiced them.
- At national level, about 3.6% reported to have practiced agro-forestry, and about 2.1% reported to have practiced irrigation of maize fields.

Main Power Sources used for tillage

- In the case of agro-forestry and irrigation of maize fields very few small and medium scale farmers reported to have practiced them.
- The predominant power sources used among small and medium scale farmers for preparing their fields was manual power that is human power.
- The other power sources used most were own animal power and hired or borrowed animal power.
- At provincial level, the largest proportion of households using manual power for tilling their fields was reported in Luapula Province followed by Northern Province.
- Southern Province reported the largest proportion of households that used own animals for tilling their fields; and was followed by Western Province.

CHAPTER 1: BACKGROUND

1.0 Introduction

The Post-Harvest Survey covering the 2002/2003 Agricultural Season was conducted during the last two weeks of June, 2004 and the first week of July, 2004. The information collected and presented in this report refers to the Agricultural Season, which started on 1st October 2002 and ended on 30th September 2003. The survey was not undertaken during the month of October and November due to logistical problems. The 2002/2003 Post-Harvest Survey was the eleventh to be conducted after the 1990/92 National Census of Agriculture.

At the time of questionnaire design, the questionnaire content was revised in such a way that information was to be collected field wise instead of crop wise. The main reason being that it is easier to quantify inputs applied to each field. This was a major departure from the previous data collection methodology in that agricultural production was better quantified with the inputs purchased and applied.

Over the period during which the Post-Harvest Surveys have been conducted, the survey questionnaire has undergone several major revisions. The purpose has been to capture relevant data , and keep abreast with the changes occurring in the agricultural sector.

1.1 Objectives of the Post-Harvest Survey (PHS)

The **general objectives** for the Post-Harvest Survey (PHS) which is undertaken annually include:

(i) Provision of annual agricultural data that helps to facilitate comprehensive analysis of the agricultural sector's contribution to the national economy, on annual basis;

(ii) Development of the Agricultural Statistics Management Information System (ASMIS) to a level such that it accommodates advances in information technology; and,

(iii) Provision of annual agricultural data that is useful for generation of performance indicators to facilitate interventions by government, donors and NGOs.

Specifically, the objectives of the survey include:

(a) Provision of actual figures pertaining to:
- Area planted to individual crops;
- Production quantities;
- Sales of produce and income realized;
- Purchase and use of agricultural inputs;
- Capital formation and other operational expenses;
- Demographic characteristics of heads of rural households;
- Farming practices and soil conservation methods used;
- Access to agricultural loans; and,
- Access to market prices information and agricultural extension services in general.

(b) To enhance the capacities and analysis of agricultural data in the Central Statistical Office (CSO) and Ministry of Agriculture and Cooperatives (MACO). This is done through training and involvement of staff, at various levels, in survey data management.

(c) Development of appropriate survey instruments for collecting post-harvest and other agricultural data.

CHAPTER 2: CONCEPTS AND DEFINITIONS

2.0 Introduction

The following concepts and definitions were used in collection of the PHS data for the 2002/2003 Agricultural Season. Generally, the standard concepts and definitions as articulated by Food and Agriculture Organisation (FAO) have been used in the agriculture surveys. However, some of these concepts and definitions have been modified to suit the Zambia local conditions.

2.1 General Concepts

Qualified Respondent is an adult member of the household, who is knowledgeable about its crops, livestock, and poultry. The qualified respondent may however consult any other member of the household on different items in the questionnaire.

Household consists of a group of people who normally live and eat together. These people may or may not be related by blood, but make common provision for food or other essentials for living and they have only one person whom they all regard as head of household. It may also consist of one member. A household normally occupies the whole of a housing unit or live in closely related premises.

Agricultural Household is a household in which at least one member is carrying out some agricultural activity (defined below) on the holding belonging to the household.

Agricultural Activity is the growing of any crop and/or raising of livestock and/or raising of poultry and/or fish farming.

Head of Household is a person who is considered to be the head by the members of the household.

Holding is all land wholly or partly operated for agricultural purposes such as growing crops and/or raising livestock and/or raising poultry for production under a single technical management. A holding may consist of one or more parcels (defined below) located in one or separate areas, the parcels share the same means of production e.g., labour.

Holder is a person who exercises management control over the operations of the holding. Usually there is one holder in a household that is engaged in agricultural activity, who may or may not be the head of the household.

Parcel is an undivided block of land in the holding, which is entirely surrounded, by land and/or water that does not belong to the same holding. It may contain one or several fields growing one or different crops, or it may be left idle or fallow, or it may be under pasture.

Field is a piece of land usually cultivated with one crop at a time. In some cases, a number of different crops (mixture) may be grown in a single field at the same time.

Mixed Cropping is a cultivation practice whereby two or more different temporary or permanent crops (but not temporary and permanent crops) are grown simultaneously in the same field.

Inter- cropping is a cultivation practice whereby a crop is planted between the rows of another crop, e.g., sorghum between cotton rows, or sorghum between groundnuts rows, or groundnuts between maize rows.

Area under Mixed Crops is the area of the field in which two or more crops are grown almost simultaneously.

Agricultural Season Zambia's Agricultural Season extends from 1st October of one year to 30th September of the following year.

Adult member refers to persons who are aged 12 years and above.

Land Preparation refers to all activities such as clearing the land, tree stumping, ploughing, etc.

Animal Draught refers to the use of animals such as oxen and donkeys, used in carrying out tasks like land preparation, planting, weeding, etc.

Mechanical Power refers to the use of tractors, bulldozers, hand tractors, etc., in any agricultural activity.

Bunding involves forming mounds in the field, i.e., piling up masses of earth over the whole field in order to reduce the rate of flow of rainwater.

Fallowing is a soil conservation method in which a piece of land is ploughed but not sown or planted with any crop.

Recycled seed refers to hybrid seed which when sown in one season, the seed for the following season is obtained from the season's harvest of the crop.

Local seed refers to traditional and indigenous seed.

Hybrid seed refers to improved seed varieties.

2.2 General Definitions

2.2.1 Crops, Fruits and Vegetables

Mixed beans include all kinds of beans except soybeans and ground (round) beans.

Cassava is brought to the market in several forms, i.e., tuber, chips, and flour. For statistical reporting, only one form is adopted as the standard form and that is cassava flour. Accordingly, quantities of production and sales of cassava relate to cassava flour.

Seed-cotton production and sales is recorded in seed-cotton form in kilograms. Where the quantity is reported in bales/woolsacks, it is converted to kilograms before recording.

Groundnuts are brought to the market in shelled as well as unshelled form. For statistical reporting, the concept of shelled groundnuts is adopted.

Maize production and sales is recorded in dried grain form.

Rice production and sales relate to paddy, (i.e., rice in husk).

Millet includes bulrush and finger millet. Their production and sales are recorded in threshed dried grain form.

Sorghum production and sales are recorded in threshed grain form.

Soybeans production and sales are recorded in dried seed form.

Cow peas production and sales are recorded in dried seed form.

Ground beans production and sales are recorded in dried seed form.

Sunflower production and sales are recorded in dried seed form.

Tobacco (Burley/Virginia)	production and sales relate to cured tobacco in kilograms.
Irish/Sweet (Potatoes)	production and sales are recorded in kg.
Fruits	include oranges, tangerines and mandarins, grapefruit and lemons, bananas, pineapples, mangoes, etc.
Vegetables	include all leafy crops e.g., cabbage, rape, onions, tomatoes, carrots, etc. Green maize, fresh groundnuts, fresh ground (round) beans is also included under vegetables.
Wheat	production and sales are recorded in dried grain form.

2.2.2 Livestock and Poultry

Livestock	include cattle, Goats, goats, sheep, and donkeys.
Cattle	include bulls, oxen, tollies, cows, heifers, and calves.
Bulls	bulls are uncastrated adult male cattle.
Oxen/Tollies	are castrated male cattle.
Cows	are female cattle that have given birth at least once. This includes female cattle that have not yet given birth but are beyond the stage of being termed heifers, i.e., they are infertile.
Heifers	are female cattle that have not yet given birth and have not reached the stage of being termed cows.
Calves	are both male and female cattle that are not yet weaned.
Poultry	include chickens, ducks, geese, pigeons, guinea fowls, and turkeys.
Chickens	include cocks, cockerels, hens, pullets, and chicks.

CHAPTER 3: SURVEY METHODOLOGY AND ORGANISATION

3.0. Introduction

This chapter covers issues pertaining to sample design, questionnaire content, field supervision and data processing. All rural districts in the country were covered for the 2002/2003 Post-Harvest Survey. Coverage in the districts was based on a sample. Data collection activities took place during the period December 2002 and January 2003. The information was solicited using personal interviews with the qualified respondents with the selected households in the sample areas known as Standard Enumeration Areas (SEAs). This survey covered small and medium scale farms.

3.1. Sample Design

The sampling frame of Standard Enumeration Areas (SEAs) was constructed using the results from the 2000 Census of Population and Housing. Within each district, the SEAs were stratified by predominant crop in order to ensure a representative sample for each crop. The SEAs were then sorted by geographic codes to ensure that geographical distribution of the sample SEAs is also representative. The sampling frame included all rural SEAs. In addition, urban SEAs, which had 70% or more agricultural households according to the Census, were included in the frame.

A two-stage sample scheme was adopted. At the first stage, an allocated proportional number in each province and district was selected using Probability Proportional to Size (PPS) selection procedure. The measure of size was the number of agricultural households (as listed in the Census) in each SEA.

A sample of 410 SEAs was selected from a total of 12,789 SEAs.

3.2. Household Sample

The household was the second stage-sampling unit. First all households in each sample SEA were listed and agricultural households were identified. To improve the precision of the survey estimates, the agricultural households were stratified into three (3) categories- A, B and C, based on total area under crops, presence of some specified crops and on numbers of cattle, Goats, goats and checked raised. A number of households were selected from each category using systematic random sampling method, coming up with a total of twenty (20) sample households in each sample SEA.

3.3. Questionnaire Design and Content

The 2002/2003 PHS questionnaires were used to collect information on the following:

- Name of the village/locality;
- Household serial number (assigned by the Enumerator during listing);
- Name of the head of household;
- Sex and age of head of household;
- Household population, i.e., number of members of households by sex and age;
- Type of agricultural activity the household is involved in;
- Fertilizer acquisition and use;
- Crop production and sales;
- Vegetable and fruit production and sales;
- Livestock and poultry production and marketing;
- Household Production Assets/implements;
- Food purchases and food aid/relief for home consumption;
- Health and deaths: past 3 months and past five years;
- Crop Management - input application and tillage methods;
- Crop rotation and irrigation.

3.4. Field Supervision

The Central Statistical Office (CSO) comprises four (4) divisions operationally by subject matter area. Among these Divisions is the Agriculture and Environment Division. The Agriculture and Environment Division was responsible for planning and execution of the 2002/2003 Post-Harvest Survey.

The Regional Statistician in each province oversaw the fieldwork. The provincial head was assisted by a number of supervisors. The overall field work force was 9 Regional Statisticians, 9 Provincial Statistical Officers, 40 supervisors and 204 enumerators. Besides the provincial staff, Master Trainers assisted in the supervision of fieldwork. These were drawn from CSO and MACO –Policy and Planning Division (PPD).

3.4.1: Training

Professional officers from both CSO and MACO-PPD conducted training of supervisors and enumerators. Regional Statisticians/Provincial Statistical Officers assisted them in the task. The master trainers played a major role in the training of staff. The training of supervisors and enumerators were done jointly.

3.4.2: Transport

There were, on average, three vehicles for use on the survey in each province. Where the fleet of CSO's motor vehicles, were inadequate it was supplemented through borrowing from the Department of Agriculture and Cooperatives (Field Services) and from other Government Departments in the provinces/districts. Such an arrangement facilitated successful completion of the survey.

3.5. Data Processing and Analysis

Supervisors and some enumerators based at provincial headquarters edited the questionnaires. The edited questionnaires were entered on microcomputers using a software package known as CS pro. Data capturing was accomplished at each provincial centre. Initial computer data processing was done at the provincial headquarters using CS pro software. Staff in Agriculture and Environment Division based at CSO headquarters did further data computer processing.

Consistency checks on the output of the raw data, with reference to the source documents, were applied before final weighted tables at district and provincial levels were produced. The software used for analysis was Statistical Package for Social Sciences (SPSS), while Microsoft Excel was used for data tabulation.

CHAPTER 4: GENERAL CHARACTERISTICS OF SURVEYED AGRICULTURAL HOUSEHOLDS

4.0. Introduction

This chapter presents characteristics of the households that completed interviews during the 2002/2003 Post Harvest Survey (PHS). The first part of the chapter presents demographic characteristics of agricultural household heads, such as their sex, age, and marital and educational status.

The second part of the chapter presents agricultural activities of these households such as crop production, livestock rearing and so on. It further presents the agricultural household heads that reported earning income from labour wages by engaging in other activities than agriculture productivity. The last part covers highlights of the chapter.

4.1. Demographic Characteristics

4.1.1. Household Heads by Sex

There was an estimated 1,021,128 rural households engaged in agricultural activities during the 2002/2003 Agricultural Season. This is an increase over the 812,945 households reported in the 2002/2003 Agricultural Season.

Out of the 1,021,128 households reported in the 2002/2003 season, 788,283 were male headed and 232,845 were female-headed, representing 77.2 and 22.8 percent, respectively.

Figure 4.1:Percentage Distribution of Households by Sex of Head, Total Zambia, 2001/2002 and 2002/2003

The proportion of male-headed households increased from 75.3 percent in the previous season to 77.2 percent in the 2003/2004 season, while the female headed households reduced to 22.8 percent in the 2002/2003 season from 24.7 in the 2002/2003 season.

All provinces recorded more male-headed agricultural households, above 60 percent. The percentage of female-headed households was less than 30 percent in all provinces except for Western Province with 33.0 percent.

Table 4.1: Households by Sex of Head and Province, 2002/2003

Province	Male	Female	Total Percent	Total Households
Central	81.7	18.3	100.0	108,918
Copperbelt	81.4	18.6	100.0	66,909
Eastern	74.5	25.5	100.0	225,047
Luapula	85.9	14.1	100.0	106,785
Lusaka	75.8	24.2	100.0	18,875
Northern	80.7	19.3	100.0	191,915
N/Western	74.5	25.5	100.0	74,290
Southern	73.5	26.5	100.0	122,341
Western	67.0	33.0	100.0	106,048
Zambia Total	**77.2**	**22.8**	**100.0**	**1,021,128**

Others Provinces with large proportions of female-headed households were Southern with 26.5 percent and Eastern and North-Western Provinces, each with 25.5 percent. The least proportion of female-headed households was recorded in Luapula Province at 14.1 percent.

4.1.2. Household Heads by Age and Sex

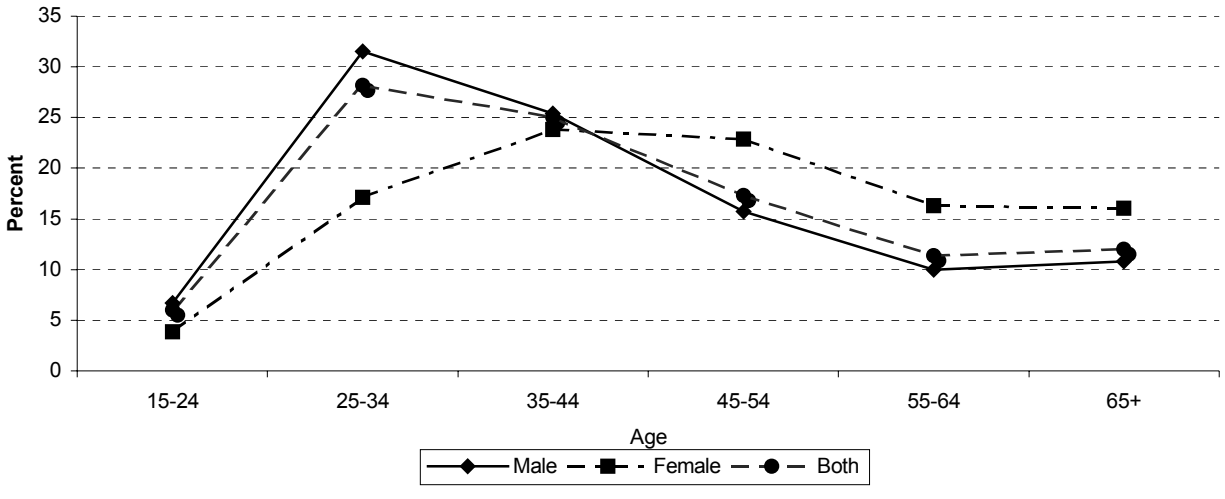
Overall, there were more household heads reported in the age group 25-34, at 28.2 percent, followed by the age group 35-44 at 25 percent. The lowest proportion of household heads was reported in the age group 15-24, with only 6 percent.

Table 4.2: Percentage Distribution of Households by Age of Head and Province, 2002/2003

Province	15-24	25-34	35-44	45-54	55-64	65+	Total
Central	5.0	26.5	29.4	15.9	12.5	10.6	100
Copperbelt	3.2	26.7	21.7	18.4	18.8	11.3	100
Eastern	7.4	31.1	22.2	16.4	10.4	12.5	100
Luapula	5.1	26.7	26.8	21.2	9.4	10.9	100
Lusaka	1.6	23.5	30.9	17.6	11.7	14.7	100
Northern	8.5	29.5	21.6	16.3	12.0	12.2	100
N/Western	6.1	23.5	31.6	17.8	8.4	12.6	100
Southern	6.1	27.5	28.4	17.2	10.8	10.0	100
Total Zambia	**6.0**	**28.2**	**25.0**	**17.3**	**11.4**	**12.0**	**100**

All provinces recorded less than 10 percent in the age group 15-24 with Lusaka Province recording the lowest proportion of only 1.6 percent.

Figure 4.2: Percentage Distribution of Household Heads by Age and Sex, Total Zambia 2002/2003



The distribution of male household heads by age group follows a similar trend as that reported at national level, with the largest proportion in the age group 24-35 with 31.5 percent, followed by the age group 35-44 with 25.4 percent. The age group with the lowest proportion of male household heads was 15- 24, with 6.7 percent. The trend for female household heads, however, shows a slight variation, with more female heads in the 35-44 age group, recording 23.8 percent, followed by the age group 45-54 with 22.9 percent.

Overall there are more male heads in the lower age groups ranging 15-44 but more female heads in the higher age groups, 45-65 years and above.

4.1.3. Educational Status of Household Heads

Overall there were more household heads reported to have completed Primary education, with 62.1 percent reported at national level. This category is followed by those with no education, at 14.9 percent and then those who reported having completed Junior Secondary, at 12.6 percent. The proportion of heads having completed various levels reduce progressively, with increasing levels of education, with only 0.1 percent agricultural household heads having acquired Bachelors' and Higher Degrees.

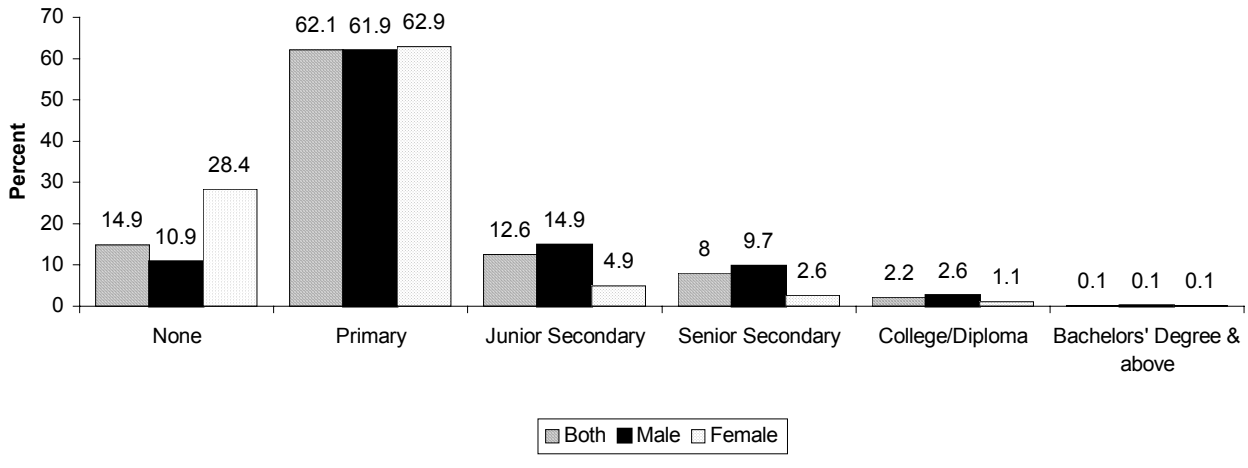
Table 4.3: Percentage Distribution of Household Heads, by Educational Level Completed and Province, 2002/2003

Province	None	Primary	Junior Secondary	Senior Secondary	College/ Diploma	Bachelors Degree & above	Total
Central	8.5	65.2	14.6	9.6	1.9	0.2	100
Copperbelt	11.2	52.6	13.2	18.8	4.0	0.1	100
Eastern	23.1	59.5	10.2	5.5	1.8	0.0	100
Luapula	11.5	61.2	17.0	7.9	2.2	0.2	100
Lusaka	11.5	50.6	13.3	16.7	6.7	1.2	100
Northern	9.9	68.7	13.7	6.0	1.7	0.0	100
N/Western	16.9	56.0	13.7	9.1	4.2	0.1	100
Southern	10.1	68.2	10.6	9.0	1.9	0.2	100
Western	23.7	58.7	9.9	5.8	1.7	0.2	100
Zambia Total	**14.9**	**62.1**	**12.6**	**8.0**	**2.2**	**0.1**	**100**

Analysis by province shows that all provinces recorded more than 50 percent of the household heads as having completed primary school education. Western and Eastern Provinces recorded the highest proportion of household heads with no education, with 23.7 and 23.1 percent respectively.

The more urbanized provinces of Copperbelt and Lusaka recorded the highest proportions of heads that reported having completed Senior Secondary and College Education levels.

Figure 4.3:Percentage Distribution of Household Heads by Educational Level Completed and Sex, 2002/2003



With regards to sex disagregation, there were no marked differences between male and female household heads that reported completing Primary Education, though there were slightly more female, at 62.9 percent, compared with male, at 61.9 percent. There was equally a higher percentage (28.4) of female heads with no education compared with the male heads (10.9 percent). However, more male than female heads were reported to have completed the higher levels of Junior Secondary and above.

Generally, there was a smaller proportion of household heads that completed higher levels of education (Junior Secondary and above), than those who completed primary education.

4.1.4. Marital Status of Household Head

Table 4.3 shows the proportion of male household heads by marital status and province. It shows that there were more male household heads that were married, than those who were either single, divorced, widowed or separated. The proportion of household heads that were either single, divorced, widowed or separated was less than 3.3 percent in all provinces.

Overall, there was a higher proportion of male household heads that were in monogamous marriages compared to those in polygamous marriages. Although there was no significant difference among the provinces in terms of the proportions of males who were in monogamous marriages, Southern Province recorded the lowest proportion of monogamously married male household heads, with 76.2 percent.

Table 4.4: Percentage Distribution of Male Household Heads by Marital Status and Province, 2002/2003

Province	Single	Monogamously Married	Polygamously Married	Divorced	Widowed	Separated	Total Percentage
Central	3.9	89.5	2.3	1.2	1.8	1.3	100.0
Copperbelt	5.7	87.4	0.5	3.0	2.4	1.1	100.0
Eastern	1.4	83.0	12.0	1.3	1.6	0.6	100.0
Luapula	1.3	91.5	5.8	0.4	0.7	0.2	100.0
Lusaka	2.2	91.6	2.1	1.5	1.8	0.8	100.0
Northern	1.7	88.8	8.0	0.4	0.6	0.5	100.0
N/Western	1.8	90.2	4.6	0.6	2.3	0.4	100.0
Southern	2.5	76.2	16.5	2.3	2.2	0.2	100.0
Western	3.9	89.0	2.9	1.6	1.5	1.2	100.0
Zambia Total	**2.4**	**86.6**	**7.6**	**1.2**	**1.5**	**0.6**	**100.0**

Southern Province, however, recorded the highest proportion of males in polygamous marriages at 16.5 percent, followed by Eastern Province, with 12.0 percent. Polygamous marriages among the male household heads were less common in the highly urbanized provinces of Copperbelt and Lusaka, with 0.5 and 2.1 percent, respectively. Copperbelt Province had the highest proportion of single and divorced male household heads, than any other province.

In the case of female heads of households, there were fewer who were in marriage. Instead, they were either widowed or divorced, with proportions of 46.6 and 21.7 percent, respectively. The proportion of the widowed female household heads was more than two times higher than that of the divorced category.

Table 4.5: Percentage Distribution of Female Heads of Households by Marital Status and Province, 2002/2003

Province	Single	Monogamously Married	Polygamously Married	Divorced	Widowed	Separated	Total Percentage
Central	6.0	11.9	3.0	12.7	64.0	2.5	100.0
Copperbelt	12.0	3.0	3.2	18.9	60.8	2.1	100.0
Eastern	2.3	4.0	18.4	17.1	50.9	7.3	100.0
Luapula	5.8	2.0	1.6	41.6	46.2	2.9	100.0
Lusaka	12.3	4.4	5.6	23.8	45.9	7.9	100.0
Northern	12.3	6.8	18.6	14.6	44.6	3.1	100.0
N/Western	6.7	2.6	10.0	48.4	28.9	3.2	100.0
Southern	3.4	3.7	23.0	14.4	48.3	7.1	100.0
Western	24.9	3.4	10.2	26.2	34.9	0.4	100.0
Zambia Total	**9.1**	**4.7**	**13.7**	**21.7**	**46.6**	**4.3**	**100.0**

Central Province had the highest proportion of monogamously married female heads with 11.9 percent. In the category of polygamously married female heads, Southern province recorded the highest proportion of 23.0 percent, followed by Northern and Eastern provinces with 18.6 and 18.4 percent, respectively.

Western Province had the highest proportion of single female household heads with 24.9 percent, followed by Lusaka and Northern provinces, recording 12.3 percent each.

4.2. Agricultural Activity and Income from Labour Wages

4.2.1. Type of Activity

During the 2002/2003 Agricultural Season, the highest proportion of rural households involved in agricultural activity undertook crop production. Almost 95 percent of households were engaged in crop production, about 73 percent in poultry rearing, 32.3 percent livestock rearing and only 1.2 percent in fish farming. Refer to Table 4.6 for details.

Table 4.6: Rural Households by Type of Agricultural Activity, 2002/2003

Province	Household Reporting	Type of Agricultural Activity			
		Crops	Livestock	Poultry	Fish Farming
Central	108,918	93.2	31.2	80.7	2.1
Copperbelt	66,909	94.5	9.5	64.9	0.5
Eastern	225,047	97.7	42.1	70.9	0.9
Luapula	106,784	92.2	21.7	67.2	0.7
Lusaka	18,876	87.1	26.1	63.7	0.7
Northern	191,915	95.1	32.6	80.6	2.5
N/Western	74,290	94.9	20.1	61.5	0.9
Southern	122,342	94.9	48.2	86.8	0.2
Western	106,048	94.5	28.7	61.1	1.2
Zambia Total	**1,021,128**	**94.9**	**32.3**	**73.1**	**1.2**

All provinces recorded more than 90 percent of households engaged in crop production with an exception of Lusaka Province with 87.1 percent. Eastern province recorded the highest proportion of households that were engaged in crop production at 97.7 percent.

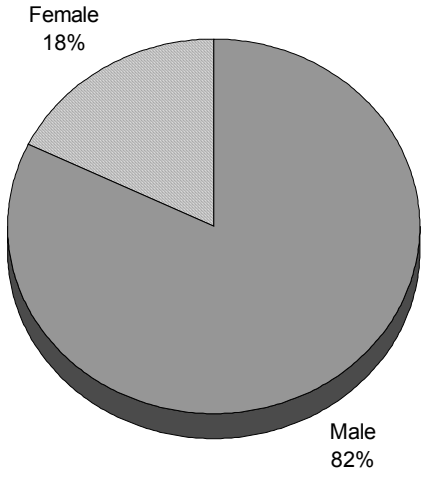
Southern Province recorded the highest proportion of agricultural households involved in livestock rearing with 48.2 percent and in poultry production, with 86.6 percent. Central and Northern Provinces also had high proportions of households that were engaged in poultry raising with 80.7 and 80.6 percent, respectively.

All provinces recorded negligible percentages of households involved in fish farming, at less than three percent. Central, Northern and Western provinces recorded more that one percent of households involved in fish farming with 2.1, 2.5 and 1.2 percent, respectively. While Southern province had a large proportion of households involved in other agricultural activities, it had the least households involved in fish farming.

4.2.2. Income from Labour wages

The survey collected information on households that earned money from labor wages. There was an estimated 312,428 households that earned income from labor wages, out of a total of 1,021,128 agricultural households.

Figure 4.4: Percentage Distribution of Households Earning Income from Labour Wages by Sex of Head, Total Zambia, 2002/2003



Of the total number of households who earned income from labour wages, 82.2 percent were male headed and 17.8 percent were female headed.

All the provinces, with the exception of Western and Eastern recorded more than 80 percent of male-headed households who earned income from labour wages.

Table 4.7: Households Earning Income from Labour Wages by Sex of Head, 2002/2003

Province	Male	Female	Total Percent	Households Earning Income from Labour Wages	Total Households
Central	85.9	14.1	100	31,869	108,918
Copperbelt	91.1	8.9	100	23,682	66,909
Eastern	78.4	21.6	100	73,923	225,047
Luapula	87.8	12.2	100	42,803	106,785
Lusaka	82.0	18.0	100	7,051	18,875
Northern	82.7	17.3	100	52,504	191,915
N/Western	81.9	18.1	100	17,615	74,290
Southern	80.4	19.6	100	36,619	122,341
Western	72.8	27.2	100	26,362	106,048
Zambia Total	**82.2**	**17.8**	**100**	**312,428**	**1,021,128**

While Copperbelt Province had the highest proportion of male-headed households who earned income from labor wages with 91.1 percent of male-headed households in the province, Western and Eastern Provinces had the highest proportions of female-headed households, with 27.2 and 21.6 percent, respectively.

4.3. Summary of Findings

There was increase in the number of rural agricultural households between the 2001/2002 and 2002/2003 agricultural season. There were more male than female-headed household recorded in both agricultural seasons. With regards to the age of the head, overall there were more heads in the age group 24-35 and least in the age group 15-24.

The survey indicates that more household heads reported to have completed Primary education, with 62.1 percent reported at national level, followed by those with no education at 14.9 percent. The proportions of heads having completed various levels reduce progressively, with increasing level of education, with only 0.1 percent having acquired Bachelors' and Higher Degrees.

Southern Province recorded the highest proportion of males in polygamous marriages at 16.5 percent, followed by Eastern Province, with 12.0 percent. Polygamous marriages among the male household heads were less common in the highly urbanized provinces of Copperbelt and Lusaka, with 0.5 and 2.1 percent, respectively.

In terms of agricultural activity, the highest proportion of rural households involved in agricultural activity during the 2002/2003 Agricultural Season undertook crop production. All provinces recorded more than 90 percent of households engaged in crop production with an exception of Lusaka province with 87.1 percent. Eastern province recorded the highest proportion of households that were engaged in crop production. Southern Province recorded the highest proportion of households involved in livestock rearing and in poultry production.

Of the total number of household heads who earned income from labour wages, 82.2 percent were male and 17.8 percent were female. Copperbelt Province recorded more male and Western more female household heads that earned income from Labour Wages.

CHAPTER 5: CROP PRODUCTION

5.0. Introduction

Small and Medium Scale Agriculture is dominated by the production of crops for two main reasons namely: as a source of livelihood, and as a source of income through marketed produce. As shown in the section on distribution of rural households by activity, over 95 percent of the rural households were engaged in crop production during the 2002/2003 Agriculture season. The crops grown by this sub-sector of agriculture include food and cash crops. The information in this report excludes large-scale farmers.

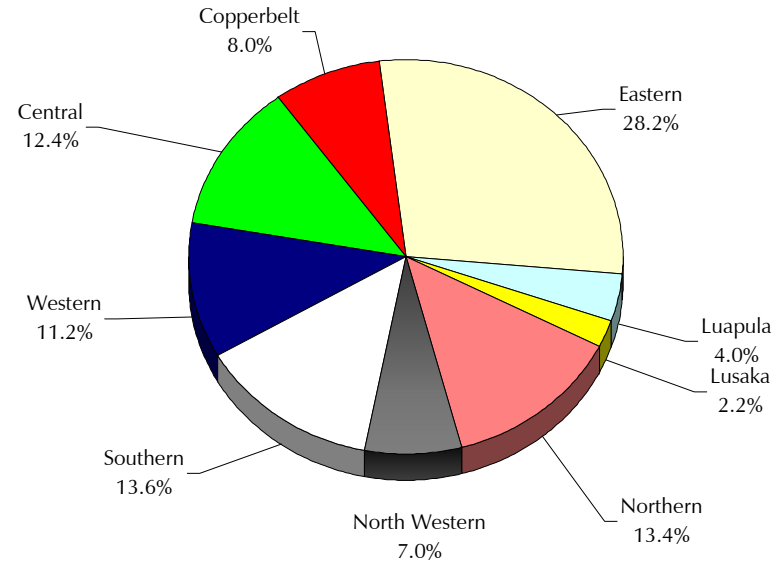
5.1. Maize

Maize is the most important staple food crop in Zambia. Despite being a staple food, it also serves as a source of income for households through marketing the surplus.

There were 760,515 households that reported to have grown maize during the 2002/2003-agriculture season compared to 648,050 households during the 2001/2002-agriculture season. This represents a 15.0 percent increase in the number of households reporting to have grown maize.

The largest number of households that grew maize was in Eastern Province contributing 28.2 percent of the total maize-growing households. Southern Province accounted for 13.6 percent of the total maize-growing households. Northern and Central provinces recorded 13.4 and 12.4 percent, respectively. Less than 10 percent of rural agricultural households were engaged in maize growing in each of the following provinces: Copperbelt, North Western, Lusaka and Luapula.

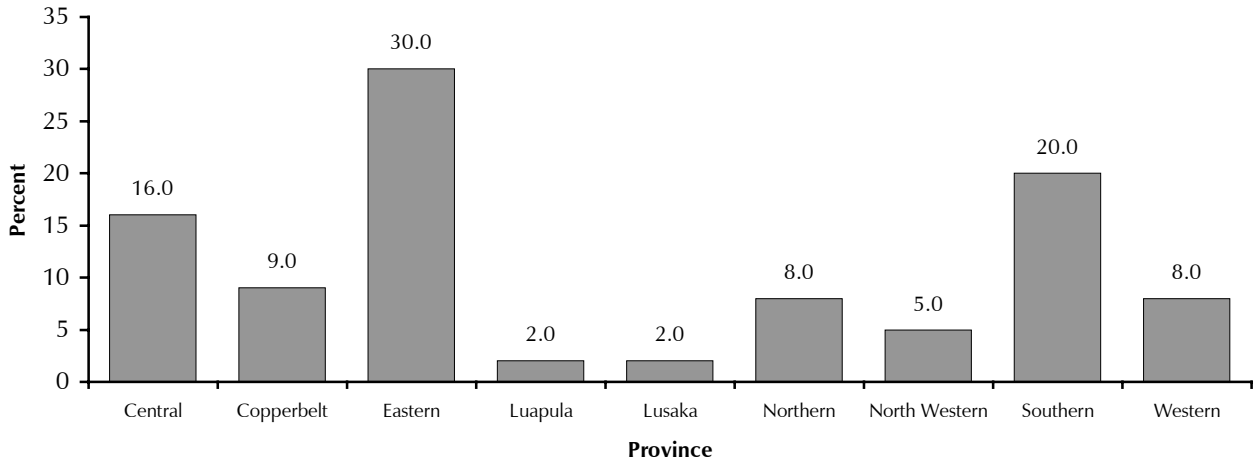
Fig 5.1 : Maize growing Households by Province,2002/2003



5.1.1. Area Planted to Maize

The total area planted to maize during the 2002/2003-agriculture season was estimated at 581,982 hectares. During the 2002/2003-agriculture season 646,450 hectares were planted. The area planted to maize during the 2002/2003-agriculture season declined by 10.0 percent. Eastern and Southern Provinces contributed the highest proportions of area planted to maize with 30.0 and 20.0 percent, respectively. Central Province recorded 16.0 percent of the total area planted to maize. The remaining provinces recorded less than 10 percent each of total area planted to maize. For details refer to Figure 5.2.

Figure 5.2: Area Planted to Maize by Province, 2002/2003

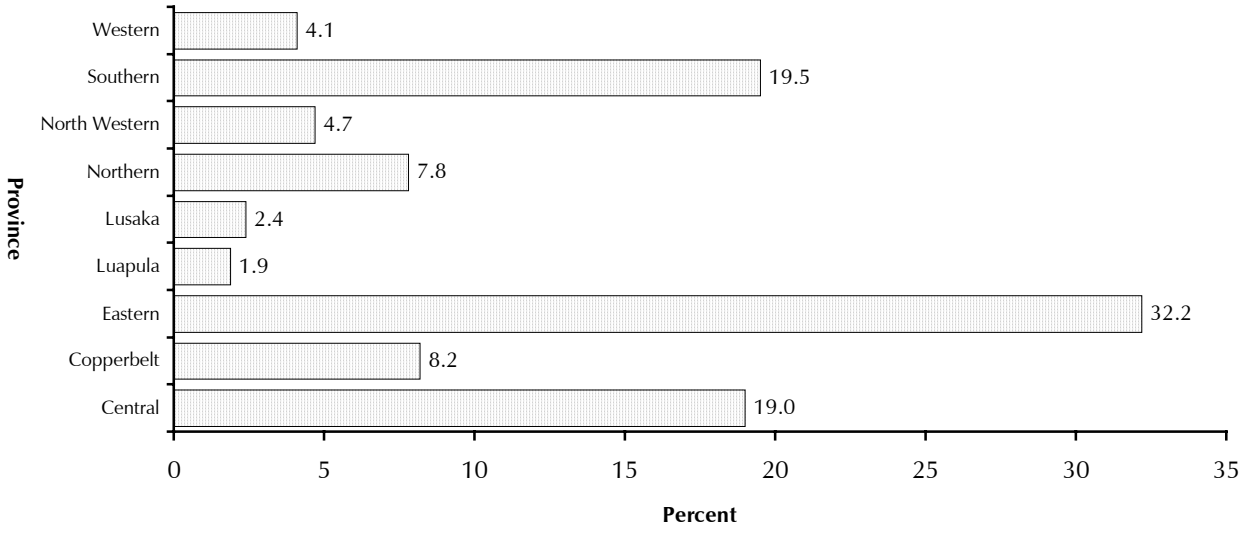


5.1.2. Maize Production

The total amount of maize produced during the 2002/2003 agriculture season was 869,964 metric tonnes compared to 664,116 metric tonnes that was produced during the previous season. This was an increase in production of 31.0 percent above what was produced during the 2001/2002 Agriculture season.

Eastern Province contributed the highest proportion of maize produced during 2002/2003 Agriculture season at 32.2 percent, followed by Southern Province with 19.5 percent. Central province represented 19.0 percent of maize produced. The lowest proportions of maize production were from Luapula, Lusaka and Western provinces. For details refer to Figure 5.3.

Figure 5.3: Maize Production by Province, 2002/2003



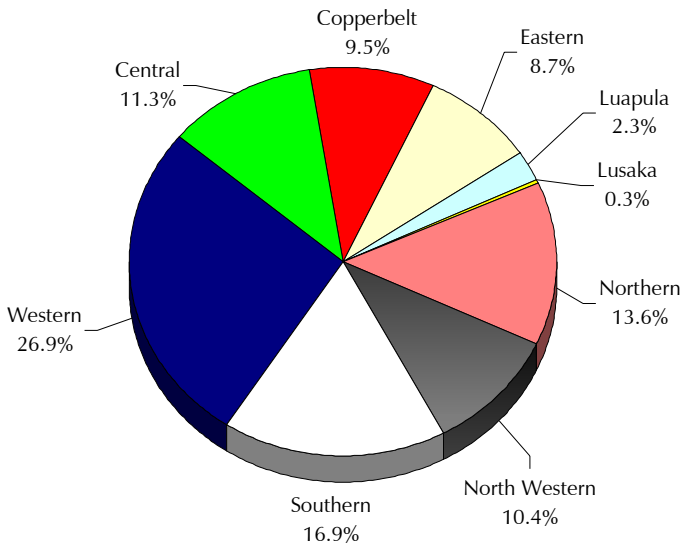
5.2. Sorghum

Sorghum is widely grown throughout the country though the number of households engaged in its production is relatively small compared to the number of households engaged in maize production. The advantage of growing sorghum compared to most crops is that it withstands pests during storage. This crop is promoted especially in drought-prone areas since it is a drought-tolerant crop. The promotion of sorghum is aimed at improving food security in areas where drought and short rain periods are frequent. Some varieties of sorghum are used in the brewing industry and therefore, sorghum is both a food and cash crop.

There were 86,388 households that reported to have grown sorghum during the 2002/2003 Agriculture season. During the 2002/2003 season, 66,705 households reported to have grown sorghum. This represents a 22.8 percent in the number of households reporting to have grown sorghum.

The largest number of households that grew sorghum was in Western Province, where 26.9 percent of the total sorghum-growing households were recorded. Southern Province accounted for 16.9 percent of the total sorghum-growing households, followed by Northern (13.6 percent) and Central Province with 11.3 percent.

Figure 5.4: Distribution of Sorghum growing Households by Province, 2002/2003

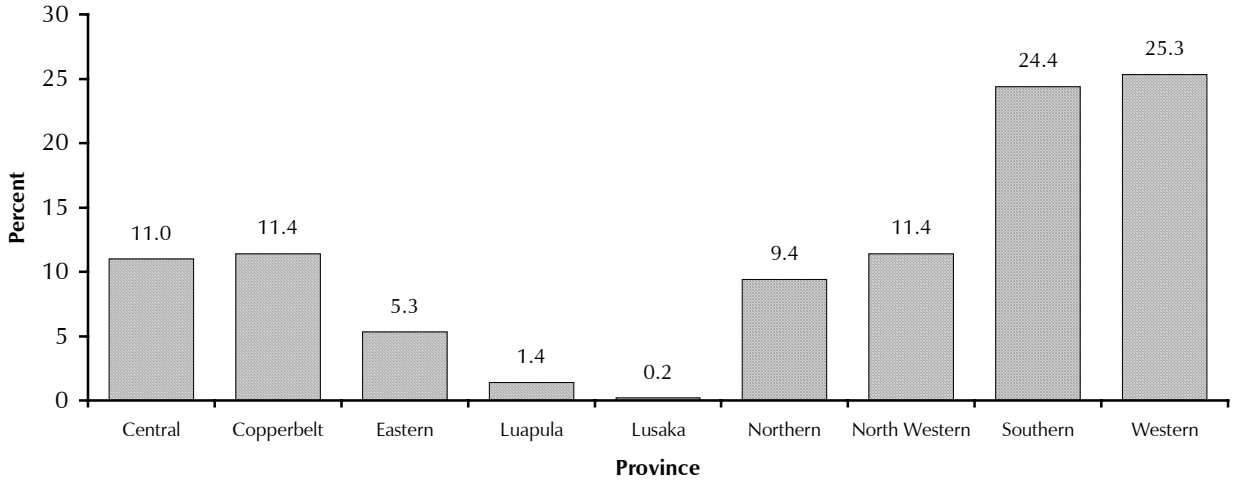


5.2.1. Area Planted to Sorghum

Figure 5.5 shows the distribution of area planted to sorghum in Zambia by province during the 2002/2003 Agriculture season. The total area planted to sorghum was estimated at 44,257 hectares as compared to 33,8 72 hectares that was planted the previous season.

Western Province accounted for 25.3 percent of the total area, followed by Southern, North Western, and Copperbelt Provinces with 24.4, 11.4 and 11.4 percent, respectively.

Figure 5.5: Area Planted to Sorghum by Province, 2002/2003

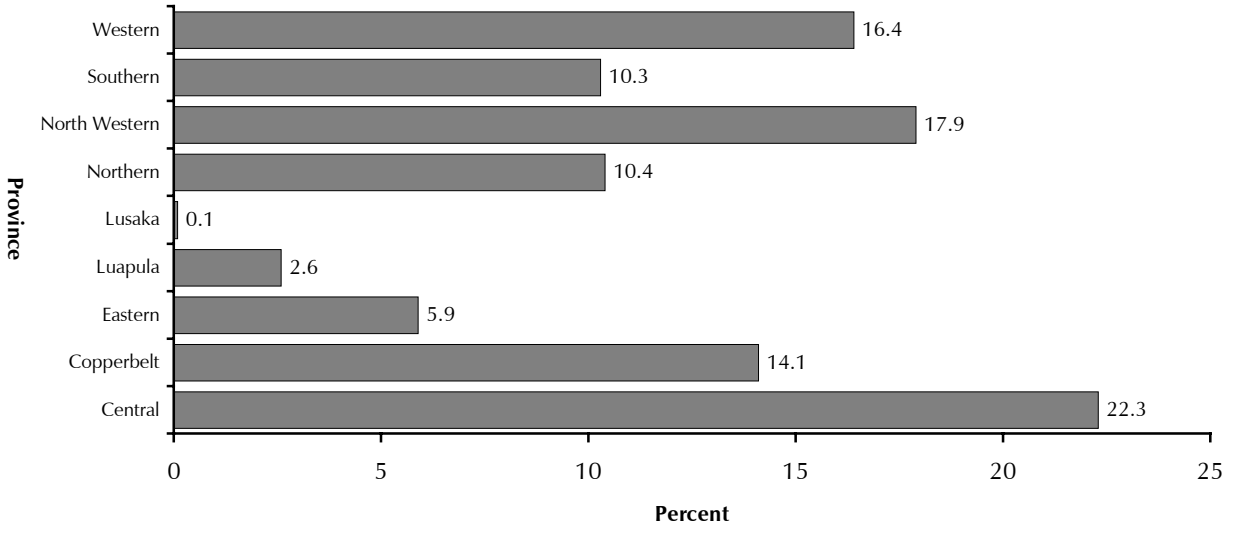


5.2.2. Sorghum Production

The total amount of sorghum produced during the 2002/2003 Agriculture season was estimated at 27,895 metric tonnes compared to 18,639 that was produced the previous season. This was an increase of 50.0 percent.

The largest proportion of sorghum produced was recorded in Central Province with 22.3 percent. NorthWestern and Western Provinces recorded 17.9 and 16.4 percent, respectively. The lowest proportions of sorghum production were recorded in Lusaka, Luapula and Eastern Provinces with less than 6 percent each.

Figure 5.6: Sorghum Production by Province , 2001/2002



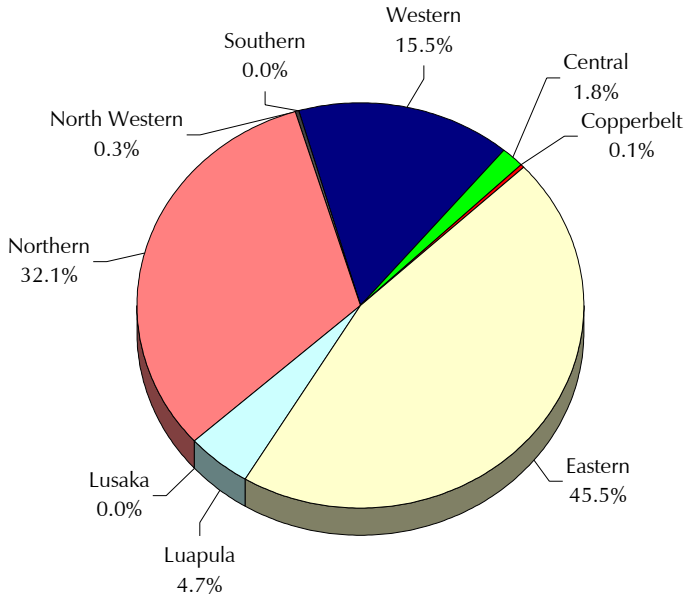
5.3. Rice

Rice grows well in well-watered areas, especially river valleys, where swamps, plains and marshlands can be found.

There were 34,895 households that reported to have grown rice during the 2002/2003 Agriculture season compared to 33,864 households during the previous season. This was an increase of 3 percent.

The largest number of households that grew rice was reported in Eastern Province with 45.4 percent of the total rice growing. Northern Province accounted for 32.1 percent of the total rice-growing households, followed by Western Province with 15.5 percent. Provinces that recorded proportions of less than 5.0 percent each were Central, Copperbelt, North-Western and Luapula. No rice growing was reported in Lusaka and Southern provinces.

Figure 5.7: Distribution of Rice growing Households by Province, 2002/2003

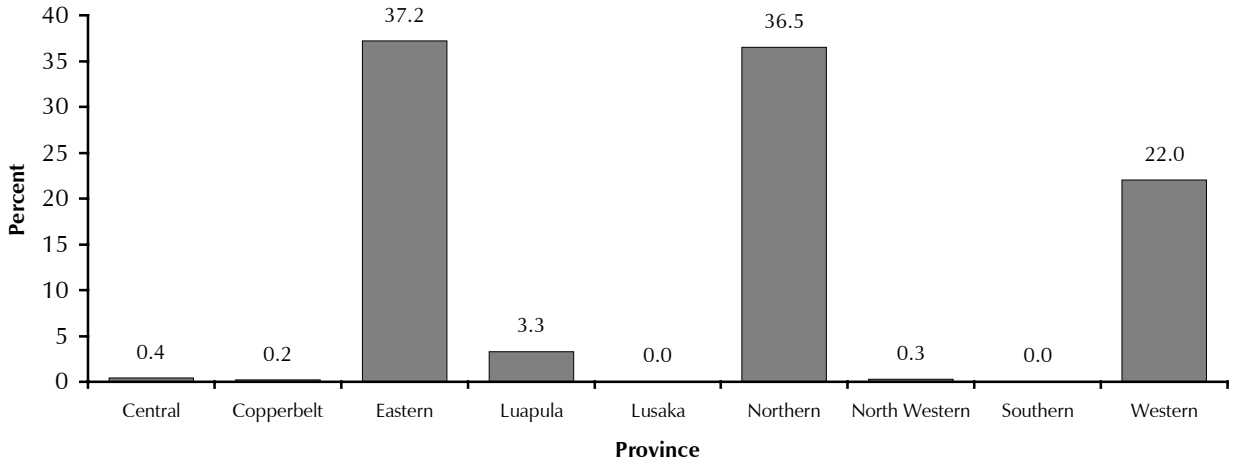


5.3.1. Area Planted to Rice

Figure 5.8 below shows the distribution of area planted to rice in Zambia by province during the 2002/2003 Agriculture season. The total area planted to rice was 11,869 hectares compared to 13, 050 hectares that was produced the previous season. This represented a decrease of 9.1 percent.

Eastern Province accounted for 37.2 percent of the total area, followed by Northern and Western Provinces with 36.5 and 22.0 percent, respectively.

Figure 5.8: Area Planted to Rice by Province, 2002/2003

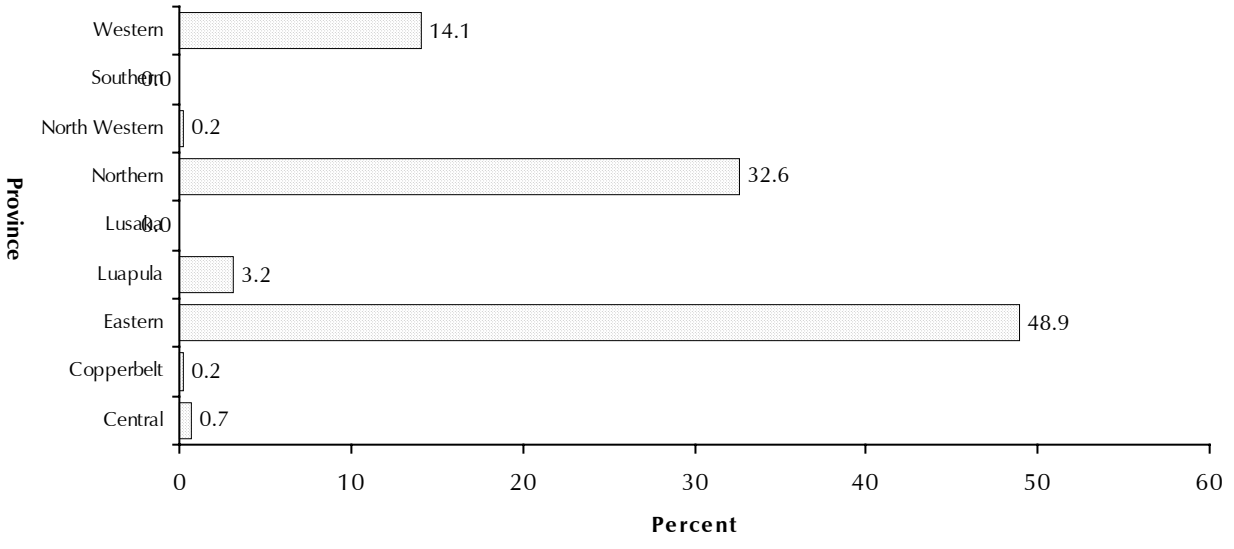


5.3.2. Rice Production

The total amount of rice produced during the 2002/2003 Agriculture season was estimated at 14,703 metric tonnes compared to 19,210 tonnes that was produced the previous season. This was a decrease of 23.5 percent.

Eastern Province produced the highest quantity of rice with 48.9 percent of the total production. Northern and Western Provinces recorded 32.6 and 14.1 percent, respectively, of total rice production. Provinces that recorded proportions of less than 2.0 percent each of rice production were Central, Copperbelt and North-western Provinces. For details refer to Figure 5.9.

Figure 5.9: Rice Production by Province, 2002/2003



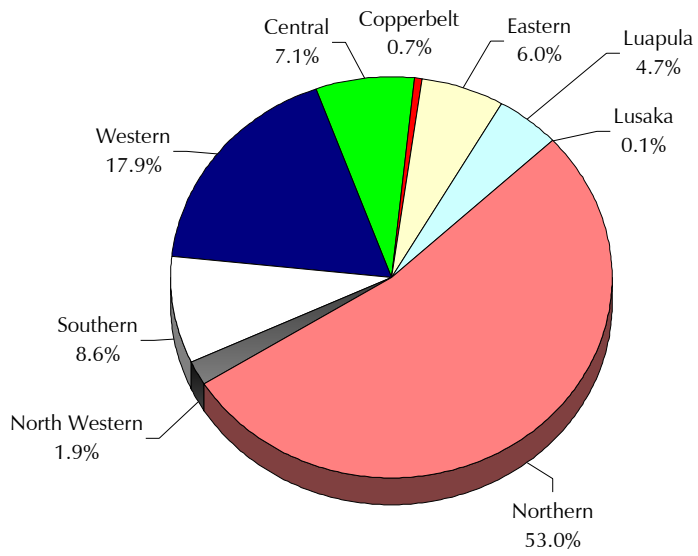
5.4. Millet

Millet is grown in all the provinces. Millet is a staple food in Northern and Western provinces. This is evidenced from the high numbers of agricultural households that grew the crop in 2002/2003 Agriculture season. Millet is also used as a major ingredient in the preparation of local brews countrywide.

There were 130,331 households that reported to have grown millet during the 2002/2003 Agriculture season compared to 133,881 households that grew rice the previous season. This was a decrease of 2.7 percent.

The largest number of households that grew millet was in Northern Province with 53.0 of the total percent of the total millet-growing households. Western Province accounted for 17.9 percent of the total millet-growing households, followed by Southern and Central Provinces with 8.6 and 7.1 percent, respectively. Provinces that recorded proportions of less than 7.0 percent each of millet growing households were Copperbelt, Eastern, NorthWestern, Luapula and Lusaka.

Figure 5.10: Distribution of Millet growing Households by Province, 2002/2003

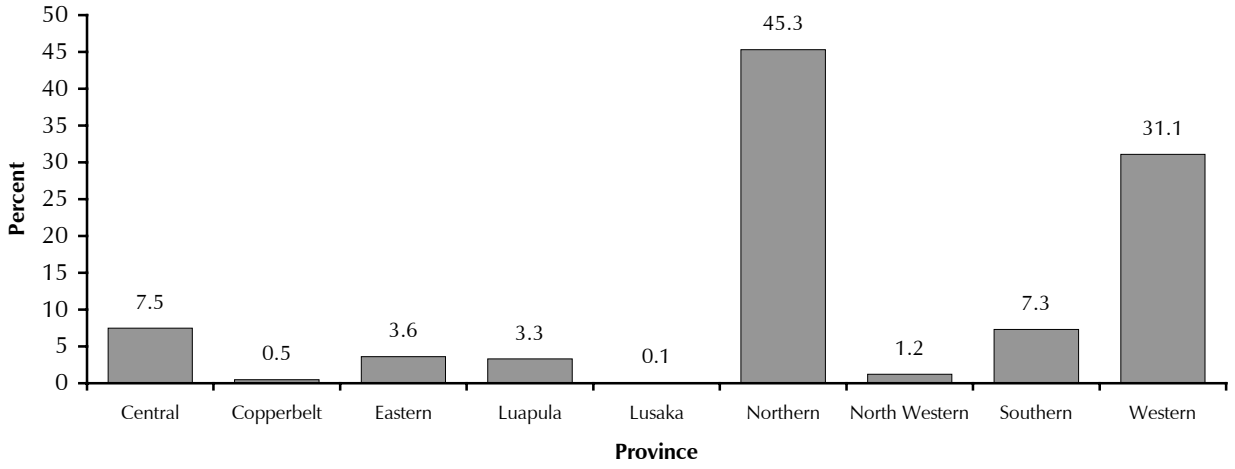


5.4.1. Area Planted to Millet

Figure 5.11 shows the distribution of area planted to millet in Zambia by province during the 2002/2003 Agriculture season. The total area planted to millet was 58,055 hectares compared to 61,347 hectares that was produced the previous season. This was a decrease of 5.4 percent.

Northern Province accounted for 53.0 percent of the total area, followed by Western and Central provinces with 31.1 and 7.5 percent, respectively. Southern and Eastern provinces recorded 7.3 and 3.6 percent, respectively.

Figure 5.11: Area Planted to Millet by Province, 2002/2003

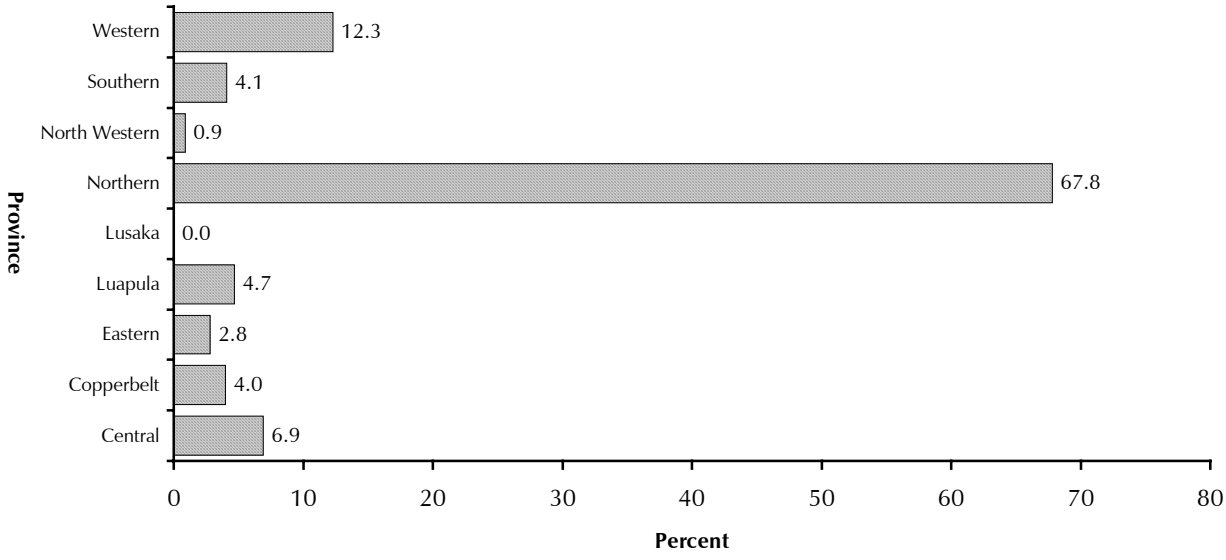


5.4.2. Millet Production

The total amount of millet produced during the 2002/2003 Agriculture season was 35,463 metric tonnes compared to 40,282 tonnes that was produced the previous season. This represented a decrease of 12.0 percent.

Northern Province produced most of the millet with 67.8 percent of the total millet production followed by Western and Central provinces with 12.3 and 6.9 percent, respectively. Luapula Province recorded 4.7 percent of total millet production. For details refer to Figure 5.12.

Figure 5.12: Millet Production by Province, 2002/2003



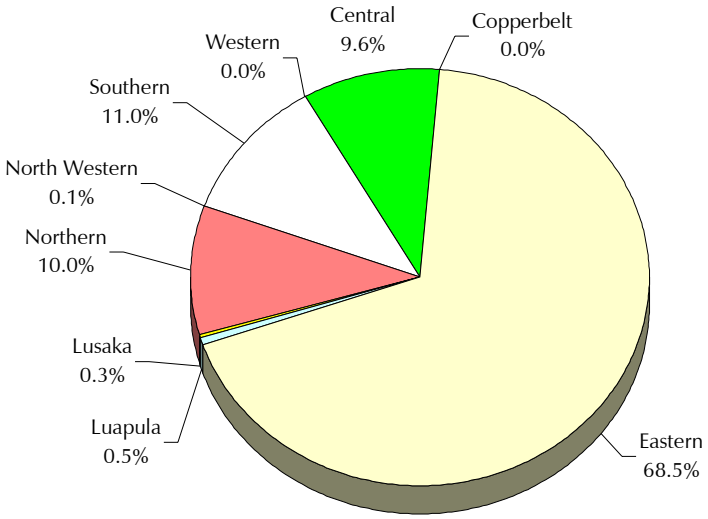
5.5. Sunflower

Sunflower is an oil-producing seed widely grown in the country. It is basically grown for cash. There were 46,857 households that reported to have grown sunflower during the 2002/2003 Agriculture season compared to 39,086 the previous season. This was an increase of 19.9 percent.

The largest number of households that grew sunflower was recorded in Eastern Province with 68.4 percent of total sunflower growing households. Southern, Northern and Central provinces recorded 11.0, 10.0 and 9.6 percent, respectively, of the total sunflower-growing households in the country.

Sunflower growing is less common in Copperbelt, Luapula, and NorthWestern provinces with less than 1.0 percent of the households growing it in 2002/2003 Agriculture season. Western Province did not record any sunflower growing.

Figure 5.13: Sunflower growing Households by Province, 2002/2003

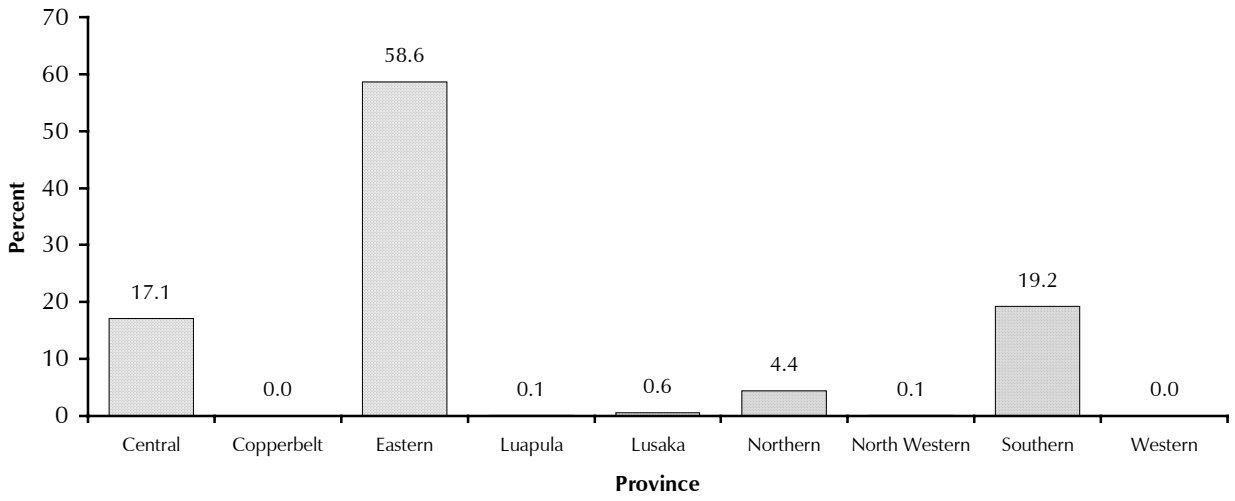


5.5.1. Area Planted to Sunflower

Figure 5.14 below shows the distribution of area planted to sunflower in Zambia by province during the 2002/2003 Agriculture season. The total area planted to sunflower was 24,799 hectares compared to 22,139 hectares that was produced the previous season. This was an increase of 12 percent.

Eastern Province accounted for 58.6 percent of the total area under sunflower, followed by Southern and Central provinces with 19.2 and 17.1 percent, respectively.

Figure 5.14: Area Planted to Sunflower by Province, 2002/2003

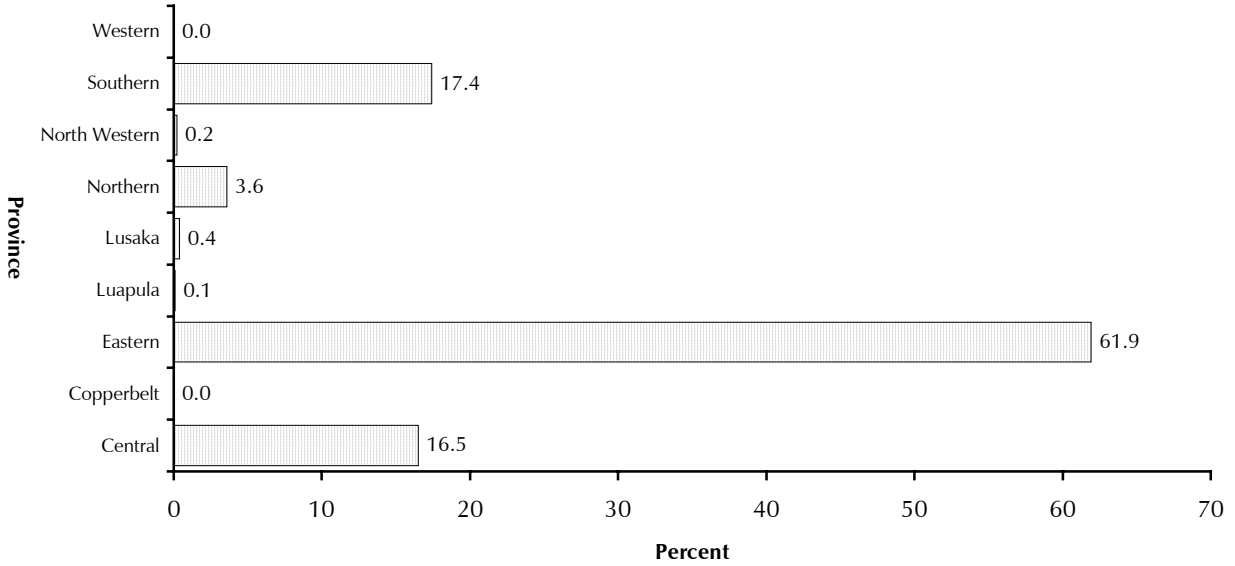


5.5.2. Sunflower Production

The total amount of sunflower produced during the 2002/2003 Agriculture season was 10,488 metric tonnes compared to 7,389 metric tonnes that was produced during the previous season. This was an increase of 42.0 percent.

Eastern Province produced the largest quantity of sunflower with 61.9 percent of total sunflower production. Southern and Central Provinces recorded 17.4 and 16.5 percent, respectively. The growing of sunflower is less common in Copperbelt, Luapula and NorthWestern provinces with less than 1.0 percent each.

Figure 5.15: Sunflower Production by Province , 2002/2003



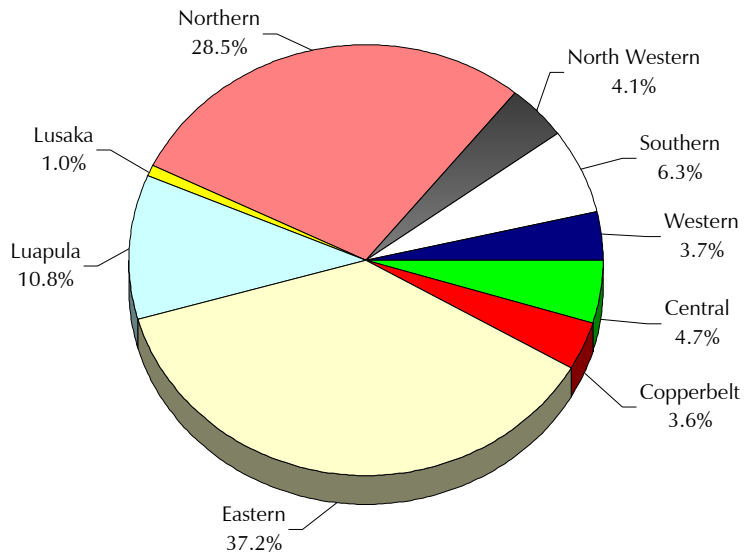
5.6. Groundnuts

Groundnuts are widely grown in Zambia. The crop is mainly used as an ingredient in relishes, especially in vegetables. It is also a source of cooking oil. Manufactured foods such as peanut butter are widely consumed in Zambia. There were 336,194 households that reported to have grown groundnuts during the 2002/2003 Agriculture season compared to 372,498 during the previous season.

Eastern Province recorded the highest proportion of groundnuts growing households with 37.2 percent of total groundnut growing households. Northern and Luapula provinces recorded 28.5 and 10.8 percent, respectively of groundnuts growing households.

The growing of groundnuts is less common in Lusaka province with less than 2.0 percent of the total households in 2002/2003 Agriculture season. For details refer to Figure 5.16.

Figure 5.16: Groundnut growing Households by Province, 2002/2003

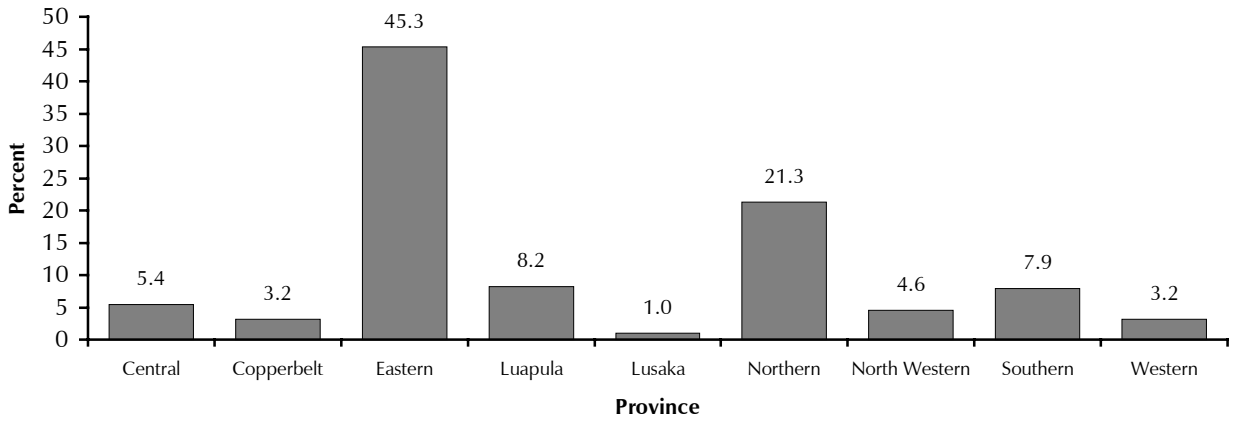


5.6.1. Area Planted to Groundnuts

The total area planted to groundnuts during the 2002/2003 Agriculture season was 114,325 hectares compared to 139,015 hectares produced during the previous season. This was a decrease of 17.8 percent.

Eastern Province accounted for 45.3 percent of the total area under groundnuts. Northern and Luapula provinces recorded 21.3 and 8.2 percent, respectively. For details refer to Figure 5.17.

Figure 5.17: Area Planted to Groundnuts by Province, 2002/2003

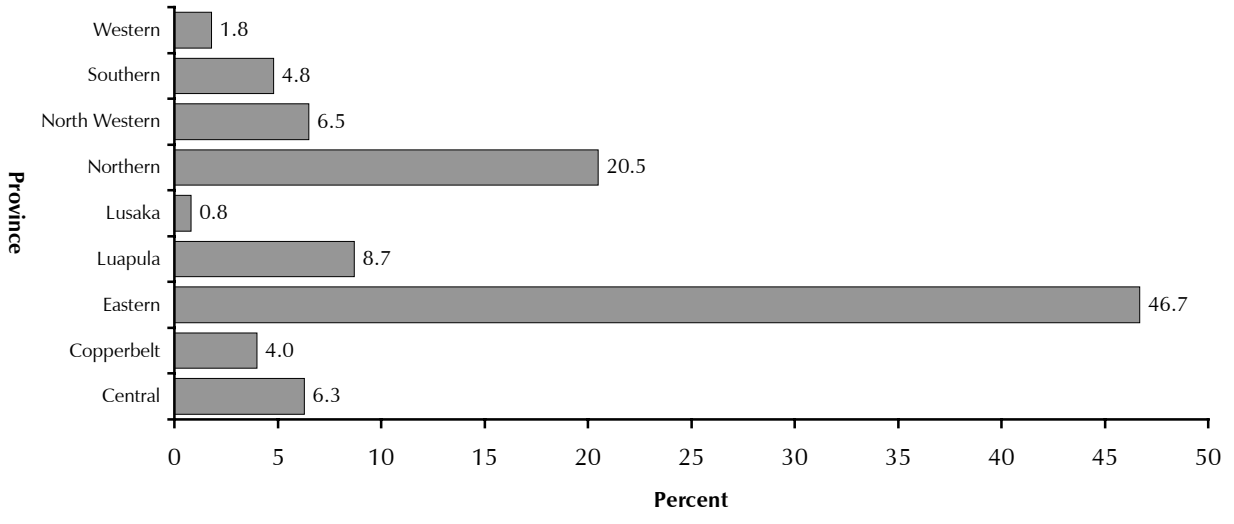


5.6.2. Groundnuts Production

The total amount of groundnuts produced during the 2002/2003 Agriculture season was estimated at 67,412 metric tonnes compared to 75,781 hectares that was produced the previous season. This was a decrease of 11.0 percent

Eastern Province produced the largest quantity of groundnuts with 46.7 percent of the total groundnut production followed by Northern and Luapula provinces with 20.5 and 8.7 percent, respectively. For details refer to Figure 5.18.

Figure 5.18: Groundnuts Production by Province , 2002/2003



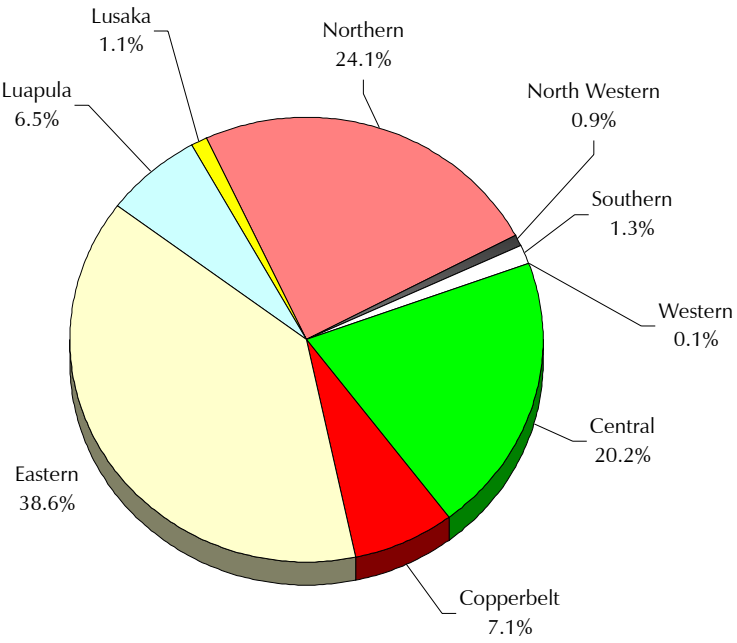
5.7. Soya Beans

Soya beans have high nutrition content and are recommended for infant feeding. It is also grown as a cash crop. The number of households estimated to have grown soya beans during the 2002/2003 Agriculture season was 21,197 compared to 17,190 households that planted the crop. This was an increase of 23.3 percent

Eastern Province recorded the highest proportion of Soya beans growing households with 38.6 percent followed by Northern Province with 24.1 percent. Central Province recorded 20.2 percent of soya beans growing households in 2002/2003 Agriculture season.

Soya beans growing are less common in North-Western and Western provinces with less than 1.0 percent each. For details refer to Figure 5.19.

Figure 5.19: Soya Beans growing Households by Province, 2002/2003

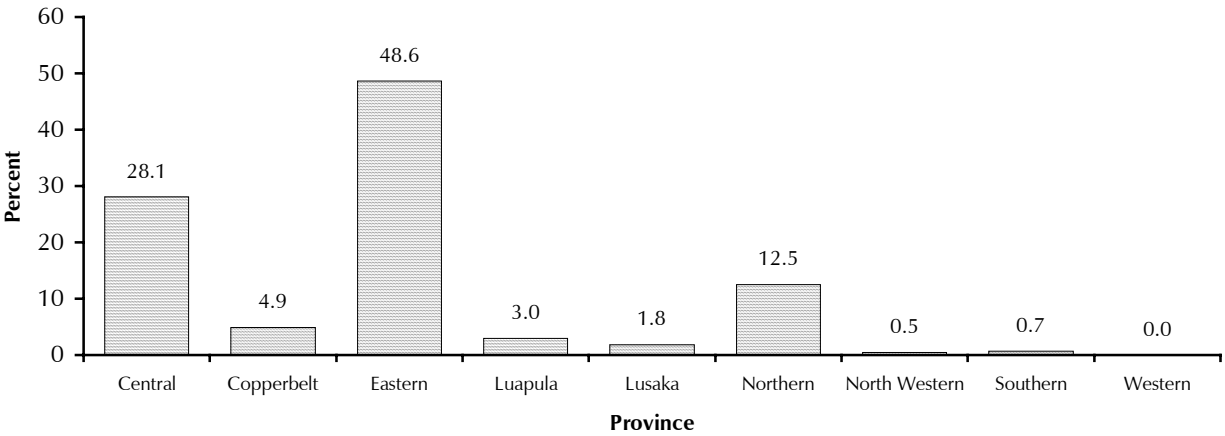


5.7.1. Area Planted to Soya beans

The area planted to soya beans during the 2002/2003 Agriculture season was estimated at 8,599 hectares compared to 6,820 hectares that was produced during the previous season. This was an increase of 26.1 percent.

Eastern Province recorded the highest proportion of area planted to soya beans at 48.6 percent of the total area planted to soya beans followed by Central Province with 28.1 percent. Luapula, Lusaka and Western provinces recorded less than 1.0 percent each of total area planted to soya beans. For details refer to Figure 5.20.

Figure 5.20: Area Planted to Soya Beans by Province, 2002/2003

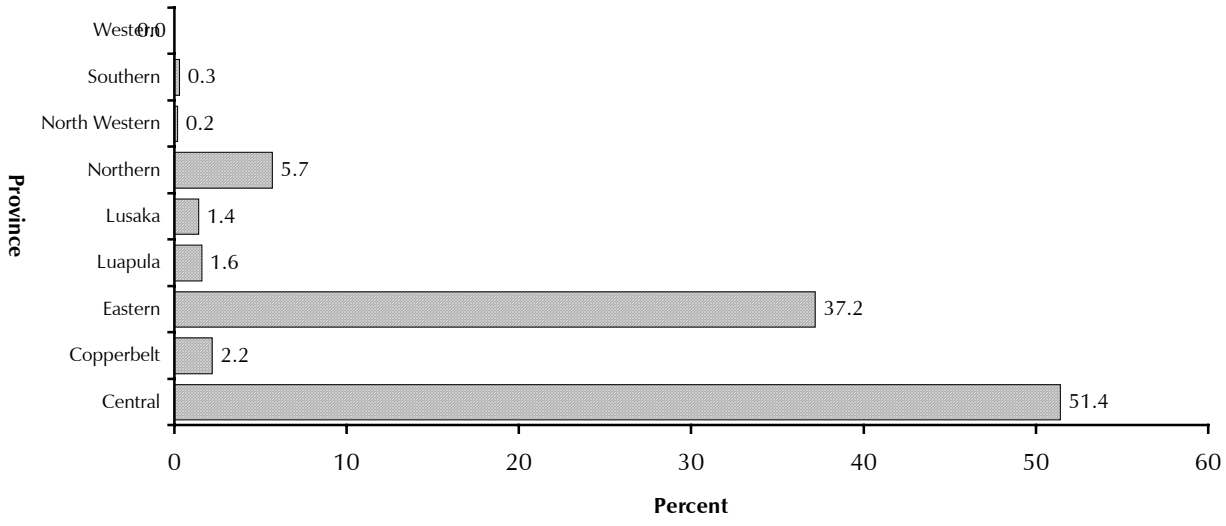


5.7.2. Soya beans Production

A total of 9,051 metric tonnes of soya beans were produced during the 2002/2003 Agriculture season compared to 3,348 tonnes that was produced the previous season. The increase was 170 percent.

Central Province produced the largest quantity of soya beans in 2002/2003 Agriculture season with 51.4 percent of the total soya beans production, followed by Eastern Province with 37.2 percent. Northern Province recorded 5.7 percent of soya beans production. Provinces that recorded less than 2.0 percent each of soya beans production were Luapula, Lusaka, North-western, Southern and Western. For details refer to Figure 5.21.

Figure 5.21: Soya Beans Production by Province, 2002/2003

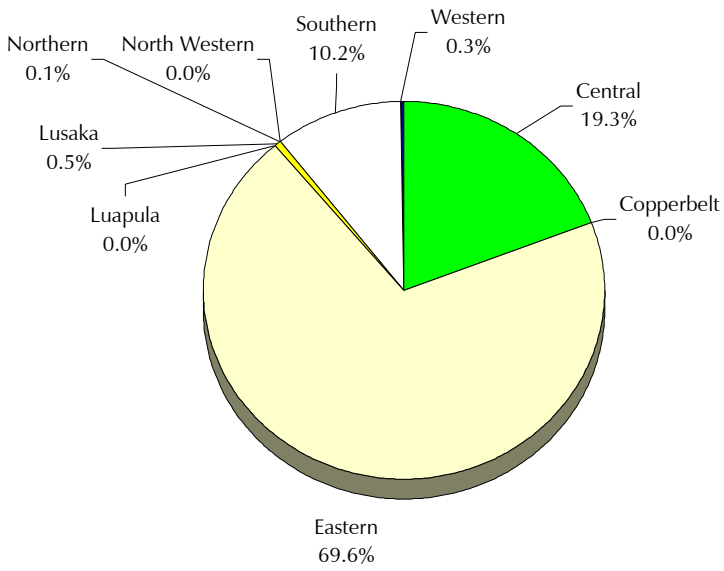


5.8. Seed Cotton

The growing of seed cotton is common in Eastern, Southern and Central Provinces. The number of households estimated to have grown seed cotton during the 2002/2003 Agriculture season was 88,426 compared to 87,422 households that planted the crop the previous season.

Eastern Province recorded the highest proportion of seed cotton growing households in 2002/2003 Agriculture season with 69.6 percent followed by Central Province with 19.3 percent. Southern Province recorded 10.2 percent of total seed cotton growing households. Less than 1.0 percent of total seed cotton growing households was recorded in Lusaka, Northern and Western provinces. For details refer to Figure 5.22.

Figure 5.22: Seed Cotton growing Households by Province, 2002/2003

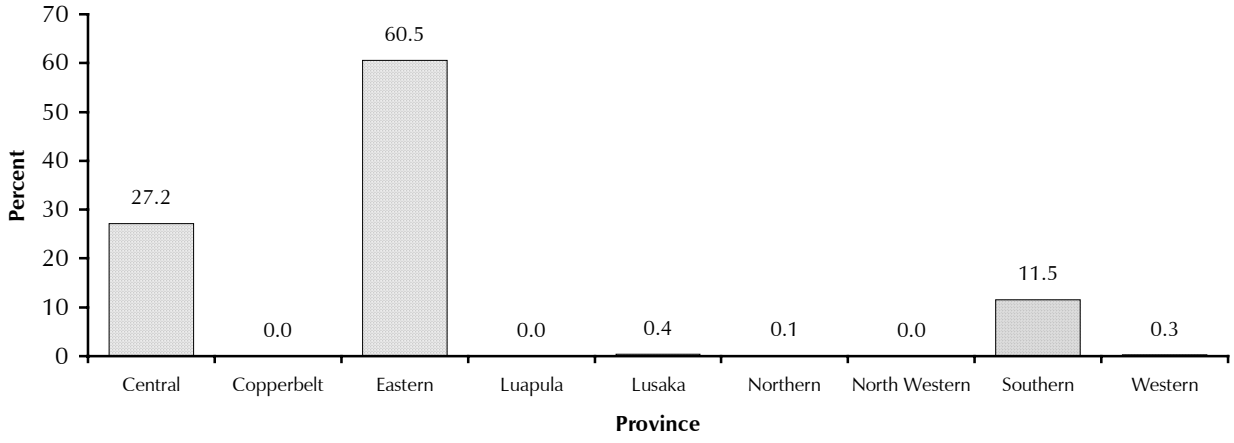


5.8.1. Area Planted to Seed Cotton

The area planted to seed cotton during the 2002/2003 Agriculture season was estimated at 85,568 hectares compared to 87.026 households that reported the crop during the previous season.

Eastern Province recorded the highest area under seed cotton with 60.5 percent followed by Central and Southern Provinces with 27.2 and 11.5 percent, respectively. For details refer to Figure 5.23.

Figure 5.23: Area Planted Seed Cotton by Province, 2002/2003

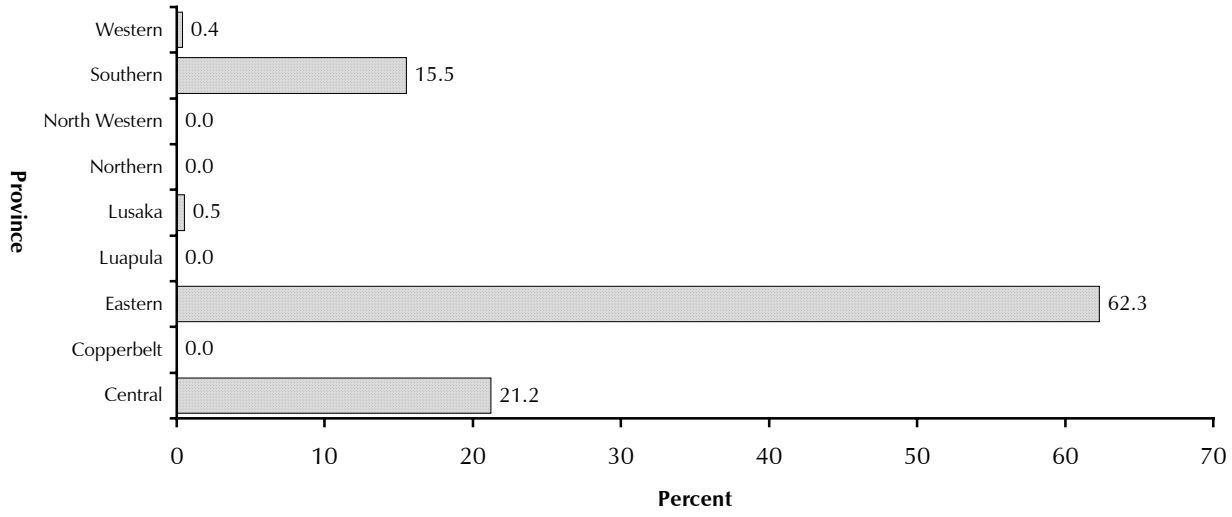


5.8.3. Seed Cotton Production

A total of 75,363 metric tonnes of seed cotton were produced during the 2002/2003 Agriculture season compared to 65,979 hectares that was produced the previous season. The increase was 14.2 percent.

Eastern Province produced the largest quantity of seed cotton with 62.3 percent of the total production followed by Central and Southern Provinces with 21.2 and 15.5 percent, respectively. The growing of seed cotton is less common in Northern, Lusaka and Western Provinces. For details refer to Figure 5.24.

Figure 5.24: Seed Cotton Production by Province, 2002/2003



5.9. Cassava

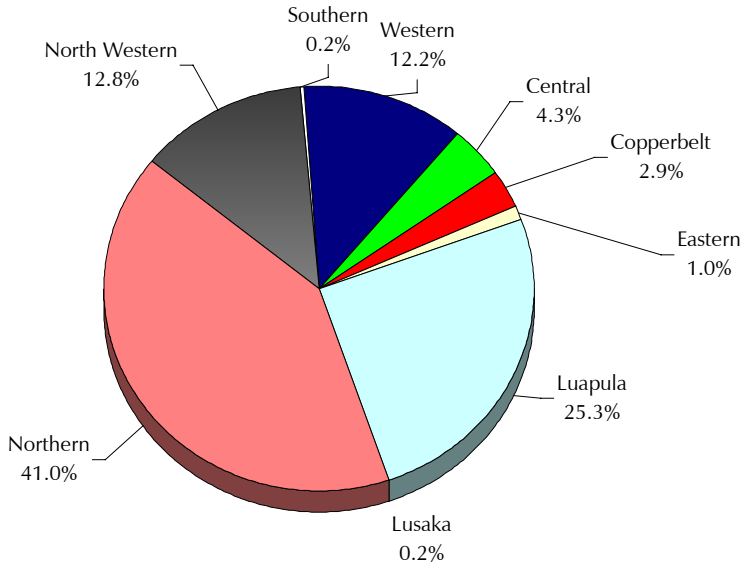
Cassava is a staple food grown in many parts of the country especially in Northern, Luapula and Western Provinces. Cassava growing is being encouraged in other parts of the country for food security reasons, as it is a drought resistant and less expensive crop to manage.

The estimated number of cassava growing households was 377,765 in 2002/2003 Agriculture season compared to 343,616 households that reported growing the crop the previous season. The increase in the number of households growing cassava was 9.9 percent.

The highest proportions of cassava growing households were recorded in Northern and Luapula Provinces with 41.0 and 25.3 percent, respectively. North-western and Western Provinces recorded 12.8 and 12.2 percent, respectively, of cassava growing households.

Cassava growing is less common in Lusaka and Southern Provinces with less than 1.0 percent of cassava growing households. For details refer to Figure 5.25.

Figure 5.25: Cassava growing Households by Province, 2001/2002

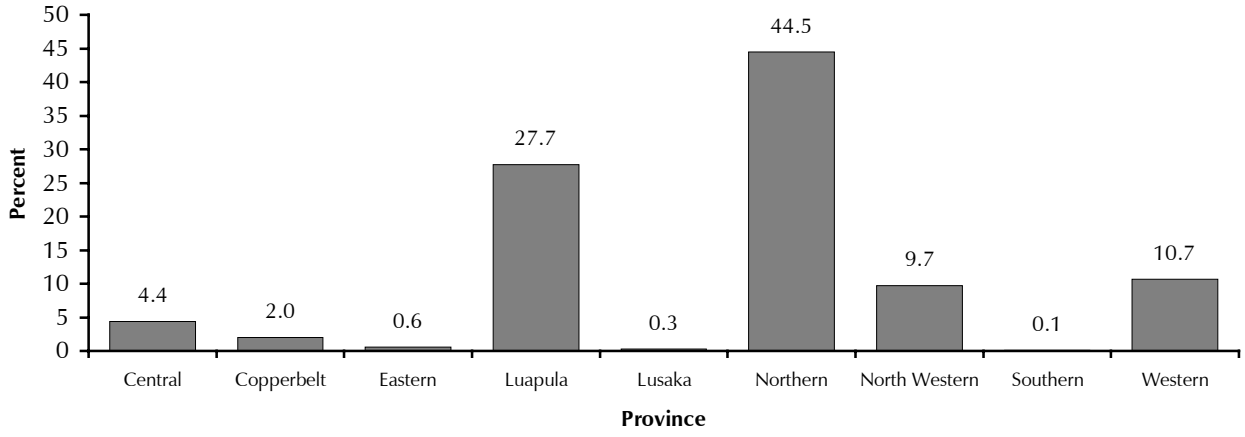


5.9.1. Area Under Cassava

The area under cassava during the 2002/2003 Agriculture season was estimated at 228,199 hectares compared to 278,759 hectares that was planted the previous season. The decrease in area was 18.1 percent.

The largest area under cassava was recorded in Northern Province with 44.5 percent, followed by Luapula and Western Provinces with 27.7 and 10.7 percent, respectively. North-Western Province recorded 9.7 percent of the total area under cassava. Eastern, Lusaka and Southern Provinces recorded less than 1.0 percent each of the total area under cassava. For details, refer to Figure 5.26.

Figure 5.26: Area Under Cassava by Province, 2002/2003

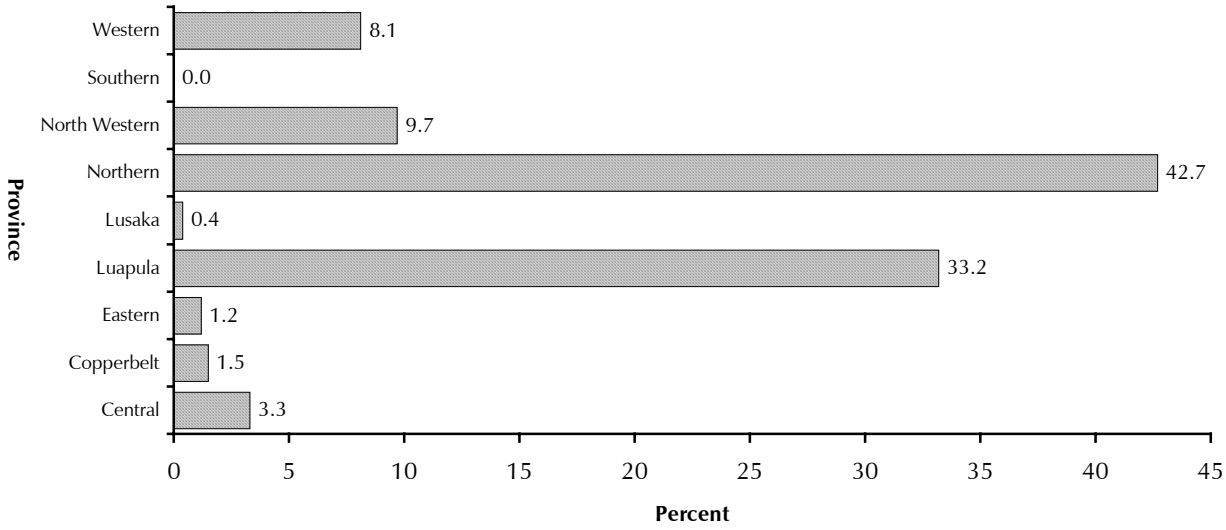


5.9.2. Cassava Production

Cassava production for the 2002/2003 Agriculture season was estimated at 189,253 metric tonnes compare to 282,331 metric tonnes that was produced during the previous season. Production of cassava decreased by 33 percent.

Most of the cassava produced was reported in Northern, Luapula and North-Western provinces accounting for 42.7, 33.2 and 9.7 percent, respectively. Less than 2.0 percent of total cassava production was reported in each of the following provinces: Copperbelt, Eastern, Lusaka and Southern. For details refer to Figure 5.27.

Figure 5.27: Cassava Production by Province, 2002/2003



5.10. Sweet Potatoes

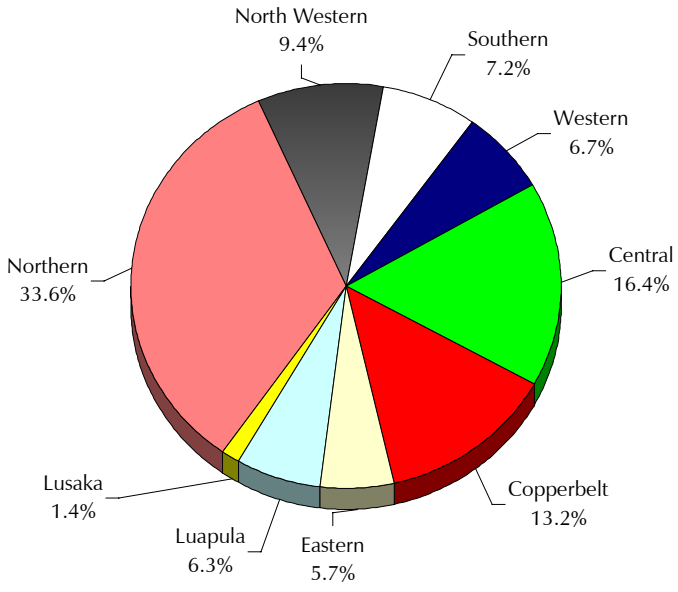
Growing of sweet potatoes is common in all provinces. In North-Western, Copperbelt and Central Provinces, sweet potatoes are also important cash crops.

The estimated number of sweet potatoes growing households in 2002/2003 Agriculture season was 104,661 compared to 90,223 households that planted the crop the previous season. The increase in production was 16.0 percent.

The highest number of households growing sweet potatoes was recorded in Northern Province, accounting for 33.6 percent of the total sweet potatoes growing households. Central and Copperbelt Provinces recorded 16.4 and 13.2 percent, respectively. North-western Province recorded 9.4 percent of total households growing sweet potatoes.

The growing of sweet potatoes is less common in Lusaka Province as evidenced from less than 2.0 percent of all households that grew the crop in 2002/2003 Agriculture season. For details refer to Figure 5.28.

Figure 5.28: Sweet Potato growing Households by Province, 2002/2003

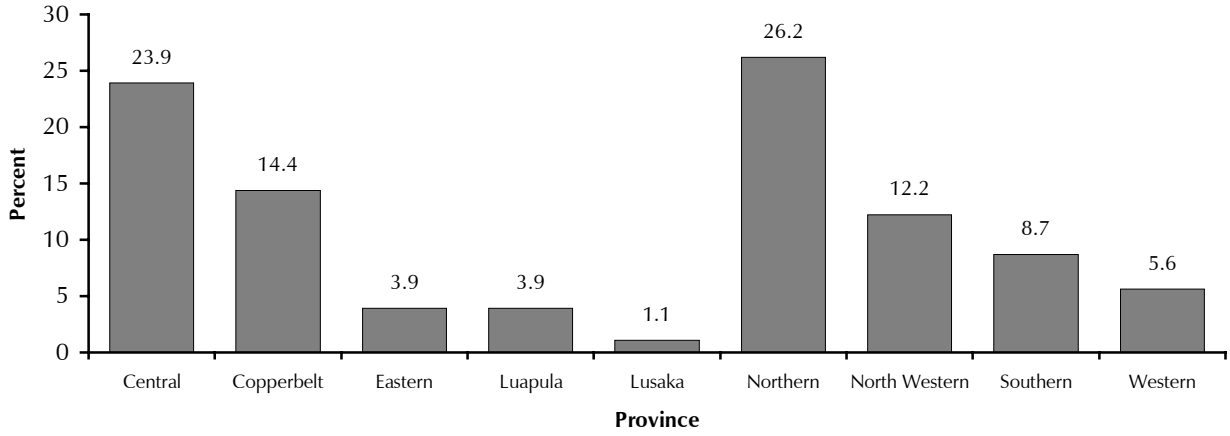


5.10.1. Area Planted to Sweet Potatoes

The area planted to sweet potatoes during the 2002/2003 Agriculture season was estimated at 27,980 hectares compared to 23,007 hectares planted during the previous season. The increase in area planted was 21.6 percent.

The highest proportion of area planted to sweet potatoes was recorded in Northern Province with 26.2 percent of the total area planted to sweet potatoes. Central and Copperbelt provinces recorded 23.9 and 14.4 percent, respectively. For details refer to Figure 5.29.

Figure 5.29: Area Planted to Sweet Potatoes by Province, 2002/2003

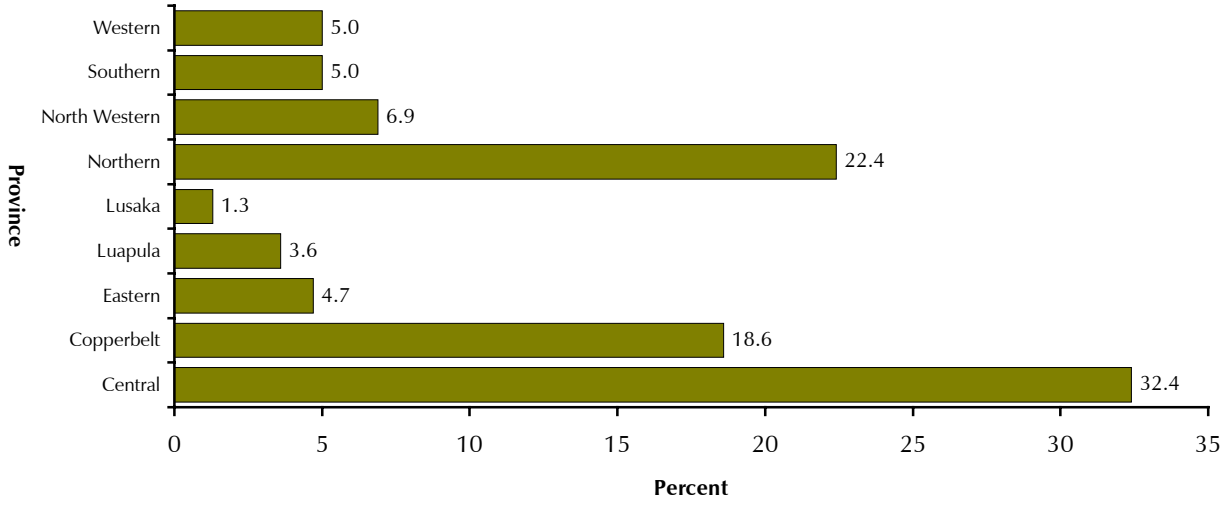


5.10.2. Sweet Potatoes Production

An estimated 66,354 metric tonnes of sweet potatoes were produced during 2002/2003 Agriculture season compared to 23.007 the previous season. The increase in production was 65.3 percent

Most of the sweet potatoes were produced in Central, Northern and Copperbelt provinces, accounting for 32.4, 22.4 and 18.6 percent, respectively. For details refer to Figure 5.30.

Figure 5.30: Sweet Potatoes Production by Province, 2002/2003



5.11. Virginia Tobacco

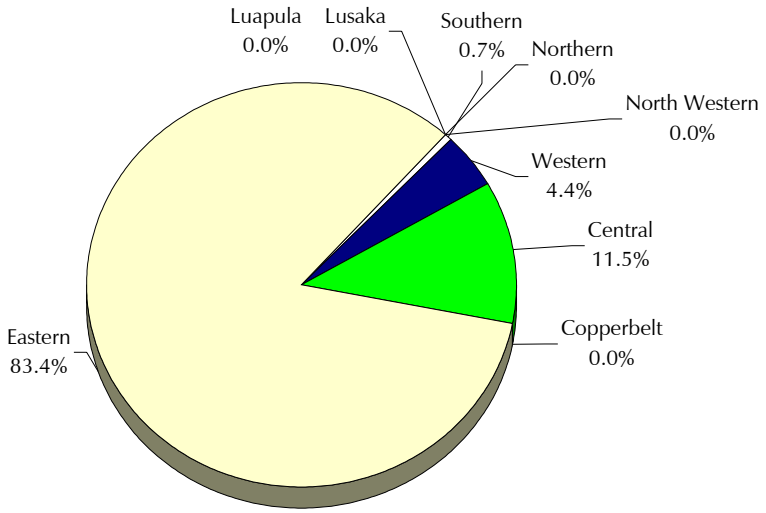
Growing of virginia tobacco is common in only a few provinces of the country. Due to the nature of the way it is cured, large-scale farmers mainly grow this crop. The crop is mainly grown in four provinces namely: Central, Eastern, Southern and Western provinces. Virginia tobacco is an important cash crop for farmers who grow it.

The estimated number of virginia tobacco growing households in 2002/2003 Agriculture season was 3,376.

The highest number of households growing virginia tobacco was recorded in Eastern Province, accounting for 83.4 percent of the total. Central and Western Provinces recorded 11.5 and 4.4 percent, respectively of households growing virginia tobacco. Southern Province recorded 0.7 percent of total households growing virginia tobacco.

For details refer to Figure 5.31.

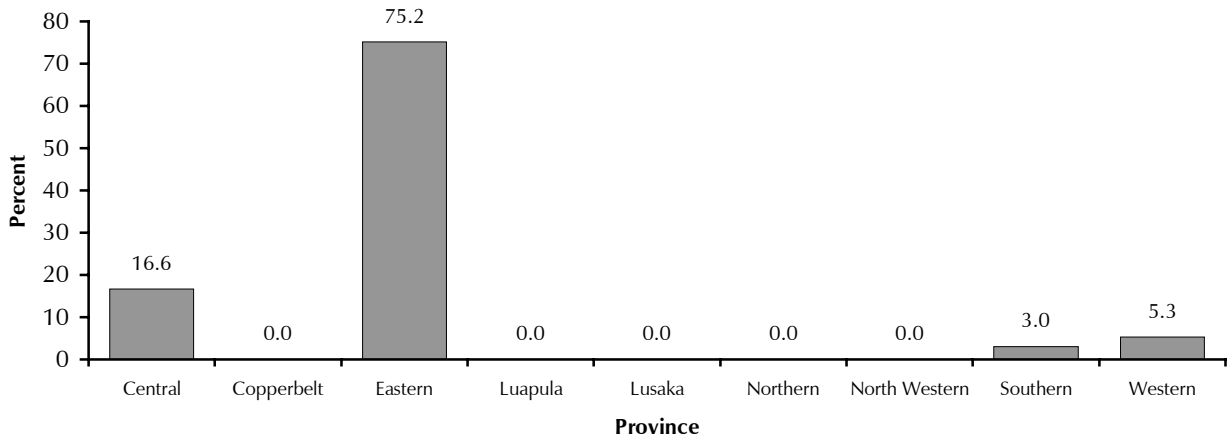
Figure 5.31: Virginia Tobacco growing Households by Province, 2002/2003



5.11.1. Area Planted to Virginia Tobacco

The area planted to virginia tobacco during the 2002/2003 Agriculture season was estimated at 1,408 hectares. The highest proportion of area planted to virginia tobacco was recorded in Eastern Province with 75.2 percent of the total area. Central and Western provinces recorded 16.6 and 5.3 percent, respectively, of total area planted to sweet potatoes. For details refer to Figure 5.32.

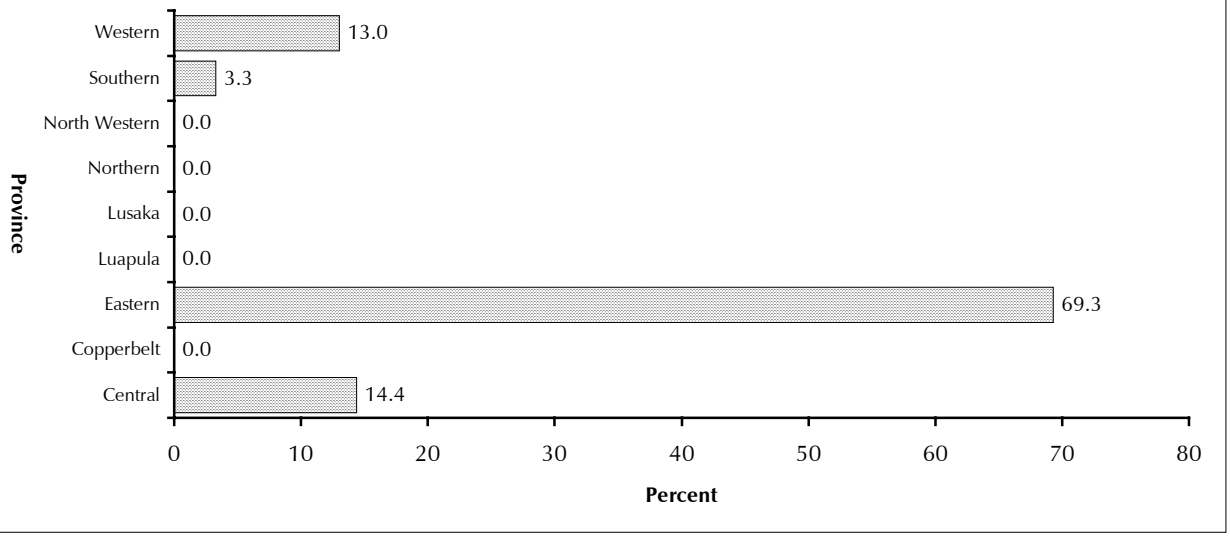
Figure 5.32: Area Planted to Virginia Tobacco by Province, 2002/2003



5.11.2. Virginia Tobacco Production

An estimated 1,716 metric tonnes of virginia tobacco were produced during 2002/2003 Agriculture season. Most of the virginia tobacco was produced in Eastern, Central, and Western provinces, accounting for 69.3, 14.4 and 13.0 percent, respectively. For details refer to Figure 5.33.

Figure 5.33: virginia tobacco Production by Province, 2002/2003



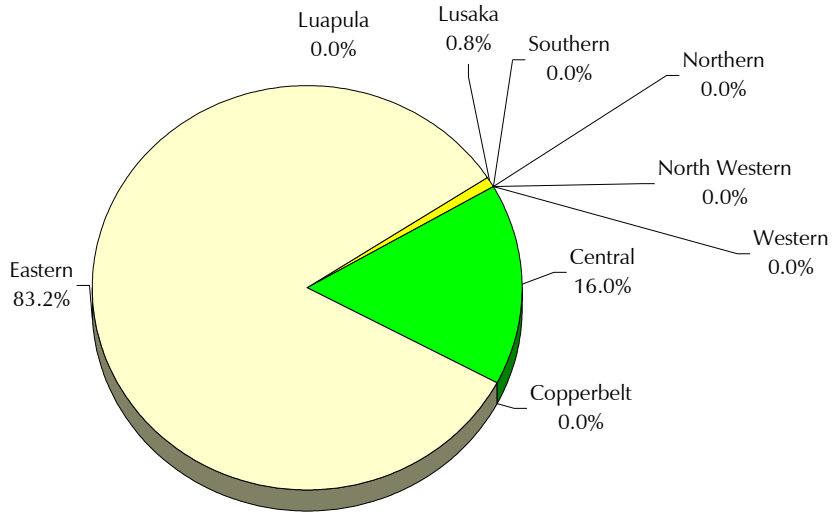
5.12. Burley Tobacco

Growing of burley tobacco is common in only a few provinces. Unlike Virginia tobacco, mainly small and medium scale farmers grow this crop. The crop is mainly grown in three (3) provinces, namely, Central, Eastern, and Lusaka provinces. Burley tobacco is important cash among farmers in these provinces.

The estimated number of burley tobacco growing households in 2002/2003 Agriculture season was 6,281 compared to 6,009 households during the previous season. The increase in the number of households that grew the crop was 4.5 percent.

The highest number of households growing burley tobacco was recorded in Eastern Province, accounting for 83.2 percent of the total burley tobacco-growing households. Central and Lusaka Provinces recorded 16.0 and 0.8 percent, respectively. For details refer to Figure 5.34.

Figure 5.34: Burley Tobacco growing Households by Province, 2002/2003

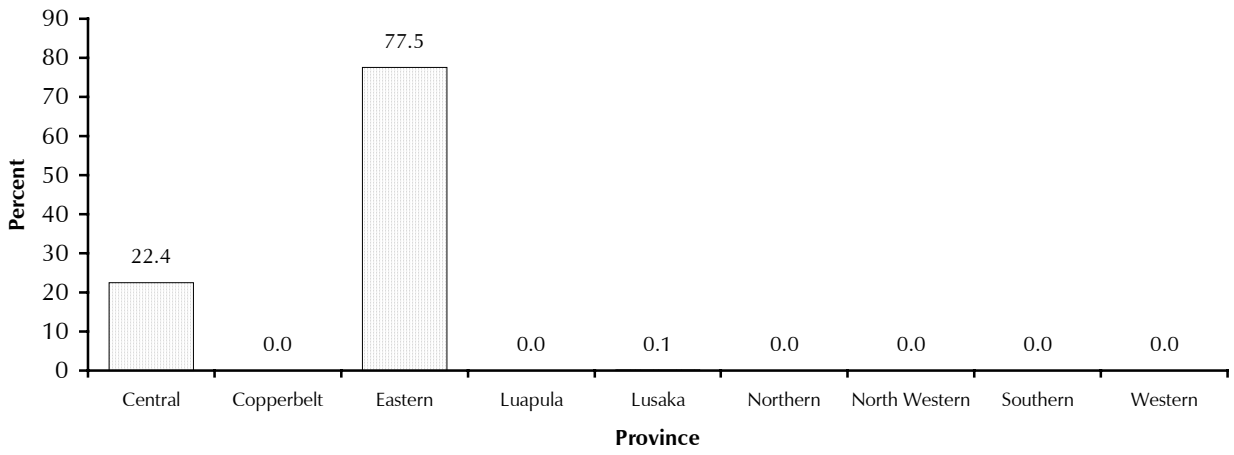


5.12.1. Area Planted to Burley Tobacco

The area planted to burley tobacco during the 2002/2003 Agriculture season was estimated at 2,841 hectares compared to 3,855 households that grew the crop during the previous season. The number of households that grew the crop decreased by 26.3 percent

The highest proportion of area planted to burley tobacco was recorded in Eastern Province with 77.5 percent of the total area. Central and Lusaka provinces recorded 22.4 and 0.1 percent, respectively. For details refer to Figure 5.35.

Figure 5.35: Area Planted to Burley Tobacco by Province, 2002/2003

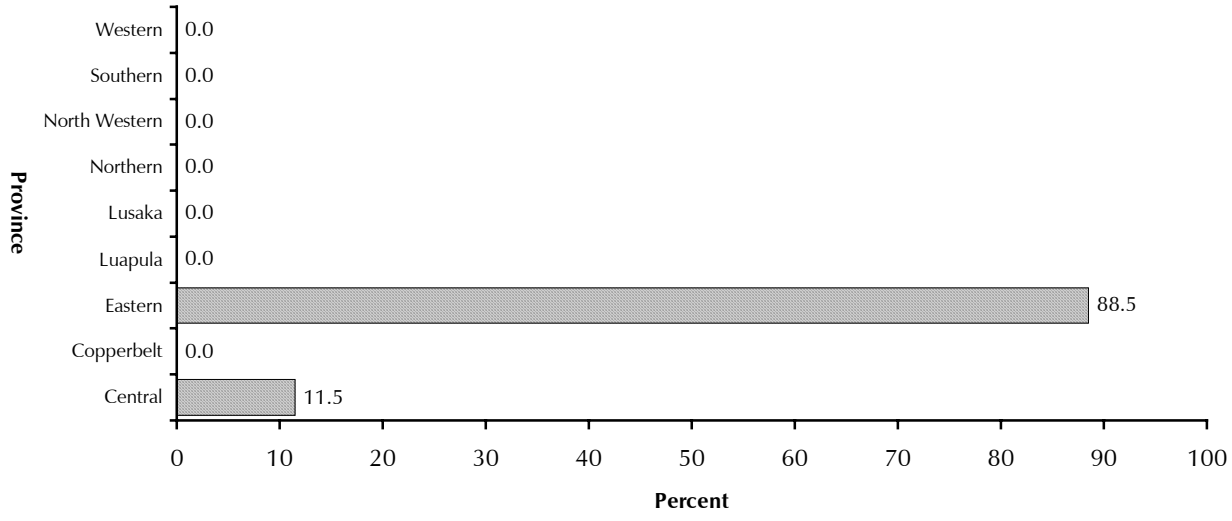


5.12.2. Burley Tobacco Production

An estimated 3,241 metric tonnes of burley tobacco were produced during 2002/2003 Agriculture season while 4,930 hectares were produced the previous season. Production of burley tobacco declined by 34.3 percent.

Most of the burley tobacco was produced in Eastern and Central provinces, accounting for 88.5 and 11.5 percent, respectively. For details refer to Figure 5.36.

Figure 5.36: Burley Tobacco Production by Province, 2002/2003



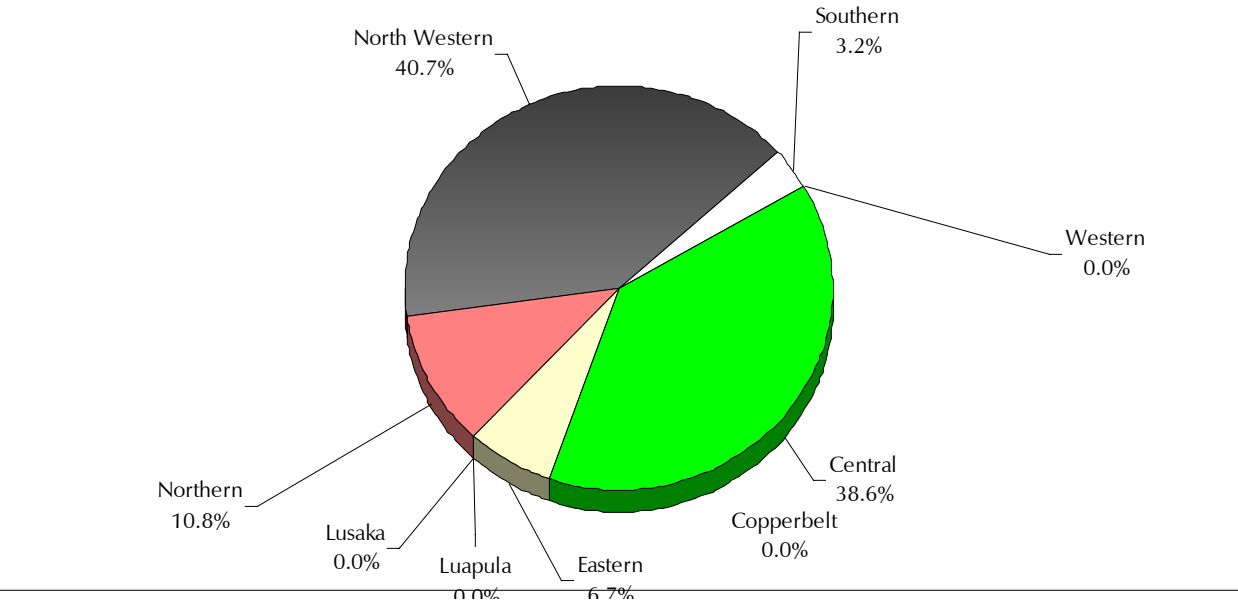
5.13. Potatoes (Irish)

Irish potatoes are not a commonly grown crop in the country. In the few districts where potatoes are grown, they are both used to raise cash and for food. The crop is mainly grown in five (5) provinces, namely, Copperbelt, Eastern, Northern, North-Western and Southern provinces.

The estimated number of irish potatoes growing households in 2002/2003 Agriculture season was 1,459 compared to 5,300 households that grew the crop the previous season. This was a decrease of 72.5 percent

The highest number of households growing irish potatoes was recorded in North-Western Province, accounting for 40.7 percent of the total. Copperbelt and Eastern provinces recorded 38.6 and 10.8 percent, respectively, of households growing irish potatoes. For details refer to Figure 5.37.

Figure 5.37: Irish Potatoes growing Households by Province, 2002/2003

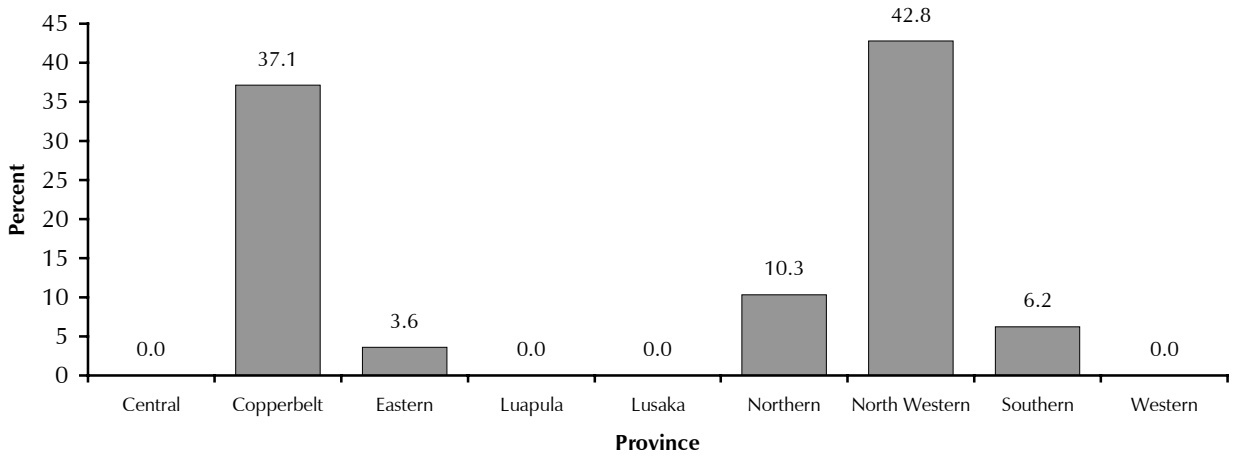


5.13.1. Area Planted to Irish Potatoes

The area planted to irish potatoes during the 2002/2003 Agriculture season was estimated at 388 hectares compared to 1,456 hectares that was planted the previous season. The decrease in area planted was 100 percent.

The highest proportion of area planted to Irish Potatoes was recorded in North-Western Province with 42.8 percent. Copperbelt and Northern provinces recorded 37.1 and 10.3 percent, respectively, of total area planted to irish potatoes. For details refer to Figure 5.38.

Figure 5.38: Area Planted to Irish Potatoes by Province, 2002/2003

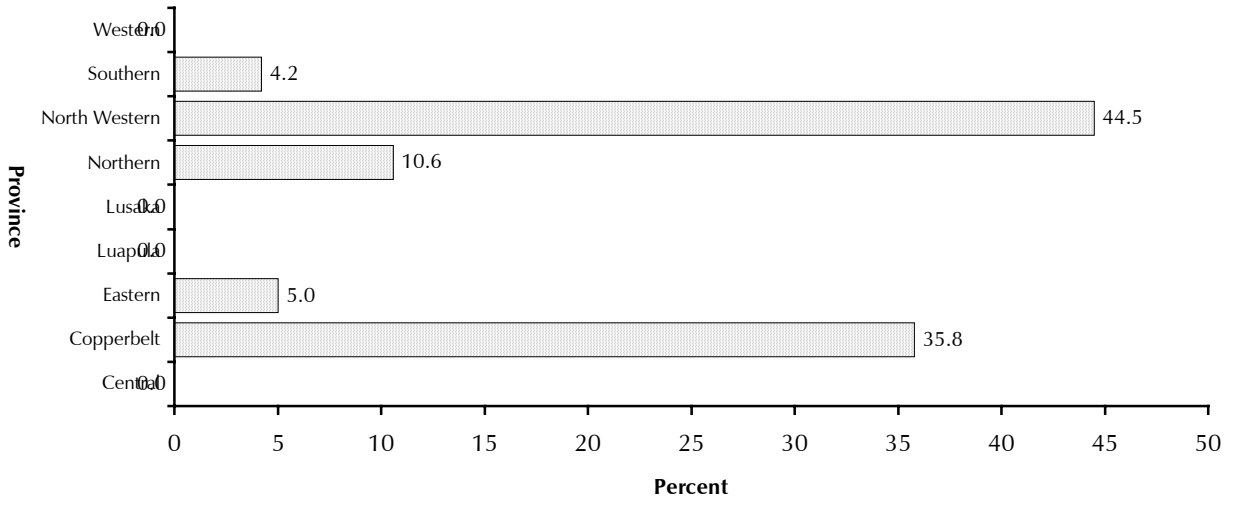


5.13.2. Irish Potatoes Production

An estimated 671 metric tonnes of irish potatoes were produced during 2002/2003 Agriculture season compared to 2,955 metric tonnes produced the previous season. The decline in production was 77.3 percent.

Most of the potatoes were produced in North-Western and Copperbelt provinces, accounting for 44.5 and 35.8 percent, respectively. For details refer to Figure 5.39.

Figure 5.39: Irish Potato Production by Province, 2002/2003



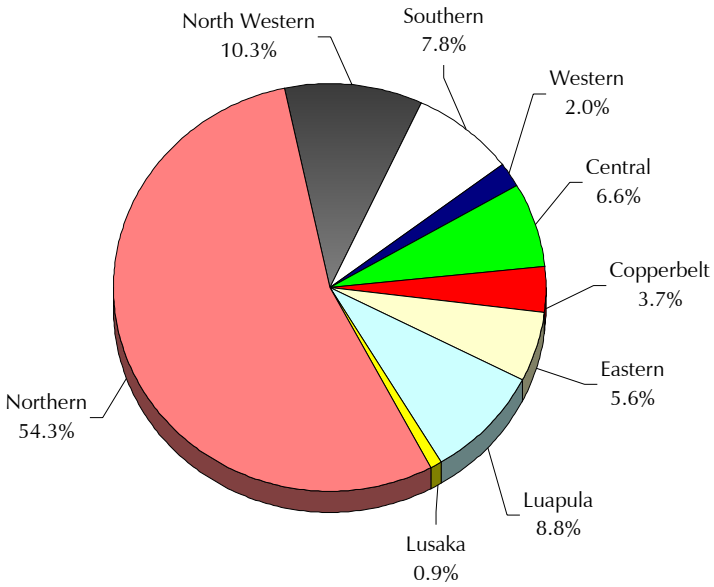
5.14. Mixed Beans

Mixed beans are both a food and cash crop grown in many parts of the country especially in Northern Province.

There were 124,285 households that reported to have grown mixed beans during the 2002/2003 agricultural season compared to 104,085 households that grew the crop the previous season. This was an increase of 19.4 percent.

The largest number of households that grew mixed beans was in Northern Province with 54.3 percent of the total mixed beans growing households. Luapula and Southern provinces recorded 8.8 and 7.8 percent respectively. For details refer to Figure 5.40

Figure 5.40: Mixed Beans growing Households by Province, 2002/2003

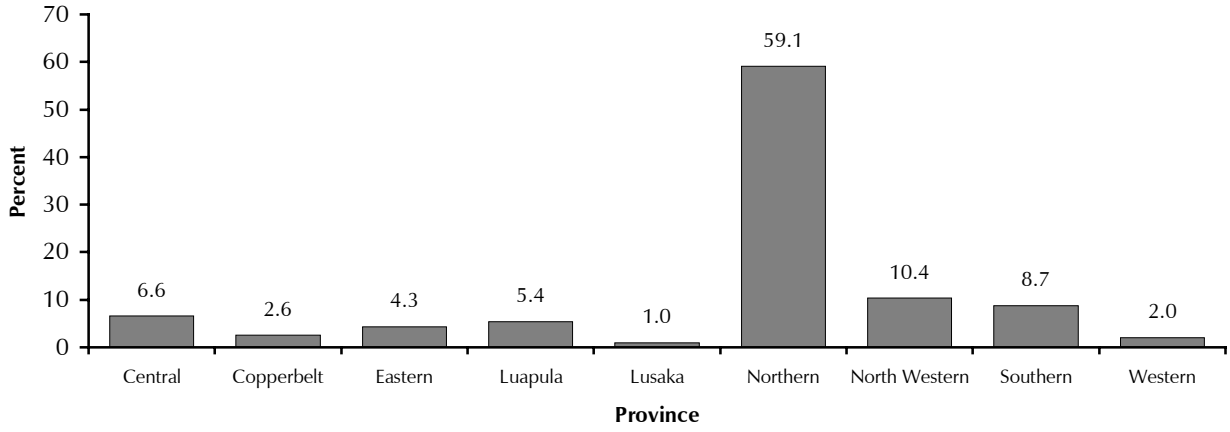


5.14.1. Area Planted to Mixed Beans

The total area planted to mixed beans during the 2002/2003 Agriculture season was estimated at 43,586 hectares compared to 40,043 hectares that was planted the previous season. The area planted to mixed beans during the season increased slightly by 8.9 percent.

Northern and North-Western provinces recorded the highest proportions of area planted to mixed beans with 59.1 and 10.4 percent, respectively. Southern Province recorded 8.7 percent of the total area planted to mixed beans. The remaining provinces recorded less than 7 percent each of total area planted to mixed beans. For details refer to Figure 5.41.

Figure 5.41: Area Planted to Mixed Beans by Province, 2002/2003

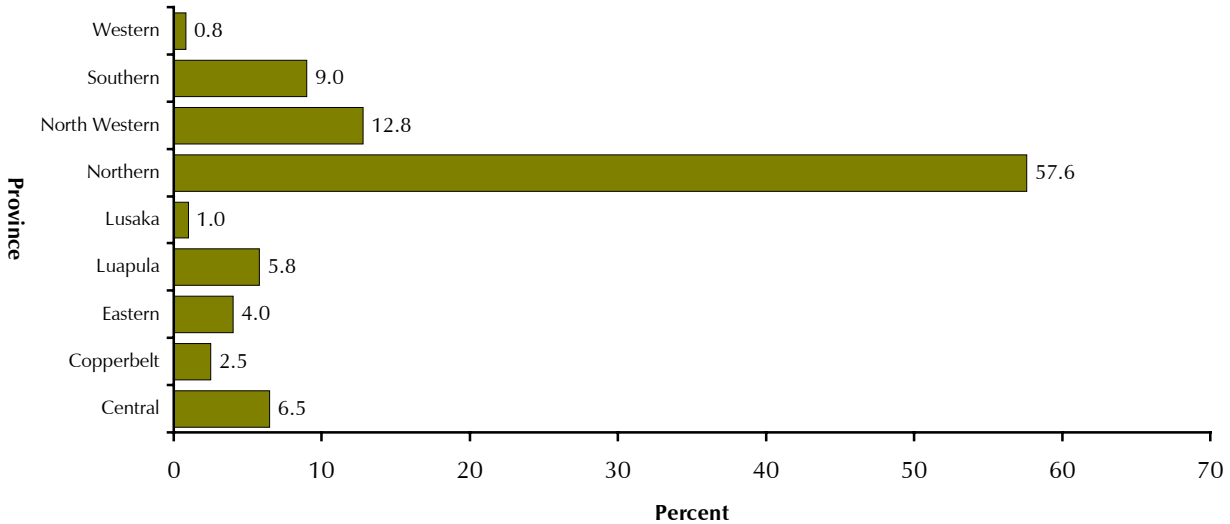


5.14. 2. Mixed Beans Production

The total amount of mixed beans produced during the 2002/2003 agriculture season was 19,788 metric tonnes. During the previous season, 19,911 metric tonnes were produced. The decrease in production was 0.6 percent.

Northern Province recorded the highest proportion of mixed beans produced during the 2002/2003-agriculture season at 57.6 percent, followed by North-Western Province with 12.8 percent. Southern Province recorded 9.0 percent of mixed beans produced. Lowest proportions of mixed beans production were recorded in Copperbelt, Eastern, Luapula, Lusaka and Western provinces. For details refer to figure 5.42.

Figure 5.42: Mixed Beans Production by Province, 2002/2003



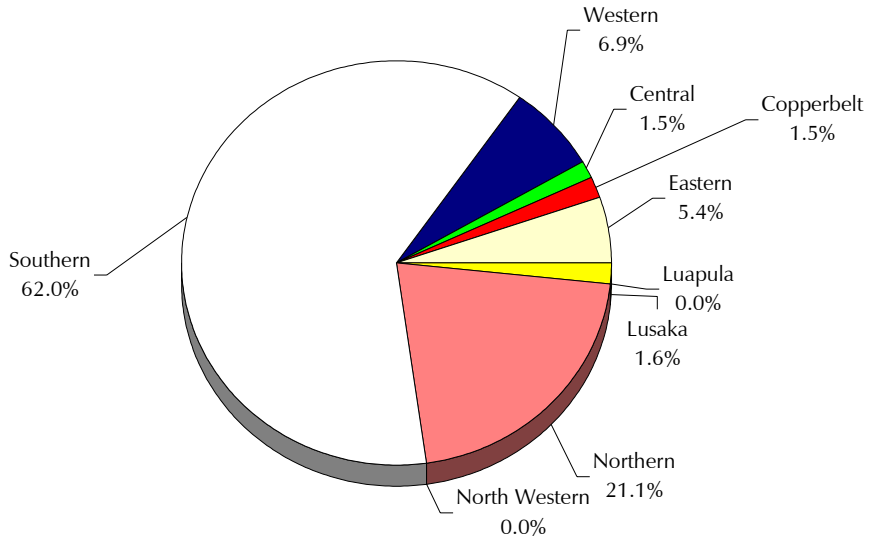
5.15. Cowpeas

Cowpeas are grown both for food and cash, especially in Southern Province. Some Districts in Southern Province were identified for cowpeas production under the Cowpea Pilot Project sponsored by the International Fund for Agricultural Development (IFAD) under the Southern Province Household Food Security Project (SPHFSP). Cowpeas are drought resistant and that is the main reason why Southern Province was chosen since it is drought prone. Previously, Northern Province used to be the major producer of cowpeas in the country.

There were 19,865 households that reported to have grown mixed beans during the 2002/2003 agricultural season compared to 10,848 households during the previous season. The number of households growing cowpeas increased by 83.0 percent during the 2002/2003-agriculture season.

The largest number of households that grew cowpeas was in Southern Province with 62.0 percent. Northern Province accounted for 21.1 percent of the total cowpeas-growing households. Western and Eastern provinces recorded 6.9 and 5.4 percent, respectively. Central, Copperbelt and Lusaka provinces recorded less than 2 percent of cowpeas growing households. For details refer to Figure 5.43.

Figure 5.43: Cowpeas growing Households by Province, 2002/2003

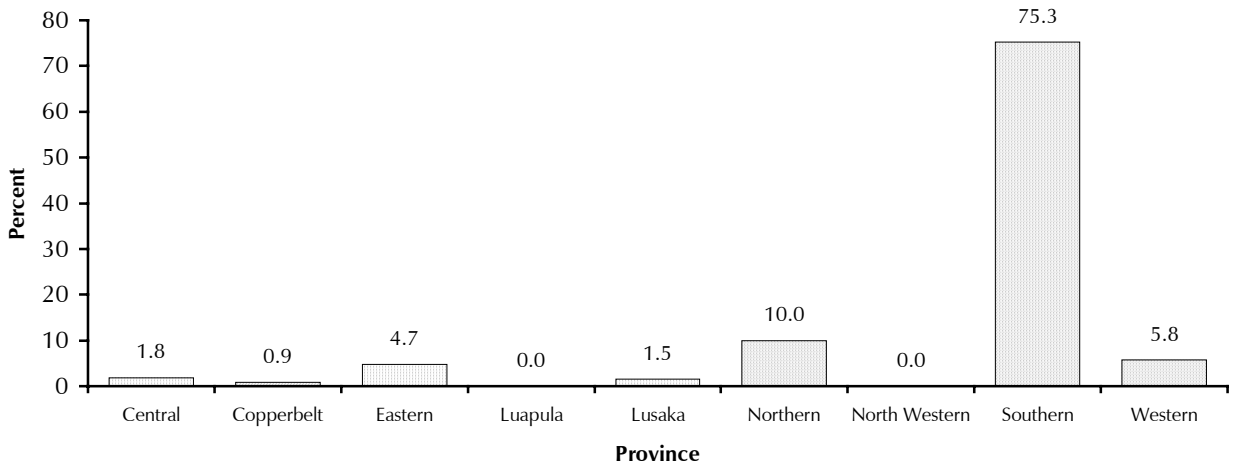


5.15.1. Area Planted to Cowpeas

The total area planted to cowpeas during the 2002/2003 Agriculture season was estimated at 5,852 hectares compared to 2,639 hectares the previous season. This was an increase of 122.0 percent.

Southern and Northern provinces recorded the highest proportions of area planted to cowpeas with 75.3 and 10.0 percent, respectively. Western Province recorded 5.8 percent of the total area planted to cowpeas. The remaining provinces recorded less than 5 percent each of total area planted to cowpeas. For details refer to Figure 5.44.

Figure 5.44: Area Planted to Cowpeas by Province, 2002/2003

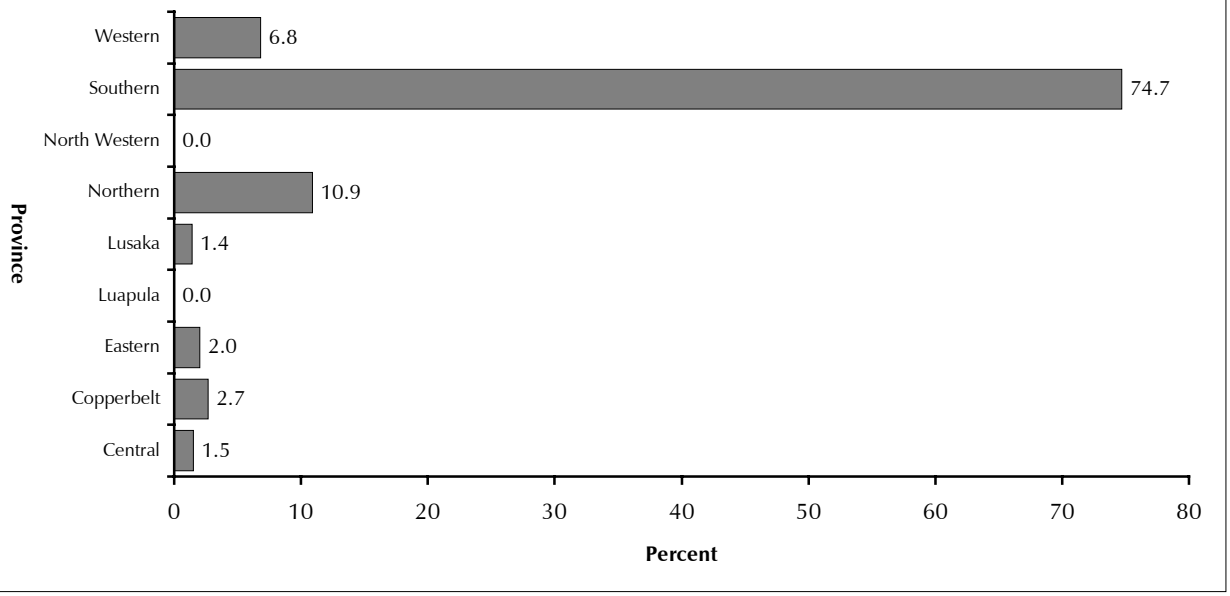


5.15. 2. Cowpeas Production

The total amount of cowpeas produced during the 2002/2003 agriculture season was 2,204 metric tonnes compared to 752 metric tonnes the previous season. Production of soya beans increased by 193.1 percent.

Southern Province recorded the highest proportion of cowpeas produced at 74.7 percent, followed by Northern Province with 10.9 percent. Western Province recorded 6.8 percent of cowpeas produced. Lowest proportions of cowpeas production were recorded in Copperbelt, Eastern, Lusaka and Central provinces. For details refer to figure 5.45.

Figure 5.45: Cowpeas Beans Production by Province, 2002/2003



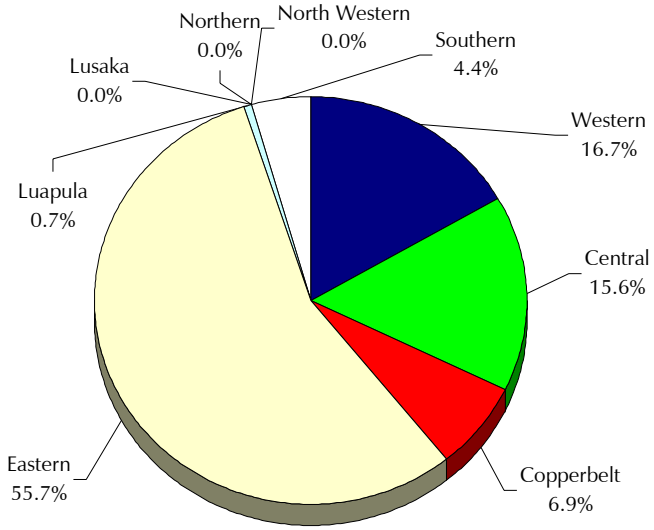
5.16. Paprika

Farmers mainly grow paprika for cash. The crop is used mainly in the food industry as a spice.

There were 2,813 households that reported to have grown paprika during the 2002/2003 agricultural season compared to 576 households that grew the crop the previous season. This was an increase of 388.4 percent.

The largest number of households that grew Paprika was in Eastern Province with 55.7 percent. Western Province accounted for 16.7 percent of the total paprika-growing households. Central and Copperbelt provinces recorded 15.6 and 6.9 percent, respectively. For details refer to Figure 5.46.

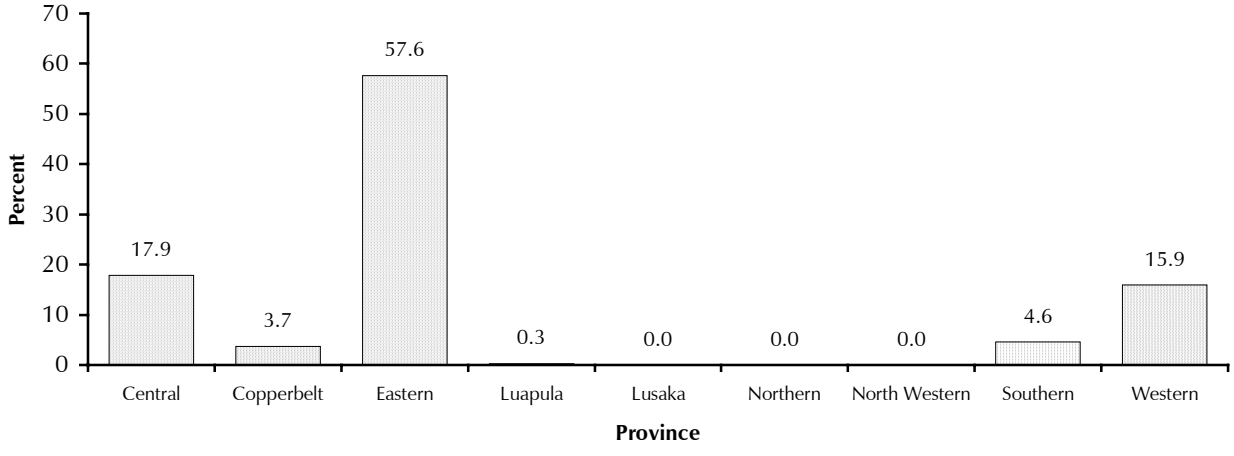
Figure 5.46: Paprika growing Households by Province, 2002/2003



5.16.1. Area Planted to Paprika

The total area planted to paprika during the 2002/2003-agriculture season was estimated at 1,155 hectares. Eastern and Central provinces recorded the highest proportions of area planted to paprika with 57.6 and 17.9 percent, respectively. Western Province recorded 15.9 percent of the total area planted to paprika. The remaining provinces recorded less than 5 percent each of total area planted to Paprika. For details refer to Figure 5.47.

Figure 5.47: Area Planted to Paprika by Province, 2002/2003

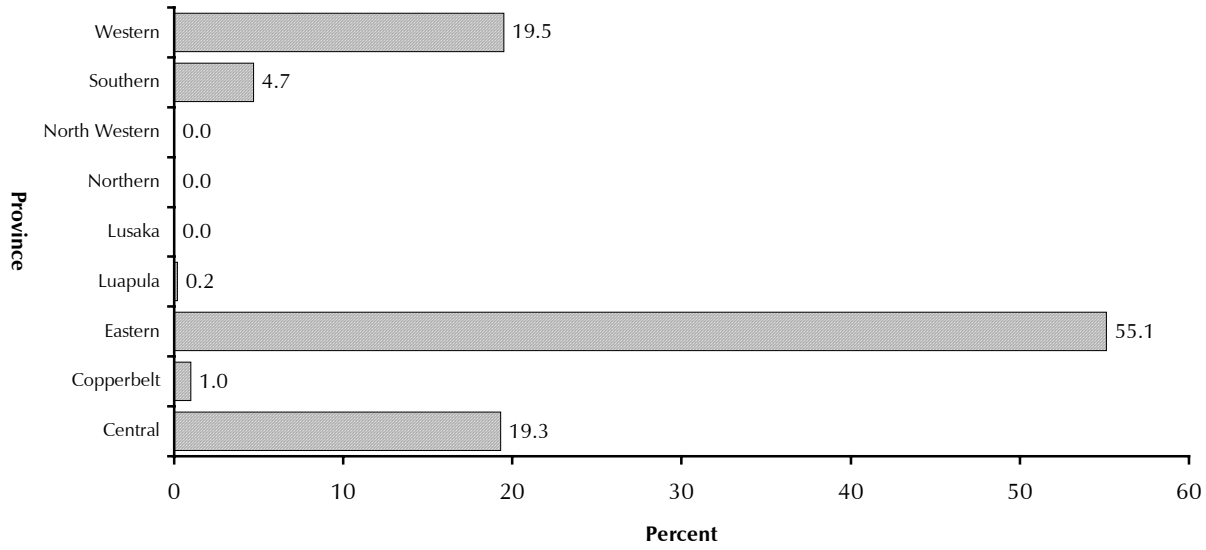


5.16.2. Paprika Production

The total amount of paprika produced during the 2002/2003 agriculture season was 486 metric tonnes.

Eastern Province recorded the highest proportion of paprika produced at 55.1 percent, followed by Western Province with 19.5 percent. Central Province recorded 19.3 percent of paprika produced. Lowest proportions of paprika production were recorded in Copperbelt, Luapula, and Southern provinces. For details refer to figure 5.48.

Figure 5.48: Paprika Production by Province, 2002/2003



5.17. Summary of Findings

- An estimated 760,515 households were reported to have grown maize during the 2002/2003 agricultural season compared to 648,050 households during the 2001/2002 agricultural season. This represents a 17.4 percent increase in the number of households of households reporting to have grown maize. The total area planted to maize during the 2002/2003 agricultural season was estimated at 581,982 hectares compared to 646,450 hectares during the previous season. This represents a decline of 10.0 percent. However, despite a decline in area planted, the quantity of maize produced increased to 869,964 metric tonnes compared to 664,116 metric tonnes during the 2002/2003 agriculture season. This was an increase of 31.0 percent.

- According to the findings 86.388 households were reported to have grown sorghum during the 2002/2003 agricultural season compared to 66,705 households during the 2001/2002 agricultural season. This represents an increase of 30.0. The total area planted to sorghum during the 2002/2003 agricultural season was estimated at 44,257 hectares compared to 33,872 hectares during the previous season. This represents an increase of 30.7 percent. Production of sorghum increased to 27,895 metric tonnes compared to 18,639 metric tonnes. This was an increase of 49.7 percent.

- During the 2002/2003 season, 34,895 households reported to have grown rice compared to 33,864 households during the 2001/2002 agricultural season. This represents an increase of 3.1 percent. The total area planted to rice during the 2002/2003 agricultural season was estimated at 11,869 hectares compared to 13,050 hectares during the previous season. This represents a decrease of 9.1 percent. The quantity of rice produced decreased to 14,703 metric tonnes compared to 19,210 metric tonnes. This was a decrease of 23.5 percent.

- An estimated 130,331 households reported to have grown millet during the 2002/2003 agricultural season compared to 133,881 households during the 2001/2002 agricultural season. This represents decrease of 2.7 percent. The total area planted to millet during the 2002/2003 agricultural season was estimated at 58,055 hectares compared to 61,347 hectares during the previous season. This represents a decrease of 5.4 percent. The quantity of millet produced was 35,463 metric tonnes compared to 40,282 metric tonnes. This was a decrease of 12.0 percent.

- About 377,765 households reported to have grown cassava during the 2002/2003 agricultural season compared to 278,759 households during the 2001/2002 agricultural season. This represents an increase of 3.8 percent. The total area under cassava during the 2002/2003 agricultural season was estimated at 228,199 hectares compared to 61,347 hectares during the previous season. This represents a decrease of 5.4 percent. The quantity of cassava produced decreased to 35,463 metric tonnes compared to 40,282 metric tonnes. This was a decrease of 12.0 percent.

- On the other hand, an estimated 336,194 households reported to have grown groundnuts during the 2002/2003 agricultural season compared to 372,498 households during the 2001/2002 agricultural season. This represents a decrease of 9.8 percent. The total area under groundnuts during the 2002/2003 agricultural season was estimated at 114,325 hectares compared to 139,015 hectares during the previous season. This represents a decrease of 17.8 percent. The quantity of groundnuts harvested decreased to 67,412 metric tonnes from 75,781 metric tonnes. This was a decrease of 11.0 percent.

- A total of 21,197 households reported to have grown soya beans during the 2002/2003 agricultural season compared to 17,190 households during the 2001/2002 agricultural season. This represents a decrease of 23.3 percent. The total area under soya beans during the 2002/2003 agricultural season was estimated at 8,599 hectares compared to 6,820 hectares during the previous season. This represents an increase of 26.18 percent. The quantity of soya beans harvested decreased to 9,051 metric tonnes from 3,348 metric tonnes. This was an decrease of 170.0 percent.

CHAPTER 6: FERTILIZER ACQUISITION AND APPLICATION

6.0. Introduction

This chapter gives an overview of the quantities of fertilizers and lime applied to different crops by province. Acquisition of the fertilizers will also be considered in this chapter in terms of the mode of acquisition, distance from point of distribution or purchase and how timely the households obtained their fertilizers for the 2002/2003 Agricultural Season. An increased agricultural production depends on timely acquisition and application of fertilizers.

6.1. Fertilizer Acquisition

Table 6.1.1 shows that a total of 968,788 agricultural households grow crops out of which 202,950 (21 percent) acquired fertilizers for the 2002/2003 agricultural season. This represents a 9.2 percent increase from 185,831 households that acquired in the 2001/2002 Agricultural Season. At national level, most households acquired fertilizer from commercial dealers (49.7 percent). Other main sources of fertilizers included, the Government cash program with 16.5 percent and the Food Security Pack from Program Against Malnutrition (PAM) with 13 percent of the households. Direct exchange and other free sources channels of transaction reported less than 8 percent each of the households acquiring fertilizers. Other free sources in this survey included free fertilizers from relatives or non-relatives, private institutions, NGO's, churches, etc. In Western Province, most farmers (35.0 percent) purchased fertilizer at subsidised price through the Government cash program. Luapula and North Western provinces small and medium scale farmers obtained their fertilizers mainly through the Government Food Security Pack, 40.9 percent and 44.7 percent, respectively.

Table 6.1.1: Number of households acquiring fertilizer by Channel and Province

Province	Total number of Crop-Growing Households	Number of Households Acquiring Fertilizers	Percent of Total Acquiring Fertilizers	Mode of Acquisition (percent)					
				Govt Cash Program	Govt Loan Program	Direct Exchange or Barter	Commercial Cash Purchases	Govt Food Security Pack (PAM)	Other Free Sources
Central	101,496	35,808	17.6	11.9	11.7	2.7	68.3	1.8	3.2
Copperbelt	63,216	16,353	8.1	9.1	10.9	0.5	58.7	17.7	3.2
Eastern	219,856	54,441	26.8	22.4	10.2	5.3	48.3	8	5.8
Luapula	98,497	6,000	3	6.2	7.4	7.9	37.6	40.9	-
Lusaka	16,439	8,559	4.2	13.8	3.8	3.7	70.8	4.5	3.4
Northern	182,502	27,118	13.4	18.5	3.3	3.4	39.8	34.4	0.7
N/Western	70,507	7,810	3.8	22.7	5.3	0.6	26.4	44.7	0.2
Southern	116,103	43,106	21.2	13.2	11.6	5	43.7	4.5	22
Western	100,171	3755	1.9	35	24.8	2	11.9	25.3	1
National	**968,788**	**202,950**	**100**	**16.5**	**9.6**	**3.9**	**49.7**	**13**	**7.3**

Table 6.1.2 shows that 22,378 metric tonnes of basal fertilizer and 22,522 metric tonnes of top dressing were acquired for the 2002/2003 agricultural season. This shows an increment of 1.2 and 1.8 percent from the results of the previous survey for basal and topdressing, respectively. Most of the fertilizers were distributed within 10 kilometres from the homesteads of the agricultural households, that is, 58.3 percent at national level. Only 43.7 percent of the households who purchased fertilizers from commercial dealers got it within 10 Km.

Table 6.1.2: Quantity in Metric Tonnes and Households acquiring fertilizers by Mode and Distance of Acquisition

Mode of Acquisition	Basal	Top	Households	Percent		
				0-10 Km	11-20 Km	>20 Km
Govt cash program	5,026	5,103	33,212	72.2	13.8	14.0
Govt loan program	2,630	2,473	19,495	69.6	17.6	12.8
Direct Exchange	884	884	7,897	77.4	13.5	9.1
Commercial cash purchase	10,771	11,176	100,913	43.7	24.0	32.3
Food Security Pack (PAM)	1,486	1,532	26,460	73.2	15.6	11.6
Other free sources	889	916	14,873	75.0	17.2	7.8
Total	**22,378**	**22,522**	**202,950**	**58.3**	**19.7**	**22.0**

The small and medium scale farmers were also asked on how timely they got their fertilizers per channel of acquisition used. The two tables below show the percentage of households who procured fertilizers in a particular province per particular mode of acquisition and whether these fertilizers were available at the time they needed them. At national level 61.8 percent of the households that obtained basal fertilizer through the Government cash programme said they got the fertilizer on time. The positive response to how timely the fertilizer was accessed varied as can be seen from the tables below from 100 percent through the government cash programme in Luapula province to zero percent through other free sources in North Western and Western province, which can be from NGO's, relatives or non relatives, institutions, churches etc.

Table 6.1.3: Timely Acquisition of Basal fertilizer by Mode

Province	Mode of Acquisition (percent)					
	Govt Cash Program	Govt Loan Program	Direct Exchange or Barter	Commercial Cash Purchases	Govt Food Security Pack (PAM)	Other Free Sources
Central	81.2	58.5	89.3	76.4	100	95.6
Copperbelt	41.8	85.9	93.7	95.9	30.3	96.0
Eastern	62.4	71.0	86.1	87.7	90.5	77.6
Luapula	100	95.1	7.2	64.7	39.4	-
Lusaka	62.2	70.2	100	83.7	64.5	65.2
Northern	59.8	46.5	85.5	71.7	66.8	30.2
N/Western	49.9	7.5	72.9	77.4	30	0.0
Southern	53.0	63.1	67.3	74.3	83.3	83.1
Western	64.4	46.2	100	90.2	50.2	0.0
National	**61.8**	**64.3**	**79.1**	**80**	**54.5**	**82.5**

Table 6.1.4: Timely Acquisition of Top dressing fertilizer by Mode

Province	Mode of Acquisition (percent)					
	Govt Cash Program	Govt Loan Program	Direct Exchange or Barter	Commercial Cash Purchases	Govt Food Security Pack (PAM)	Other Free Sources
Central	79.8	56.2	89.4	83.3	100	95.6
Copperbelt	51.2	64.5	100	95.6	31.6	96.0
Eastern	72.0	65.0	85.9	88.5	88.4	80.6
Luapula	100	75.7	45	60.9	30.1	-
Lusaka	67.5	55.3	100	84.9	73.3	100.0
Northern	55.7	56.9	85.4	69.5	57.4	30.2
N/Western	57.5	7.5	72.9	69.3	22.4	0.0
Southern	49.8	67.1	71.1	68.4	81.8	84.5
Western	71.6	17.5	100	83.1	50.2	0.0
National	**65.2**	**59.8**	**80.5**	**80.8**	**54.6**	**84.1**

6.2. Basal Dressing Fertilizer Application

Table 6.2 shows that a total of 22,475 metric tonnes of basal fertilizer was applied to various crops countrywide during the 2002/2003 Agricultural Season, which is an increment of 13.2 percent, compared to the previous season. The largest quantities of basal fertilizers was applied to crops in Eastern Province with 25.9 percent,

Central Province with 23.9 percent and Southern Province with 20.8 percent of the total amount applied countrywide in 2002/2003 Agricultural Season. The least quantity of basal fertilizer were applied to crops in Western, Luapula and North Western provinces with less than 4 percent each.

It is important to note that large quantities of fertilizers were applied to maize in all provinces in the 2002/2003 season. More than 84 percent in each province was applied to maize crop only. All the basal fertilizers in Luapula Province were applied to the maize crop. Apart from the crops indicated below, other crops, which reported application of fertilizers, are Seed cotton, Irish potatoes, Virginia Tobacco, Barley Tobacco, Mixed Beans and Paprika.

Table 6.2: Quantities of Basal Fertilizer Applied by Crop and Province, 2002/2003

Province	Total MT	Percent	Type of Crop (percent)								Total Percent
			Maize	Sorghum	Rice	Millet	Sunflower	Groundnuts	Soya beans	Other crops	
Central	5,366	23.9	96.3	-	-	-	0.1	-	0.9	2.7	100.0
Copperbelt	1,866	8.3	99.7	-	-	-	-	-	0.2	0.0	100.0
Eastern	5,832	25.9	84.4	-	-	-	0.1	-	-	15.5	100.0
Luapula	677	3.0	100.0	-	-	-	-	-	-	-	100.0
Lusaka	916	4.1	98.6	0.1	-	0.1	-	0.2	0.6	0.5	100.0
Northern	2,217	9.9	99.8	-	-	-	0.1	-	-	0.1	100.0
N/Western	539	2.4	99.0	-	0.4	-	-	0.3	-	0.3	100.0
Southern	4,669	20.8	99.9	-	-	-	-	-	0.1	0.0	100.0
Western	393	1.7	98.9	-	-	-	-	-	-	0.1	100.0
Zambia	**22,475**	**100**	**94.9**	**0.0**	**0.0**	**0.0**	**0.1**	**0.0**	**0.3**	**4.7**	**100.0**

6.3. Top-dressing Fertilizer Application

Table 6.3 shows that a total of 23,467 metric tonnes of top dressing fertilizer was applied to various crops countrywide during the 2002/2003 Agricultural Season. This represents a 13.3 percent increment from what was applied in the 2002/2003 Agricultural Season. Most of the fertilizer was applied in three provinces, Eastern, Central and Southern provinces with 25.9, 25.0 and 20.5 percent, respectively, of the total amount applied at national level. The rest of the provinces had less than ten percent each of the total top dressing fertilizer application.

Similarly, large quantities of top dressing fertilizer were applied to maize in all the provinces in the 2002/2003 Agricultural Season, with more than 89 percent of it in each province being applied to maize fields.

Table 6.3: Quantities of Top-Dressing Fertilizer Applied by Crop and Province, 2002/2003

Province	Total MT	Percent	Type of Crop (percent)								Total Percent
			Maize	Sorghum	Rice	Millet	Sunflower	Groundnuts	Soya beans	Other Crops	
Central	5,901	25.0	98.0	-	-	-	0.1	-	-	2.1	100.0
Copperbelt	2,140	9.5	99.9	0.1	-	-	-	0.0	0.0	-	100.0
Eastern	6,004	25.9	89.1	-	-	-	0.1	-	-	10.7	100.0
Luapula	669	2.8	99.9	-	0.1	-	-	-	-	-	100.0
Lusaka	872	3.7	99.0	0.1	-	0.1	-	0.2	0.1	0.4	100.0
Northern	2,085	8.9	100.0	-	-	-	-	0.0	-	0.0	100.0
N/Western	582	2.5	98.9	-	-	0.9	-	0.2	-	-	100.0
Southern	4,815	20.5	99.8	-	-	-	-	-	-	0.2	100.0
Western	398	1.7	98.2	-	-	-	-	-	-	1.8	100.0
Zambia	**23,467**	**100**	**96.4**	**0.0**	**0.0**	**0.0**	**0.1**	**0.0**	**0.0**	**3.0**	**100.0**

6.4. Lime Application

Liming is important for an increased crop production in soils that are acidic. Acidity in soils can be due to climatic conditions of an area, that is very hot and wet conditions which is typical of the northern regions of Zambia

namely Laupula , Northern and North Western Province. Prolonged use of inorganic fertilizers can also cause soil acidity and therefore liming is necessary to neutralise the acid in the soil for the fertilizers to be efficient and increase crop yield.

Large quantities of lime were applied to maize fields throughout the country in 2002/2003 Agricultural Season. A total of 1,091 metric tonnes of lime was applied countrywide. Out of this quantity, 32.6 percent was applied in Southern Province and Central Province with 31 percent. Lime application in Northern and Luapula Province was 9.3 and 8.9 percent of the national total, respectively. Note that lime application in North Western Province was found to be negligible from the results of this survey. Most of the lime was applied to maize fields with a national average of 87.5 percent of the total quantity. In Eastern province 25.3 percent of the lime was applied to Virginia tobacco fields while 11.6 and 11.3 percent was applied to Soya beans to Central and Lusaka provinces, respectively.

Table 6.4: Quantities of Lime Applied by Crop and Province, 2002/2003

Province	Total MT	Percent	Type of Crop (percent)								Total Percent
			Maize	Sorghum	Rice	Millet	V. Tobacco	Groundnuts	Soya beans	Other Crops	
Central	339	31.0	76.8	-	-	2.0	-	2.6	11.6	7.0	100.0
Copperbelt	77	7.1	90.1	-	-	-	-	2.8	1.4	5.7	100.0
Eastern	86	7.8	74.7	-	-	-	25.3	-	-	-	100.0
Luapula	97	8.9	92.3	-	-	-	-	7.7	-	-	100.0
Lusaka	25	2.3	88.7	-	-	-	-	-	11.3	-	100.0
Northern	102	9.3	94.6	-	-	-	-	5.4	-	-	100.0
Southern	355	32.6	97.1	-	-	-	-	-	1.5	1.4	100.0
Western	10	0.9	73.9	-	-	-	-	-	-	26.1	100.0
Zambia	**1,091**	**100.0**	**87.5**	**-**	**-**	**0.6**	**-**	**2.2**	**4.4**	**5.3**	**100.0**

This survey revealed that most of the fertilizers were procured on time and was within accessible distance from the farmers. However, only 21 percent of the total crop-growing households acquired fertilizers. Maize fields had the highest application of basal, top-dressing fertilizers and lime. It can be noted that there was a substantial application of lime in Southern and Central provinces and a corresponding high fertilizer application. These are major crop producers and large fertilizer application over the years has lead to soil acidity problems therefore large amounts of lime were used as compared to Northern, Luapula and North Western provinces, which have mostly acidic soils due to their climatic conditions.

6.5. Summary of Findings

Out of 968,788 crop-growing agricultural households, 202,950 (21 percent) acquired fertilizers using various modes or channels acquisition. The majority of these households procured their fertilizers from commercial dealers, 49.7 percent. An estimated 22,378 metric tonnes of basal and 22,522 top dressing fertilizers was acquired for the 2002/2003 Agricultural Season. Most of the households obtained fertilizers within 10 Kilometers of the their homesteads, that is 58.3 percent. All the modes or channels of acquisition reported more than 54 percent of farmers obtaining their fertilizers on time.

Approximately 22,475 and 23,497 metric tonnes of basal and top dressing fertilizers, respectively, were applied to crops nationwide. Eastern, Central and Southern provinces had the highest quantities of fertilizers applied to crops, more than 20 percent each. Most of the fertilizers were applied to maize fields with 94.6 percent for basal and 96.4 for top dressing fertilizers at national level. A total of 1,091 metric tonnes of lime was applied to various crops. Southern and Central provinces applied most of the lime with each reporting more than 30 percent of the total quantity lime. A large amount of lime was applied to maize fields, that is 87.5 percent of the total at national level.

CHAPTER 7: TILLAGE METHODS

7.0. Introduction

During the 2002/2003 Post Harvest Survey (PHS), data was collected on the main tillage methods used and the number of households using each tillage method. In all, seven alternative tillage methods used were considered and these were; conventional hand hoeing, ploughing, ridging, bunding and conservation tillage methods (i.e., pot holing, zero tillage, and ripping). This chapter discusses the proportion of households growing crops, tillage methods used and area under crops.

7.1. Maize

During the 2002/2003 Agricultural Season, 760,515 households grew maize. About 45.1 percent of the total maize-growing households used conventional hand hoeing as main tillage method. Over Twenty-nine percent (29.2) and 19.2 percent of maize growing households countrywide used ploughing and ridging tillage methods respectively. Conservation tillage methods (pot holing, zero tillage and ripping) and bunding were each used by less than 5 percent of the maize-growing households.

Within provinces, conventional hand hoeing method was commonly used in almost all provinces during the 2002/2003 Agricultural Season. In Lusaka, Eastern, Copperbelt, Central and North-Western provinces, the most common tillage method was conventional hand hoeing practiced by 66.7, 54.9, 54.9, 54.4 and 54.1 percent of the maize-growing households, while in Southern Province, the proportion of households using this method was only 15.8 percent.

About 8.7 and 6.4 percent of maize growing households in Lusaka and Southern provinces, respectively, used pot holing as main tillage method in their maize fields. Zero tillage method was not commonly used except in Eastern Province where 8.6 percent of maize growing households used this method.

Ploughing as main tillage method was reported mainly in Southern and Western provinces where 79.5 and 57.9 percent of maize growing households used this tillage method.

Ridging tillage method was commonly used in Northern, Luapula and North-western provinces where 59.0, 41.0 and 35.4 percent of maize growing households, respectively, used this tillage method during the 2002/2003 Agricultural Season. Southern and Western provinces did not report any households that used ridging as main tillage method in their maize fields.

Bunding tillage method was practiced mainly in Copperbelt, Luapula and Northern provinces where 11.9, 9.2 and 5.9 percent of maize growing households respectively, used this tillage method in 2002/2003 Agricultural Season. For details refer to Table 7.1 above.

Table 7.1: Maize Growing Households by Main Tillage Method Used and by Province, 2002/2003 Agricultural Season

Province	Estimated number of maize-growing households	Proportion of maize-growing households using each tillage method						
		Conventional hand hoeing	Pot holing	Zero tillage	Ploughing	Ripping	Ridging	Bunding
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Central	93,942	54.4	2.8	0.8	39.8	0.0	2.3	0.0
Copperbelt	60,914	54.9	0.9	0.1	4.6	1.2	27.2	11.9
Eastern	214,695	54.9	1.4	8.6	19.2	0.4	16.7	0.2
Luapula	30,328	48.7	0.0	0.9	0.1	0.0	41.0	9.2
Lusaka	16,405	66.7	8.7	2.1	20.8	0.9	1.0	0.0
Northen	101,883	32.9	0.3	0.3	2.5	0.0	59.0	5.9
North Western	53,473	54.1	0.7	0.7	5.6	0.3	35.4	3.1
Southern	103,485	15.8	6.4	0.6	79.5	0.6	0.0	0.1
Western	85,390	42.2	0.4	0.3	57.9	0.0	0.0	0.0
Total	**760,515**	**45.1**	**2.0**	**2.8**	**29.2**	**0.3**	**19.2**	**2.4**

Table 7.2 below shows the distribution in percentages, of area under maize by tillage method used. A total of 581,982 hectares of land was reported under maize in the 2002/2003 Agricultural Season. About 42.2 percent of

it was prepared using the ploughing method, while 35.7 percent was prepared by conventional hand hoeing method.

Eastern Province had the largest share of land area under maize (29.5 percent), followed by Southern (20.1 percent) and Central provinces with 16.1 percent. About 47 percent of the land under maize in Eastern Province was prepared by conventional hand hoeing method. Although Central Province reported a proportion of 54.4 percent of maize growing households who used conventional hand hoeing method in maize fields, these households only prepared 38.9 percent of the land area under maize in that province. A much higher proportion of land area (55.5 percent) under maize in Central Province was prepared by 39.8 percent of the maize-growing households using the ploughing method. In Southern Province, about 88.5 percent of the total land under maize was prepared by the ploughing method. For details refer to Table 7.2.

Table 7.2: Proportion of Land Area (percent) under Maize by Main Tillage Method and Province, 2002/2003 Agricultural Season

Province	Land area (Percent) under maize by tillage method							Total area under maize
	Conventional hand hoeing	Pot holing	Zero tillage	Ploughing	Ripping	Ridging	Bunding	
Central	38.9	3.7	0.3	55.5	.	2.0	.	93,622
Copperbelt	51.1	1.1	0.3	13.8	0.6	23.3	9.8	52,387
Eastern	50.0	1.1	8.7	23.4	0.6	18.9	0.3	171,728
Luapula	46.9	.	0.3	4.2	.	43.6	5.0	9,868
Lusaka	54.9	7.0	1.8	33.3	2.3	0.7	.	13,663
Northern	31.0.	0.2	0.0	5.0	.	58.6	5.2	46,138
North-western	48.4	0.3	0.7	9.9	0.7	38.0	2.0	29,842
Southern	6.8	3.4	0.4	88.5	0.8	.	0.1	117,171
Western	31.8	0.4	0.1	67.7	.	.	.	47,563
Total	**35.7**	**1.9**	**2.8**	**42.2**	**0.5**	**15.3**	**1.6**	**581,982**

7.2. Sorghum

An estimated 86,388 households were reported to have grown sorghum in 2002/2003 Agricultural Season and the most common tillage method used in these fields was conventional hand hoeing, used by 53.8 percent of the total sorghum-growing households countrywide. Ploughing was second and used by 30.1 percent of sorghum growing households. Ridging was third and used by 9.9 percent of the total sorghum-growing households. Conservation farming (zero tillage, pot holing and ripping) was used by less than 3 percent of the sorghum-growing households.

Conventional hand hoeing was mostly used by 87.6 percent of sorghum growing households in Eastern Province. Central Province recorded 83.4 percent of the households using conventional hand hoeing method. North-Western Province was third with 77.4 percent of households using conventional hand hoeing. Ploughing method recorded the highest in Southern Province where 74.0 percent of the households that grew sorghum used it during the 2002/2003 Agricultural Season. Ploughing was also common in Western Province where an estimated 55.2 percent used it to prepare the fields.

Table 7.3: Sorghum Growing Households by Main Tillage Method Used and Province, 2002/2003 Agricultural Season

Province	Estimated number of sorghum-growing households	Proportion of sorghum-growing households using each tillage method						
		Conventional hand hoeing	Pot holing	Zero tillage	Ploughing	Ripping	Ridging	Bunding
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Central	9,786	83.4	0.9	1.5	14.2	0.0	0.0	0.0
Copperbelt	8,199	68.1	0.0	0.0	6.9	0.0	11.4	13.6
Eastern	7,528	87.6	0.0	10.1	0.0	0.0	2.3	0.0
Luapula	2,028	12.8	0.0	0.0	0.0	0.0	1.9	85.3
Lusaka	269	44.9	43.7	0.0	11.4	0.0	0.0	0.0
Northern	11,740	45.4	0.0	0.0	3.0	0.0	51.0	0.6
North-western	8,989	77.4	0.0	3.3	0.4	0.0	15.9	3.1
Southern	14,634	22.5	0.8	2.6	74.0	0.0	0.0	0.0
Western	23,215	43.7	0.0	1.0	55.2	0.0	0.1	0.0
Total	**86,388**	**53.8**	**0.4**	**2.1**	**30.1**	**0.0**	**9.9**	**3.7**

At national level, 44,257 hectares of land was under sorghum in 2002/2003 Agricultural Season. Of this land 25.3 percent was in Western and 24.4 percent was in Southern Province. Much of the land under sorghum (48.0

percent) was prepared using the conventional hand hoeing method while ploughing was used to prepare 41.8 percent of the total land under sorghum.

In Northern Province the most significant tillage method was ridging with 51.0 percent of the sorghum-growing households using it. The area prepared using ridging method was almost the same as area prepared by conventional hand hoeing method in Northern Province. For details refer to Table 7.4.

Table 7.4: Proportion of Land Area (percent) under Sorghum by Main Tillage Method and Province, 2002/2003 Agricultural Season

Province	Land area (Percent) by tillage method							Total area
	Conventional hand hoeing	Pot holing	Zero tillage	Ploughing	Ripping	Ridging	Bunding	
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Central	69.2	0.4	0.7	29.7	.	.	.	4,890
Copperbelt	69.1	.	.	13.2	.	11.4	6.3	5,066
Eastern	89.1	.	7.9	.	.	3.0	.	2,361
Luapula	2.5	.	.	.	.	1.6	95.9	642
Lusaka	30.0	47.0	.	23.0	.	.	.	100
Northen	32.8	.	.	34.1	.	32.9	0.2	4,147
North-western	84.3	.	3.9	10.0	.	10.0	0.8	5,035
Southern	24.9	0.3	3.5	71.3	.	.	.	10,799
Western	35.0	.	0.8	64.2	.	0.0	.	11,216
Total	**48.0**	**0.2**	**2.1**	**41.8**	**.**	**5.7**	**2.2**	**44,257**

7.3. Millet

An estimated 130,331 households were reported to have grown millet during the 2002/2003 Agricultural Season. The most common tillage method used by these households was conventional hand hoeing, which was used by 55.7 percent of the total millet-growing households. The second and third most common tillage methods used in the millet fields' country-wide were zero tillage, used by 17.1 percent and ploughing, used by 16.5 percent.

Conventional hand hoeing was commonly used in Lusaka, Central and Eastern Provinces where more than 75 percent of the households used this tillage method. Zero tillage was common in Luapula Province where 55.7 percent of the households used it to prepare the millet fields. In Northern and Copperbelt provinces, more than 20 percent of the households in the two provinces used the zero tillage method in preparing the millet fields. Ploughing method was used commonly by millet growing households in Southern and Western provinces with 72.4 and 46.1 percent, respectively.

Table 7.5: Millet Growing Households by Main Tillage Method and Province 2002/2003 Agricultural Season

Province	Estimated number of millet-growing households	Proportion of millet-growing households using each tillage method						
		conventional hand hoeing	Pot holing	Zero tillage	Ploughing	Ripping	Ridging	Bunding
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Central	9,258	81.1	0.4	6.5	2.8	0.0	7.7	1.4
Copperbelt	881	63.6	0.0	33.4	3.1	0.0	0.0	0.0
Eastern	7,796	76.6	0.0	7.7	10.9	0.0	3.5	1.4
Luapula	6,121	41.7	0.0	55.7	0.0	0.0	2.0	0.5
Lusaka	120	88.6	0.0	0.0	11.4	0.0	0.0	0.0
Northern	69,167	56.7	0.1	24.7	2.2	0.0	9.2	8.0
North Western	2,446	43.1	0.0	11.6	0.0	0.0	40.6	4.7
Southern	11,157	26.7	0.0	0.0	72.4	0.9	0.0	0.0
Western	23,384	53.9	0.0	0.0	46.1	0.0	0.0	0.0
Total	**130,331**	**55.7**	**0.1**	**17.1**	**16.5**	**0.1**	**6.5**	**4.5**

An estimated 58,055 hectares of land was under millet in 2002/2003 Agricultural Season. Northern and Western Provinces had large portions of land under millet with 45.3 percent and 31.1 percent, respectively. Western Province recorded more land under millet prepared using ploughing method as compared to land prepared by conventional hand hoeing method. However, there were fewer households recorded in Western Province, which used ploughing method. For details refer Table 7.6.

Table 7.6: Proportion of Land Area (percent) under Millet by Main Tillage Method, and Province, 2002/2003 Agricultural Season

Province	Land area (Percent) by tillage method							Total area (Ha)
	Conventional hand hoeing	Pot holing	Zero tillage	Ploughing	Ripping	Ridging	Bunding	
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Central	81.4	0.3	6.8	2.2	.	8.5	0.8	4,331
Copperbelt	79.5	.	13.0	7.5	.	.	.	284
Eastern	71.5	.	8.2	14.2	.	2.0	4.1	2,092
Luapula	45.7	.	52.4	.	.	0.8	1.1	1,932
Lusaka	95.3	.	.	4.7	.	.	.	64
Northern	53.0	0.0	26.0	7.3	.	6.9	6.8	26,327
North-western	28.3	.	6.5	.	.	60.8	4.4	675
Southern	23.9	.	.	74.9	1.2	.	.	4,264
Western	41.3	.	.	58.7	.	.	.	18,083
Total	**49.6**	**0.0**	**14.5**	**27.8**	**51**	**4.6**	**3.4**	**58,055**

7.4: Groundnuts

An estimated 336,194 households grew groundnuts during the 2002/2003 Agricultural Season. The most prevalent tillage method used by households that grew groundnuts was conventional hand hoeing used by 53.6 percent. The next common methods of tillage were ridging and ploughing used by 20.7 and 18.0 percent of the groundnuts growing households, respectively. Conservation tillage (zero tillage, pot holing and ripping) and bunding were each used by less than 4 percent of the households growing groundnuts.

The distribution of households growing groundnuts varies by province. Eastern, Northern and Luapula Provinces accounted for most of the groundnuts growing households with 37.2, 28.5 and 10.8 percent, respectively.

During the 2002/2003 Agricultural Season conventional hand hoeing was common in all the provinces except in Southern Province. Western Province recorded an insignificant number of households that grew groundnuts during the 2002/2003 Agricultural Season. Ridging ranked second after the conventional hand hoeing method, with Northern, Luapula, North Western and Eastern provinces recording 28.8, 25.3, 24.4 and 21.9 percent, respectively.

Households growing groundnuts in Southern, Central, Lusaka and Eastern provinces commonly used ploughing as a tillage method. However, ploughing method was not very common in Luapula and Northern provinces where proportions of less than 2 percent were recorded. Pot holing, zero tillage, ripping and bunding are not commonly used methods of tillage for groundnut fields in all provinces in Zambia. Less than 10 percent of households growing groundnuts used these methods in each province during the 2002/2003 Agricultural Season.

Table 7.7: Groundnuts Growing Households by Main Tillage Method and Province, 2002/2003 Agricultural Season

Province	Estimated number of groundnut-growing households	Proportion of groundnut-growing households using each tillage method						
		Conventional hand hoeing	Pot holing	Zero tillage	Ploughing	Ripping	Ridging	Bunding
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Central	15,634	49.2	0.0	1.2	38.5	0.6	8.8	1.6
Copperbelt	12,178	79.4	0.2	0.1	8.7	0.0	5.0	6.6
Eastern	125,198	51.6	1.1	5.2	19.5	0.2	21.9	0.4
Luapula	36,383	62.5	0.0	3.2	0.3	0.0	25.3	8.8
Lusaka	3,529	63.3	2.5	3.5	30.4	0.0	0.3	0.0
Northen	95,787	58.4	0.0	5.2	1.7	0.1	28.8	6.0
North Western	13,929	58.9	0.1	0.0	15.2	0.2	24.4	1.2
Southern	21,097	10.7	1.4	0.0	86.5	1.3	0.1	0.0
Western	0	-	-	-	-	-	-	-
Total	**336,194**	**53.6**	**0.5**	**3.9**	**18.0**	**0.2**	**20.7**	**3.2**

Overall, 114,325 hectares of land was under groundnuts in 2002/2003 Agricultural Season. Conventional hand hoeing tillage method was used in 46 percent of the total land under groundnuts in Zambia. Ploughing and ridging tillage methods were used to prepare 26.6 and 21 percent of the total land under groundnuts, respectively.

Proportionately, Eastern Province recorded the highest percentage of area under groundnuts at 45.1 percent followed by Northern Province at 21.4 percent. For details, refer to Table 7.8.

Table 7.8: Proportion of Land Area (percent) under Groundnuts by Tillage Method by Province, 2002/2003 Agricultural Season

Province	Land area (Percent) by tillage method							Total area
	Conventional hand hoe	Pot holing	Zero tillage	Ploughing	Ripping	Ridging	Bunding	
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Central	36.7	.	0.4	57.8	0.3	4.4	0.3	6,174
Copperbelt	70.2	0.1	0.1	17.1	.	3.9	8.6	3,636
Eastern	43.0	0.9	4.0	26.2	0.2	25.0	0.6	51,754
Luapula	63.5	.	1.4	0.8	0.3	28.6	5.4	9,413
Lusaka	54.7	2.2	3.5	39.0	.	0.6	.	1,135
Northern	59.0	0.0	4.5	2.4	0.1	27.1	6.9	24,336
North-western	44.8	0.1	.	28.6	0.2	25.8	0.6	5,265
Southern	4.7	0.9	.	91.3	3.0	0.1	.	9,009
Western	48.6	.	0.1	51.3	.	.	.	3,604
Total	**46.0**	**0.5**	**3.0**	**26.6**	**0.4**	**21.0**	**2.5**	**114,325**

7.5. Rice

About 34,895 households were reported to have grown rice during the 2002/2003 Agricultural Season. Of these, 84.3 percent used the conventional hand hoeing and 11.3 percent used ploughing as the main tillage methods. Zero tillage method was used by 3.1 percent of households that grew rice, while ridging and bunding methods were each used by less than 1 percent of the total rice growing households. Pot holing and ripping tillage methods were not practiced in any rice fields in Zambia during the 2002/2003 Agricultural Season.

Table 7.9: Rice Growing Households by Main Tillage Method and Province, 2002/2003 Agricultural Season.

Province	Estimated number of rice-growing households	Proportion of rice-growing households using each tillage method						
		Conventional hand hoeing	Pot holing	Zero tillage	Ploughing	Ripping	Ridging	Bunding
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Central	639	100.0	0.0	0.0	0.0	0.0	0.0	0.0
Copperbelt	39	100.0	0.0	0.0	0.0	0.0	0.0	0.0
Eastern	15,848	93.3	0.0	2.8	2.7	0.0	0.0	1.2
Luapula	1,652	89.7	0.0	4.2	0.0	0.0	3.9	2.2
Northen	11,211	91.2	0.0	5.0	2.4	0.0	1.2	0.3
North Western	99	54.9	0.0	0.0	45.1	0.0	0.0	0.0
Western	5,407	40.8	0.0	0.0	59.2	0.0	0.0	0.0
Total	**34,895**	**84.3**	**0.0**	**3.1**	**11.3**	**0.0**	**0.6**	**0.7**

Rice growing was mainly reported in Eastern, Northern and Western provinces where about 93.3, 91.2 and 40.8 percent of the rice growers, respectively used the conventional hand hoeing method. In Western Province, 59.2 percent used the ploughing method.

An estimated 11,869 hectares of land was under rice in the 2002/2003 Agricultural Season. Conventional hand hoeing method was used to prepare 76.3 percent of this area. The ploughing method was used to prepare 20.6 percent while the remaining 3.1 percent was prepared using zero tillage, ridging and bunding tillage methods.

All land reported under rice in Central and Copperbelt Provinces was prepared by conventional hand hoeing tillage method. In Eastern Province, 95 percent of the land under rice was prepared by conventional hand hoeing method. Conventional hand hoeing method was also used to prepare 87.9 percent of land under rice in Northern Province. In Western Province however, most of the land under rice (77.1 percent) was prepared using the ploughing method.

Table 7.10: Proportion of Land Area (percent) under Rice by Tillage Method and Province, 2002/2003 Agricultural Season

Province	Land area (Percent) by tillage method							Total area (Ha)
	Conventional hand hoeing	Pot holing	Zero tillage	Ploughing	Ripping	Ridging	Bunding	
Central	100	.	.	.	.	.	.	51
Copperbelt	100	.	.	.	.	.	.	29
Eastern	95.0	.	3.0	1.4	.	.	0.5	4,420
Luapula	93.3	.	2.6	.	.	3.1	1.0	388
Northern	87.9	.	3.9	7.7	.	0.3	0.2	4,329
North-western	17.5	.	.	82.5	.	.	.	40
Western	22.9	.	.	77.1	.	.	.	2,611
Total	**76.3**	**.**	**2.6**	**20.6**	**.**	**0.2**	**0.3**	**11,869**

7.6: Cotton

The estimated number of households that grew cotton in 2002/2003 Agricultural Season was 88,426. Ploughing was the most common tillage method used by 43.5 percent of the cotton-growing households. Conventional hand hoeing method was the second most common method used by 37 percent of the households growing cotton. Ridging method was third used by 17.5 percent of the households while conservation tillage methods (pot holing, zero tillage and ripping) were used by less than 2 percent of the total cotton-growing households countrywide.

Eastern Province with 69.7 percent reported a higher percentage of cotton-growing households. About 46.4 percent of these households used conventional hand hoeing method to prepare cotton fields. In the same province, ploughing method was used by 26.6 percent. In Southern and Central Provinces, 91.2 and 77.6 percent of households growing cotton used the ploughing method as main tillage method.

Table 7.11: Cotton Growing Households by Main Tillage Method used and Province, 2002/2003 Agricultural Season

Province	Estimated number of cotton-growing households	Proportion of cotton-growing households using each tillage method						
		Conventional hand hoeing	Pot holing	Zero tillage	Ploughing	Ripping	Ridging	Bunding
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Central	17,034	20.7	1.8	0.0	77.6	0.0	0.0	0.0
Eastern	61,598	46.4	0.8	0.5	26.6	0.3	25.1	0.4
Lusaka	458	9.9	2.9	0.0	87.1	0.0	0.0	0.0
Northern	97	100.0	0.0	0.0	0.0	0.0	0.0	0.0
Southern	8,995	5.8	3.7	0.0	91.2	0.0	0.0	0.0
Western	243	0.0	0.0	0.0	100.0	0.0	0.0	0.0
Total	**88,426**	**37.0**	**1.3**	**0.4**	**43.5**	**0.2**	**17.5**	**0.2**

The total land area under cotton was estimated at 85,568 hectares. At national level, 51 percent of land under cotton was prepared by the ploughing method, while 28.9 percent of this land was prepared by using the conventional hand hoeing method.

Table 7.12: Proportion of Land Area (percent) under Cotton by Tillage Method and Province, 2002/2003 Agricultural Season

Province	Land area (Percent) by tillage method							Total area
	Conventional hand hoeing	Pot holing	Zero tillage	Ploughing	Ripping	Ridging	Bunding	
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Central	20.3	1.3	.	78.4	.	.	.	23,248
Eastern	37.8	0.8	0.6	30.4	0.2	30.0	0.2	51,740
Lusaka	9.7	3.4	.	86.9	.	.	.	383
Northern	100	.	.	.	.	.	.	73
Southern	3.4	5.3	.	91.3	.	.	.	9,836
Western	.	.	.	100	.	.	.	288
Total	**28.9**	**1.5**	**0.4**	**50.9**	**0.1**	**18.2**	**0.1**	**85,568**

Eastern Province with 60.5 percent had a higher percentage of the total land area under cotton. The most common tillage methods used in Eastern Province were conventional hand hoeing, ploughing and ridging with 37.8, 30.4 and 30.0 percent of the area under cotton, respectively. About 46.4 percent of households growing cotton used conventional hand hoeing method to prepare 37.8 percent of the total land under cotton in Eastern

Province. Similarly, 26.6 percent of cotton growing households used the ploughing method to prepare 30.4 percent of the land under cotton in the same province.

In Southern Province, 91.3 percent of the land under cotton was prepared using the ploughing method and this was done by 91.2 percent of cotton growing households. Conventional hand hoeing was used in only 3.4 percent of the land under cotton by 5.8 percent of the households that grew cotton in Southern Province. Tables 7.11 and 7.12 give details.

7.7: Mixed Beans

An estimated 124,285 households grew mixed beans during the 2002/03 Agricultural Season. The main tillage method used by 47.8 percent of the mixed beans growing households in Zambia during the 2002/2003 Agricultural Season, was the ridging method. Conventional hand hoeing and ploughing methods ranked second and third with 31.4 and 9.9 percent, respectively, of the households growing mixed beans. Conservation tillage was not so common in the mixed beans fields during the 2002/2003 Agricultural Season.

Table 7.13: Mixed Beans Growing Households by Main Tillage Method and Province, 2002/2003 Agricultural Season

Province	Estimated number of mixed beans-growing households	Proportion of mixed beans-growing households using each tillage method						
		Conventional hand hoeing	Pot holing	Zero tillage	Ploughing	Ripping	Ridging	Bunding
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Central	8,219	25.8	0.0	0.0	4.2	2.2	64.4	3.4
Copperbelt	4,589	38.6	0.0	0.0	5.8	0.4	18.8	36.5
Eastern	6,997	56.2	0.0	11.9	14.8	0.0	17.1	0.0
Luapula	10,965	42.1	0.0	0.0	0.0	0.0	37.4	21.9
Lusaka	1,163	70.5	0.0	0.0	29.5	0.0	0.0	0.0
Northern	67,497	27.8	0.5	0.3	2.3	0.1	62.6	7.1
North Western	12,778	36.9	0.0	1.4	0.6	0.0	43.6	17.3
Southern	9,642	9.6	8.0	0.0	79.0	3.3	0.0	0.0
Western	2,435	54.9	0.0	0.0	45.1	0.0	0.0	0.0
Total	**124,285**	**31.4**	**0.9**	**1.0**	**9.9**	**0.5**	**47.7**	**9.1**

Central and Northern provinces recorded 64.4 percent and 62.6 percent, respectively, of the mixed beans growing households using the ridging method of tillage. Ploughing recorded the highest in Southern province where 79.0 percent of the mixed beans growing households used it. In Western province, 45.1 percent of the households that grew mixed beans used the ploughing method to prepare the fields.

An estimated 43,586 hectares of land was under mixed beans in 2002/03 Agricultural Season. The main tillage method used in the mixed beans fields was the ridging method, used to prepare 40.6 percent of the total land under mixed beans nation wide by 47.7 percent of the households that grew mixed beans. Conventional hand hoeing was used to prepare 30.8 percent of the land under mixed beans by 31.4 percent of the households. For more details, see table 7.14.

Table 7.14: Proportion of Land Area (percent) under Mixed Beans by Tillage Method and Province, 2002/2003 Agricultural Season

Province	Land area (Percent) by tillage method							Total area
	Conventional hand hoeing	Pot holing	Zero tillage	Ploughing	Ripping	Ridging	Bunding	
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Central	18.1	.	.	4.6	2.0	72.6	2.7	2,880
Copperbelt	33.4	.	.	11.0	0.9	15.6	39.1	1,114
Eastern	43.8	.	5.6	23.9	.	26.6	.	1,859
Luapula	39.9	.	.	.	.	41.4	18.7	2,363
Lusaka	72.0	.	.	28.0	.	.	.	421
Northern	30.2	0.3	0.6	6.0	0.2	47.3	15.4	25,770
North-western	42.3	.	1.0	0.8	.	39.7	16.2	4,530
Southern	10.6	5.9	.	75.9	7.6	.	.	3,793
Western	41.6	.	.	58.4	.	.	.	856
Total	**30.8**	**0.7**	**0.7**	**13.3**	**0.9**	**40.6**	**13.0**	**43,586**

7.8 Sweet potatoes

At national level, a total of 104,661 sweet potato growing households were recorded in 2002/2003 Agricultural Season. Of these, 41.9 percent used the ridging method while 27.8 percent and 23.6 percent used conventional hand hoeing and bunding method, respectively. Pot holing, zero tillage and ripping were only used by less than 1 percent each of the sweet potato growing households.

In Northern Province, the main tillage method was ridging, used by 61.8 percent of the households growing sweet potatoes and these prepared 56.2 percent of the land under mixed beans. The ridging method was also widely used in Central Province where 52.3 percent of the sweet potato growing households used this method to prepare 46.2 percent of the total land under sweet potatoes. The bunding method was significant in Copperbelt and Lusaka provinces where 65.4 percent and 64.6 percent of the households that grew sweet potatoes used it.

Table 7.15: Sweet Potato Growing Households by Main Tillage Method and Province, 2002/2003 Agricultural Season

Province	Estimated number of sweet potato-growing households	Proportion of sweet potato-growing households using each tillage method						
		Conventional hand hoeing	Pot holing	Zero tillage	Ploughing	Ripping	Ridging	Bunding
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Central	17,211	33.2	0.0	0.0	4.7	0.0	52.3	9.8
Copperbelt	13,826	13.4	0.0	0.0	0.1	0.0	21.1	65.4
Eastern	5,937	61.5	0.0	0.0	9.2	0.0	20.6	8.7
Luapula	6,622	63.8	0.0	0.0	0.0	0.0	29.0	7.2
Lusaka	1,461	25.1	0.0	0.0	6.1	0.0	4.2	64.6
Northern	35,211	18.6	0.2	0.2	0.0	0.0	61.8	19.2
North Western	9,845	24.5	0.0	0.0	0.0	6.8	34.6	34.1
Southern	7,487	8.0	0.2	0.0	55.1	0.0	21.1	15.6
Western	7,060	52.5	0.0	0.0	8.5	0.4	28.2	10.4
Total	**104,661**	**27.8**	**0.1**	**0.1**	**5.9**	**0.7**	**41.9**	**23.6**

Ripping was mainly practiced by 6.8 percent of the households growing sweet potatoes on 2.4 percent of the total land under sweet potatoes in North Western province. The use of conservation tillage methods was insignificant in all the provinces.

Table 7.9: Proportion of Land Area (percent) under Sweet Potatoes by Tillage Method and Province, 2002/2003 Agricultural Season

Province	Land area (Percent) by tillage method							Total area
	Conventional hand hoeing	Pot holing	Zero tillage	Ploughing	Ripping	Ridging	Bunding	
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Central	37.0	.	.	8.4	.	46.2	8.4	6,689
Copperbelt	12.6	.	.	0.1	.	22.7	64.6	4,029
Eastern	37.1	.	.	20.9	.	22.7	19.3	1,078
Luapula	60.1	.	.	.	.	36.4	3.6	1,102
Lusaka	31.2	.	.	8.9	.	5.1	54.8	314
Northern	20.7	0.2	0.1	.	.	56.2	22.7	7,344
North-western	13.0	.	.	.	2.4	21.7	62.9	3,422
Southern	5.6	0.5	.	60.1	.	19.8	14.0	2,436
Western	53.3	.	.	11.4	0.7	30.9	3.7	1,566
Total	**25.3**	**0.1**	**0.0**	**8.8**	**0.3**	**37.6**	**27.9**	**27,980**

7.9: Cassava

The number of cassava growing households at national level was estimated at 377,765. Of these, 47.5 percent used conventional hand hoeing method, 26.2 percent used the ridging method and the bunding method was used by 21.9 percent of the cassava-growing households.

Table 7.17: Cassava Growing Households by Main Tillage Method and Province, 2002/2003 Agricultural Season

Province	Estimated number of cassava-growing households	Proportion of cassava-growing households using each tillage method						
		Conventional hand hoeing	Pot holing	Zero tillage	Ploughing	Ripping	Ridging	Bunding
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Central	16,239	6.9	0.0	0.3	0.2	0.5	62.7	29.4
Copperbelt	11,060	18.8	0.0	1.7	0.4	0.0	16.6	63.4
Eastern	3,732	51.0	2.3	23.6	0.0	0.8	19.7	2.7
Luapula	95,530	60.3	4.5	9.1	0.1	0.1	22.3	17.2
Lusaka	943	85.2	0.0	5.2	7.4	0.0	0.0	2.2
Northern	154,963	39.1	1.2	12.0	0.3	0.0	39.8	17.6
North Western	48,369	35.1	1.3	0.8	0.6	0.0	6.9	55.7
Southern	785	78.5	0.0	0.0	13.1	0.0	0.0	8.4
Western	46,145	81.8	2.5	0.8	15.2	0.1	0.0	0.0
Total	**377,765**	**47.5**	**2.1**	**7.7**	**2.1**	**0.1**	**26.2**	**21.9**

Conventional hand hoeing method was commonly used in Lusaka and Western provinces by 85.2 and 81.8 percent of the cassava-growing households, respectively. Southern and Luapula provinces recorded 78.5 and 60.3 percent of the households using conventional hand hoeing method, respectively.

The second most common tillage method was ridging widely practiced by 62.7 percent of the cassava-growing households in Central Province. Ridging was used by 39.8 percent of the cassava-growing households in Northern Province.

The third most common tillage method, practiced by 63.4, 55.7 and 29.4 percent of the households growing cassava in Copperbelt, North Western and Central provinces, respectively, was bunding.

Conservation tillage methods were not widely used except for the zero tillage method, which was used by 23.6 percent of cassava growing households in Eastern Province. Zero tillage method was also used by 12 percent of cassava-growing households in Northern Province. For details refer to Table 7.17.

Most of the land under cassava was prepared using conventional hand hoeing method which accounted for 43.9 percent of the total reported land under cassava during the 2002/2003 Agricultural Season.
Out of the land prepared using conventional hand hoeing method, 35.7 percent was in Luapula Province, 35.1 percent in Northern Province and 18.1 percent was in Western Province.

In Northern Province, 39.8 percent of the cassava-growing households used the ridging method to prepare 37.5 percent of the total land under cassava in that Province. The ridging method was also used to prepare 18.7 percent of the total land under cassava in Luapula Province. Refer to Table 7.18 for details.

Table 7.18: Proportion of Land Area (percent) under Cassava by Tillage Method and Province, 2002/2003 Agricultural Season

Province	Land area (Percent) by tillage method							Total area
	Conventional hand hoeing	Pot holing	Zero tillage	Ploughing	Ripping	Ridging	Bunding	
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Central	4.9	.	0.1	0.4	0.2	63.3	31.1	10,070
Copperbelt	33.8	.	0.9	0.4	.	11.7	53.2	4,651
Eastern	39.2	1.4	9.6	.	1.2	46.6	2.0	1,454
Luapula	56.6	3.0	5.5	0.1	0.0	18.7	16.1	63,236
Lusaka	92.1	.	2.0	5.0	.	.	0.9	597
Northern	34.6	1.1	10.6	0.1	.	37.5	16.1	101,598
North-western	35.6	0.9	0.5	1.3	.	6.5	55.2	22,053
Southern	61.3	.	.	25.8	.	.	12.9	124
Western	74.2	1.8	0.4	23.5	0.1	.	.	24,416
Total	**43.9**	**1.6**	**6.4**	**2.8**	**0.0**	**25.8**	**19.5**	**228,199**

7.10: Soya Beans

An estimated 21,197 households grew soya beans in the 2002/2003 Agricultural Season. The main tillage method used by 49 percent of these households was conventional hand hoeing method while 29.3 percent and 19

percent used the ridging and ploughing methods, respectively. Conservation tillage was not so common to the soya beans growing households in the nation.

Table 7.19: Soya Beans Growing Households by Main Tillage Method used and Province, 2002/2003 Agricultural Season

Province	Estimated number of soya bean-growing households	Proportion of soya bean-growing households using each tillage method						
		Conventional hand hoeing	Pot holing	Zero tillage	Ploughing	Ripping	Ridging	Bunding
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Central	4,292	34.5	3.0	0.0	45.2	2.3	15.0	0.0
Copperbelt	1,511	60.0	0.0	0.0	1.9	1.3	25.1	11.7
Eastern	8,168	47.0	0.0	0.0	20.8	0.0	32.2	0.0
Luapula	1,373	80.5	0.0	0.0	0.0	0.0	19.5	0.0
Lusaka	240	22.9	0.0	0.0	77.1	0.0	0.0	0.0
Northern	5,116	54.8	0.0	0.0	2.5	0.0	42.2	0.5
North Western	191	13.1	0.0	0.0	0.0	0.0	70.0	16.8
Southern	279	62.6	18.7	0.0	18.7	0.0	0.0	0.0
Western	27	100.0	0.0	0.0	0.0	0.0	0.0	0.0
Total	**21,197**	**49.1**	**0.9**	**0.0**	**19.0**	**0.6**	**29.3**	**1.1**

Of the total households that grew soya beans in 2002/2003 Agricultural Season, Eastern Province recorded the highest soya beans growing households while Northern province ranked second with 38.5 and 24.1 percent, respectively.

Table 7.20: Proportion of Land Area (percent) under Soya Beans by Tillage Method and Province, 2002/2003 Agricultural Season

Province	Land area (Percent) by tillage method							Total area (Ha)
	Conventional hand hoe	Pot holing	Zero tillage	Ploughing	Ripping	Ridging	Bunding	
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Central	31.4	1.9	.	59.4	0.5	6.8	.	2,413
Copperbelt	56.7	.	.	6.9	4.8	26.3	5.3	418
Eastern	33.5	.	.	26.8	.	39.7	.	4,176
Luapula	84.3	.	.	.	.	15.7	.	254
Lusaka	30.7	.	.	69.3	.	.	.	153
Northern	63.2	.	.	4.2	.	32.0	0.6	1,077
North-western	4.7	.	.	.	.	76.7	18.6	43
Southern	57.4	21.3	.	21.3	.	.	.	61
Western	100	.	.	.	.	.	.	3
Total	**39.3**	**0.7**	**.**	**31.9**	**0.4**	**27.3**	**0.4**	**8,599**

Eight thousand, five hundred and ninety nine (8,599) hectares of land was under soyabeans in the 2002/2003 Agricultural Season. About 48.6 percent of this land was in Eastern province, 28.1 and 12.5 percent were in Central and Northern provinces, respectively. Conventional hand hoeing method was used to prepare 39.3 percent of the total land under soya beans. This method was used by 100 percent, 80.5 percent and 62.6 percent of the soya beans-growing households in Western, Luapula and Southern provinces, respectively. For details refer to table 7.20.

7.11: Summary of Findings

At national level, a total of 760,515 maize-growing households were recorded in 2002/03 Agricultural Season. The main tillage method was conventional hand hoeing used by 45.1 percent of these households, on 35.7 percent of the total land (581,982 hectares) under maize in the country. Although more maize-growing households used the conventional hand hoeing method to prepare the maize fields in 2002/2003 Agricultural Season, more land under maize (42.2 percent) was prepared using the ploughing method by 29.2 percent of the maize-growing households countrywide.

An estimated 86,388 sorghum-growing households were recorded during the 2002/2003 Agricultural Season. A total of 44,257 hectares of land was under sorghum during the season. The main tillage method was conventional hand hoeing used by 53.8 percent of the sorghum-growing households. This method was used to prepare 48 percent of the land under sorghum at national level.

One million, thirty thousand, three hundred and thirty-one (130,331)households grew millet in 2002/2003 Agricultural Season. The widely practiced tillage method used by the households was conventional hand hoeing and this was used in preparing 49.6 percent of the total land (58,055 ha) under millet in Zambia.

A total of 336,194 households grew groundnuts in 2002/2003 Agricultural Season. Eastern province had the highest number of households growing groundnuts in Zambia with 37.2 percent. About 53.6 percent of the groundnut-growing households countrywide, used the conventional hand hoeing method. This method was used to prepare 46 percent of 114,325 hectares under groundnuts nation wide.

Rice growing was only reported in Central, Copperbelt, Eastern, Luapula, Northern, North Western and Western provinces during the 2002/2003 Agricultural Season. An estimated 34,895 households grew rice.. About 84.3 percent of these households used the conventional hand hoeing method to prepare 76.3 percent of 11,869 hectares of land under rice.

A total of 88,426 cotton-growing households were recorded during the 2002/2003 Agricultural Season and a total of 85,568 hectares of land was under this crop. The main tillage method was ploughing used by 43.5 percent of the total households growing cotton. This method was used to prepare 50.9 percent of the land under cotton at national level.

An estimated 124,285 households grew mixed beans in 2002/2003 Agricultural Season. About 54.3 percent of the households that grew mixed beans were in Northern Province. The main tillage method was ridging used by 47.7 percent of the households that grew mixed beans. A total of 43,586 hectares of land was under mixed beans and the ridging method was used in preparing 40.6 percent of that land.

One hundred and four thousand six hundred and sixty-one households grew sweet potatoes in 2002/03 Agricultural Season. The widely practiced tillage method was ridging used by 41.9 percent of these households and this method was used in preparing 37.6 percent of 27,980 hectares of land under millet. in Zambia.

Cassava growing households were estimated at 377,765 in 2002/2003 Agricultural Season. Northern Province with 41 percent had the highest record of cassava-growing households. The main tillage method was conventional hand hoeing used by 47.5 percent of these households to prepare 43.9 percent of 100,223 hectares of land under cassava.

At national level, households that grew soya beans were estimated at 21,197. The main tillage method was the conventional hand hoeing used by 49.1 percent of the soya beans-growing households. This method was used to prepare 39.3 percent of the 8,599 hectares of land under soya beans in Zambia.

CHAPTER 8: MAIN POWER SOURCES USED FOR TILLAGE

8.0. Introduction

During the 2002/2003 Post Harvest Survey; data on main power sources used for tillage were collected. The main sources of power used to till the fields were categorized into five main groups namely own animal power, hired or borrowed animal power, own mechanical power, hired or borrowed mechanical power and manual power (or human power).

This chapter of the report discusses the main power sources used for tillage of fields for particular crops and the proportions of households using each of these main power sources. The analysis is done at both national and provincial levels.

Generally, the data from tables 8.1 to 8.7 showed that the predominant power sources used for tillage of fields for all crops among small and medium scale farming - households in Zambia were manual power, hired or borrowed animal power and own animal power.

8.1. Main Sources of Power for Tillage (Maize Fields)

Maize is the major crop grown by both small and medium scale farmers in Zambia. The total number of maize fields reported during the 2002/2003 Post Harvest Survey was 853,524; shared among 760,515 households. The most common power source used for tilling these fields was manual power (i.e. human power).

The proportions of households reported to have used manual power for tilling maize fields at national level was about 69.0 percent. Hired or borrowed animal power reported by 19.0 percent households was second; followed by own animal power reported by 12.5 percent of the maize – growing households. However, only few households (i.e. 0.3 percent and 0.1 percent) reported having used hired or borrowed mechanical power and own mechanical power for tillage respectively.

Within provinces, manual or human power remained the major source of power for tilling maize fields, with Luapula Province ranking high recording about 99.7 percent of households using this particular power source, followed by Northern Province recording 97.5 percent and Copperbelt Province 95.0 percent of maize-growing households. However, usage of manual power for tilling maize fields was less common in Southern and Western Provinces, which recorded 24.6 and 46.0 percent of maize growing households respectively.

Own animal and hired or borrowed animal power were also commonly used for tilling maize fields. Southern Province ranked high in usage of these two power sources for tillage; recording 22.8 percent and 55.3 percent of maize-growing households utilizing own animal power and hired or borrowed animal power respectively.

Table 8.1: Proportion of Maize-growing households by Power Source by Province During the 2002/2003 Agriculture Season

Province	Estimated Number of Maize Fields	Estimated Number of Households	Proportion of Maize-growing households using a particular power source				
			Own animal Draft power	Hired or Borrowed Animal Power	Own Mechanical Power	Hired or Borrowed Mechanical Power	Manual Power
Central	96,168	93,942	16.6	23.3	0.0	0.3	59.9
Copperbelt	68,601	60,914	1.8	2.9	0.2	0.9	95.0
Eastern	232,083	214,695	15.6	14.0	0.0	0.1	71.5
Luapula	31,555	30,328	0.1	0.2	0.0	0.0	99.7
Lusaka	18,065	16,405	6.2	12.2	0.4	2.2	79.2
Northern	108,812	101,883	1.6	0.9	0.0	0.0	97.5
North Western	55,454	53,473	2.6	3.8	0.0	0.0	93.6
Southern	137,780	103,485	22.8	55.3	0.1	0.1	24.6
Western	105,007	85,390	20.4	33.8	0.3	0.5	46.0
Zambia Total	**853,524**	**760,515**	**12.5**	**19.0**	**0.1**	**0.3**	**69.0**

8.2. Main Sources of Power for Tillage (Sorghum Fields)

Sorghum is among the crops being encouraged as an alternative crop in drought prone areas. At national level about 86,388 households reported having grown sorghum. These households reported to have grown a total of 87,941 sorghum fields. Nationally, the most common power source used for tilling these fields was manual power reported by 71.5 percent of sorghum – growing households, followed by hired or borrowed animal power reported by 14.9 percent of households. About 13.6 percent of the households reported to have used own animal power to till sorghum fields.

The highest percentages of sorghum growing - households, that reported using manual power for tilling their fields at provincial level, were in Eastern, Luapula, North Western, Northern and Copperbelt provinces. Each of these five provinces recorded having more than 90 percent of sorghum growing - households that used manual power for tilling their sorghum fields.

The small proportions of sorghum – growing households using manual power in Southern and Western provinces indicated that they depended less on this particular power source for tillage as compared to the other provinces. Each of these two provinces reported less than 50 percent of households using this power source for tilling sorghum fields.

Besides manual power, hired or borrowed animal and own animal power sources were some of the main power sources used for tilling sorghum fields in Southern and Western Provinces. In Southern Province alone about 40.8 and 25.8 percent of the households used hired or borrowed animal power and own animal power respectively as the major power sources for tilling sorghum fields. Western Province reported having had about 24 percent and 29 percent of sorghum growing - households using hired or borrowed animal and own animal power for tillage respectively.

Table 8.2: Proportion of Sorghum-growing households by Power Source by Province During the 2002/2003 Agricultural Season

Province	Estimated Number of Sorghum Fields	Estimated Number of Households	Proportion Of Sorghum-Growing Households Using A Particular Power Source				
			Own animal Draft power	Hired or Borrowed Animal Power	Own Mechanical Power	Hired or Borrowed Mechanical Power	Manual Power
Central	9,786	9,786	8.2	8.4	0.0	0.0	83.4
Copperbelt	8,206	8,199	1.7	5.5	0.0	0.2	92.6
Eastern	7,528	7,528	0.0	0.0	0.0	0.0	100.0
Luapula	2,028	2,028	0.0	0.0	0.0	0.0	100.0
Lusaka	269	269	2.6	0.0	8.8	0.0	88.6
Northern	11,740	11,740	3.0	0.0	0.0	0.0	97.0
North Western	9,068	8,989	0.2	0.2	0.0	0.0	99.6
Southern	15,437	14,634	25.8	40.8	0.1	0.0	33.3
Western	23,879	23,215	28.6	24.2	0.0	0.0	47.3
Zambia Total	**87,941**	**86,388**	**13.6**	**14.9**	**0.0**	**0.0**	**71.5**

8.3. Main Sources of Power for Tillage (Groundnuts Fields)

The total number of groundnut fields reported countrywide was 342,940 fields; which was shared among 336,194 groundnuts-growing households.

The data in table 8.3 shows that at national level, 77.7 percent of households used manual power as the main power source for tilling groundnuts fields; while in 11.6 percent of households, own animal power was reported as the main power source for tillage; followed by hired or borrowed animal power which was commonly used among 10.6 percent of groundnuts growing – households as the main power source for tillage.

At provincial level, data from table 8.3 indicates that usage of manual power as the main power source for tilling groundnuts fields was common among groundnuts-growing households in Luapula, Northern, Copperbelt and North-Western provinces. In fact, nearly all groundnuts-growing households in Luapula and Northern provinces used manual power for tillage of groundnuts field. Southern Province recorded the least proportion of groundnuts-growing households using manual power for tillage, (11.9 percent).

Hired or borrowed animal power was very common among groundnuts-growing households in Southern Province reported by 50.9 percent households followed by own animal power reported by 37.1 percent groundnuts-

growing households. Western Province also recorded significant proportions of households using these two power sources. About 22.4 percent and 22.2 percent of groundnuts – growing households in Western provinces reported usage of hired or borrowed animal power and own animal power as their main sources of power for tillage of groundnut fields, respectively.

Table 8.3: Proportion of Groundnuts-growing households by Power Source by province

Province	Estimated Number of Groundnuts Fields	Estimated Number of Households	Proportion of Groundnuts-growing households using a particular power source				
			Own animal Draft power	Hired or Borrowed Animal Power	Own Mechanical Power	Hired or Borrowed Mechanical Power	Manual Power
Central	15,634	15,634	18.6	19.7	0.0	0.0	61.7
Copperbelt	12,178	12,178	2.8	4.4	0.0	2.2	90.7
Eastern	125,500	125,198	18.1	12.6	0.0	0.0	69.3
Luapula	37,147	36,383	0.1	0.0	0.0	0.0	99.9
Lusaka	3,529	3,529	10.2	15.1	0.7	0.3	73.7
Northern	100,442	95,787	1.0	0.7	0.0	0.0	98.3
North Western	14,621	13,929	6.4	10.2	0.0	0.0	83.4
Southern	21,109	21,097	37.1	50.9	0.0	0.1	11.9
Western	12,781	12,459	22.2	22.4	0.0	1.1	54.3
Zambia Total	**342,940**	**336,194**	**11.6**	**10.6**	**0.0**	**0.1**	**77.7**

8.4. Main Sources of Power for Tillage (Soya Beans Fields)

Soya beans are also grown widely in Zambia. Nationally, a total of 21,197 fields under this crop were reported. About 70.4 percent of households reported using manual power for tillage of these fields. In 17.8 percent of Soya beans - growing households, the main power source used for tillage was own animal power, whereas in 11.5 percent of households, hired/borrowed animal power was the main power source for tillage of Soya beans fields.

Within provinces, Eastern, North Western and Lusaka provinces had the highest proportions of households using own animal power source reporting about 30.7 percent, 28.7 percent and 26.7 percent of soya beans households, respectively. In Luapula and Western provinces no household used this power source for tilling Soya beans fields.

Hired or borrowed animal power was the other main power source commonly used in Lusaka, Central, Eastern and Copperbelt provinces reported the largest proportions of Soya beans growing - households using this main power source for tilling Soya beans fields with proportions of 37.4 and 22.0 percent respectively.

Manual power was the most commonly used power source in almost all the provinces, with the highest levels of usage observed in Luapula, Western, Northern and Copperbelt provinces reporting over 96 percent of soya bean growing households.

Table 8.4: Proportion of Soya beans-growing households by Power Source by Province During the 2002/2003 Agricultural Season

Province	Estimated Number of Soya beans Fields	Estimated Number of Households	Proportion of Soya beans-growing households using a particular power source				
			Own animal Draft power	Hired or Borrowed Animal Power	Own Mechanical Power	Hired or Borrowed Mechanical Power	Manual Power
Central	4,292	4,292	23.2	22.0	0.0	0.0	54.8
Copperbelt	1,511	1,511	1.6	1.9	0.0	0.0	96.4
Eastern	8,168	8,168	30.7	16.7	0.0	0.0	52.6
Luapula	1,373	1,373	0.0	0.0	0.0	0.0	100.0
Lusaka	240	240	26.7	37.4	0.0	8.5	27.4
Northern	5,116	5,116	1.6	0.0	0.9	0.0	97.5
North Western	191	191	28.7	0.0	0.0	0.0	71.3
Southern	279	279	18.7	0.0	0.0	0.0	81.3
Western	27	27	0.0	0.0	0.0	0.0	100.0
Zambia Total	**21,197**	**21,197**	**17.8**	**11.5**	**0.2**	**0.1**	**70.4**

8.5. Main Sources of Power for tillage (Mixed Beans Fields)

The estimated total number of mixed beans – growing households was 124,285. These households were estimated to have cultivated 128,909 mixed beans fields across the country. At national level, in 89.8 percent of mixed – beans growing households, the most common power source used for tilling these fields was manual power. Own animal power and hired or borrowed animal power accounted for about 4.5 and 5.6 percent, respectively, of households reported to have used these power sources for tilling mixed beans fields.

Table 8.5: Proportion of Mixed-Beans-growing Households Using a Particular Power Source by Province during 2002/2003 Agricultural Season.

Province	Estimated Number of Mixed Beans Fields	Estimated Number of Households	Proportion of Mixed-Beans-growing households using a particular power source				
			Own animal Draft power	Hired or Borrowed Animal Power	Own Mechanical Power	Hired or Borrowed Mechanical Power	Manual Power
Central	8,257	8,219	1.2	3.6	0.0	0.0	95.2
Copperbelt	4,589	4,589	1.1	4.7	0.0	0.0	94.2
Eastern	6,997	6,997	19.8	8.4	0.0	0.0	71.9
Luapula	11,537	10,965	0.2	0.0	0.0	0.0	99.8
Lusaka	1,190	1,163	14.8	11.7	2.0	0.0	71.5
Northern	70,708	67,497	1.9	0.4	0.0	0.0	97.7
North Western	13,509	12,778	1.1	0.0	0.0	0.0	98.9
Southern	9,681	9,642	19.1	52.2	0.0	0.0	28.7
Western	2,442	2,435	26.9	16.9	0.0	0.0	54.9
Zambia Total	**128,909**	**124,285**	**4.5**	**5.6**	**0.0**	**0.0**	**89.8**

In Southern Province, 52.2 percent of mixed beans households used hired or borrowed animal power as the main power source for tillage; followed by Western Province, which reported 16.9 percent of households using this power source for tilling mixed – beans fields.

Western Province reported the largest proportion of about 26.9 percent of mixed beans growing households that used own animal power for tilling mixed beans fields followed by Eastern Province with 19.8 percent. The provinces with the least proportions of households using own animal power for tillage of mixed beans fields were Luapula, Copperbelt, North Western, Central and Northern provinces. Each of these provinces reported less than 2 percent of households that used own animal power as the main power source for tillage.

In all the provinces, manual power still remained as the major power source for tillage of mixed beans fields. Luapula province reported the largest percentage of households (99.8%) using this particular power source.

8.6. Main Sources of Power for tillage (Sweet Potatoes Fields)

The total estimated number of fields reported under sweet potatoes across the country was 105,902. In about 94.0 percent of sweet potato – growing households, manual power was reported as the major power source for tillage of the sweet potato fields.

The other common power sources reported among sweet potato growers were hired or borrowed animal and own animal powers. In about 41.0 percent of sweet potatoes growing households in Southern Province, hired/borrowed animals were used as the main power source for tilling sweet potato fields.

In Luapula, Northern, and North Western provinces, nearly all the sweet potato - growing households used manual power for tilling sweet potato fields.

Table 8.6: Proportion of Sweet Potato-growing households by power source by Province During the 2002/2003 Agricultural Season

Province	Estimated Number of Sweet Potato Fields	Estimated Number of Households	Proportion of Sweet Potato-growing households using a particular power source				
			Own animal Draft power	Hired or Borrowed Animal Power	Own Mechanical Power	Hired or Borrowed Mechanical Power	Manual Power
Central	17,211	17,211	0.9	4.0	0.0	0.0	95.1
Copperbelt	13,849	13,826	0.1	0.5	0.0	0.0	99.4
Eastern	5,937	5,937	12.5	3.5	0.0	0.0	84.0
Luapula	7,368	6,622	0.0	0.0	0.0	0.0	100.0
Lusaka	1,481	1,461	2.6	2.0	0.0	0.0	95.4
Northern	35,665	35,211	0.0	0.0	0.0	0.0	100.0
North Western	9,845	9,845	0.0	0.0	0.0	0.0	100.0
Southern	7.487	7,487	9.3	41.0	0.2	0.0	49.4
Western	7,060	7,060	3.3	1.0	2.0	2.0	91.8
Zambia Total	**105,902**	**104,661**	**1.8**	**4.0**	**0.2**	**0.1**	**94.0**

8.7. Main Sources of Power for tillage (Cassava Fields)

Cassava is one of the main staple food crops in Zambia. The estimated total number of cassava – growing households was 377,765 countrywide. The total number of fields estimated to have been cultivated under this crop was 578,380 across the country. At national level, in 97.7 percent of cassava growing households, the most common power source used for tilling these fields was manual power. Own animal power and hired or borrowed animal power accounted for about 1.1 and 1.2 percent, respectively of the power sources used by cassava growing households.

Table 8.7: Proportion of Cassava-growing households by Power Source by Province During the 2002/2003 Agricultural Season

Province	Estimated Number of Cassava Fields	Estimated Number of Households	Proportion of Cassava-growing households using a particular power source				
			Own animal Draft power	Hired or Borrowed Animal Power	Own Mechanical Power	Hired or Borrowed Mechanical Power	Manual Power
Central	21,196	16,239	0.0	0.2	0.0	0.0	99.8
Copperbelt	11,953	11,060	0.2	1.4	0.0	0.2	98.2
Eastern	3,732	3,732	3.0	0.0	0.0	0.0	97.0
Luapula	174,379	95,530	0.0	0.0	0.0	0.0	100.0
Lusaka	963	943	2.2	0.0	0.0	5.2	92.6
Northern	248,231	154,963	0.8	0.0	0.0	0.0	99.4
North Western	64,725	48,369	0.5	0.1	0.0	0.0	99.3
Southern	887	785	13.1	0.0	0.0	0.0	86.9
Western	52,313	46,145	5.1	9.2	0.4	0.0	85.1
Zambia Total	**578,380**	**377,765**	**1.1**	**1.2**	**0.1**	**0.0**	**97.7**

At provincial level, the majority of the cassava growing - households were in Luapula and Northern provinces. The major power source used for tillage was manual power in all provinces.

Own animal and hired or borrowed animal power were not commonly used sources of power for tilling cassava fields. However, notable proportions of usage of own animals were reported by 13.1 percent of households in Southern Province; while in Western Province, hired or borrowed animal power was reported by about 9.2 percent of cassava – growing households.

Nearly all the cassava-growing households rarely used own mechanical and hired or borrowed mechanical power for tilling their fields.

8.8: Summary of Findings:

The predominant power sources used among small and medium scale farmers for preparing their fields was manual power that is human power. The other power sources used most were own animal power and hired or borrowed animal power.

At provincial level, the largest proportion of households using manual power for tilling their fields was reported in Luapula Province followed by Northern Province. Southern Province reported the largest proportion of households that used own animals for tilling their fields; and was followed by Western Province.

CHAPTER 9: LIVESTOCK AND POULTRY REARING

9.0 Introduction

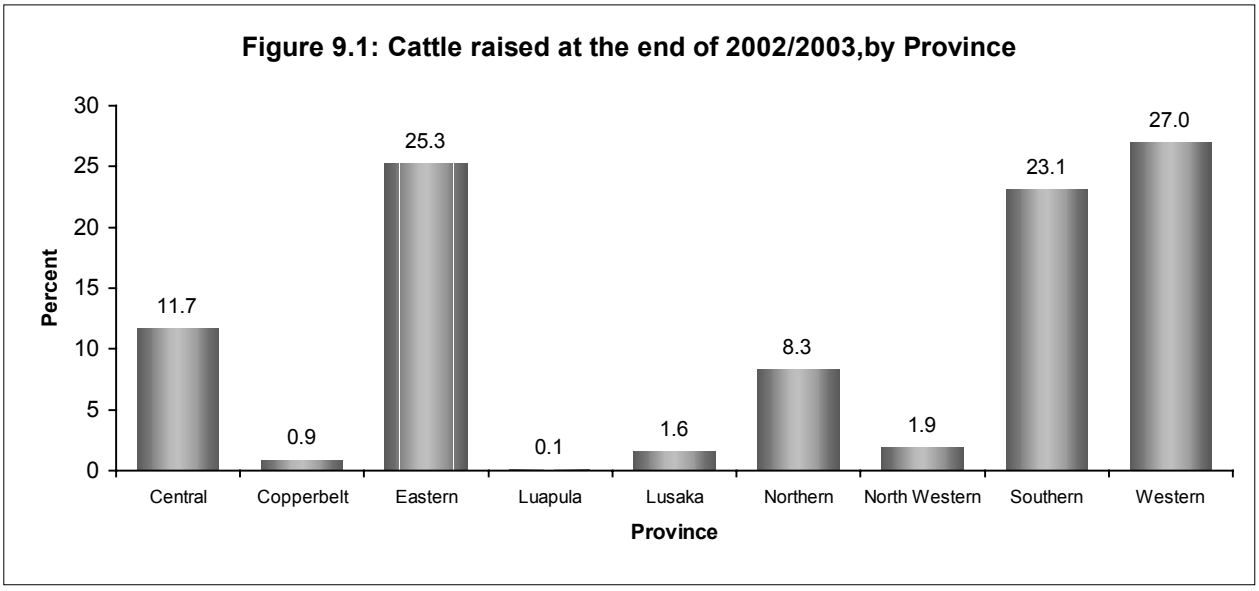
The 2002/2003 Post-Harvest Survey (PHS) collected data on different types of livestock and poultry. For each type of livestock and poultry details pertaining to households raising, number raised, ownership by gender, number died due to disease, number sold for cash and value of sales were covered. Details on donkeys and other poultry are only referred to in the appendix.

9.1 Households Rearing Cattle

The 2002/2003 Post Harvest Survey reported 143,046 households rearing cattle compared to 166,646 in the 2001/2002 Agriculture Season, representing a 14 percent decline. Southern and Western provinces recorded a drop in cattle rearing households, whereas Central, Copperbelt, Eastern and North-Western provinces had marginal increases. The highest number of households was reported in Eastern Province at 35 percent, followed by Southern and Western provinces at 21 and 16 percent of total cattle rearing households respectively. The lowest number of households was recorded in Copperbelt, Luapula, and Lusaka provinces. (Refer to Table 1 in appendix).

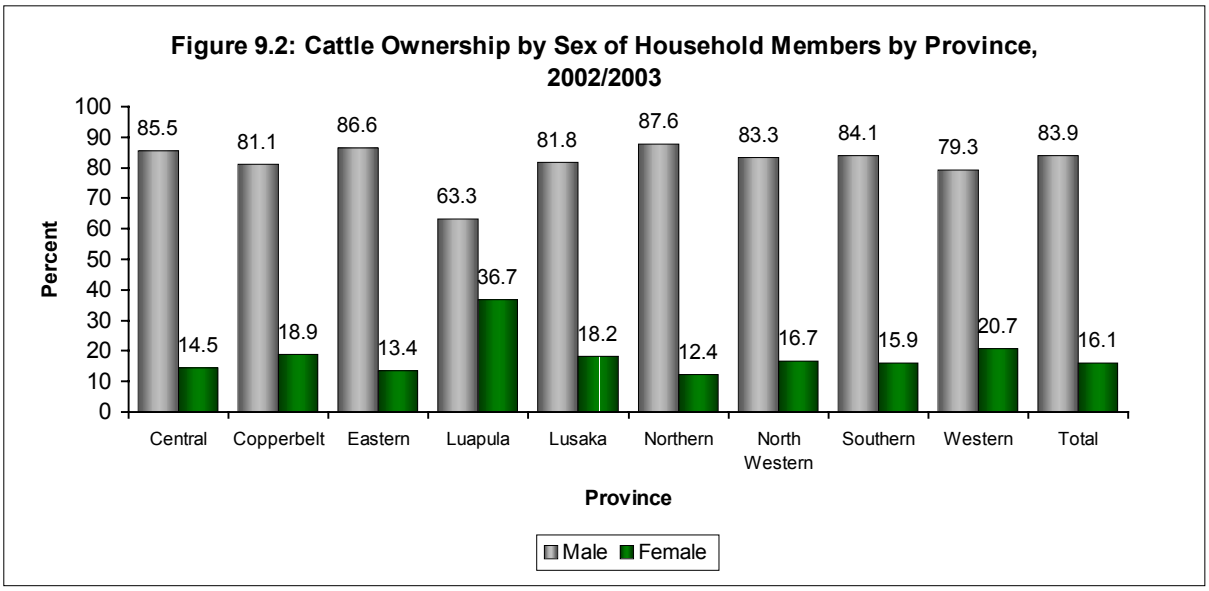
9.1.1. Number of Cattle Raised

Cattle population at the end of 2002/2003 Agriculture Season was estimated at 1,088,744 compared to 1,393,335 at the end of 2001/2002 Agriculture Season representing a 21.8 percent cattle decline. Despite a reduction in households raising cattle in Western and Southern provinces, Western Province recorded the largest number of cattle at 27.0 percent, followed by Eastern and Southern provinces at 25.3 and 23.1 percent, respectively. The lowest numbers of cattle were reported in Luapula, Copperbelt, Lusaka and Northwestern provinces with 2 percent or less. Generally, cattle population declined with Southern, North-Western and Lusaka provinces being more affected.



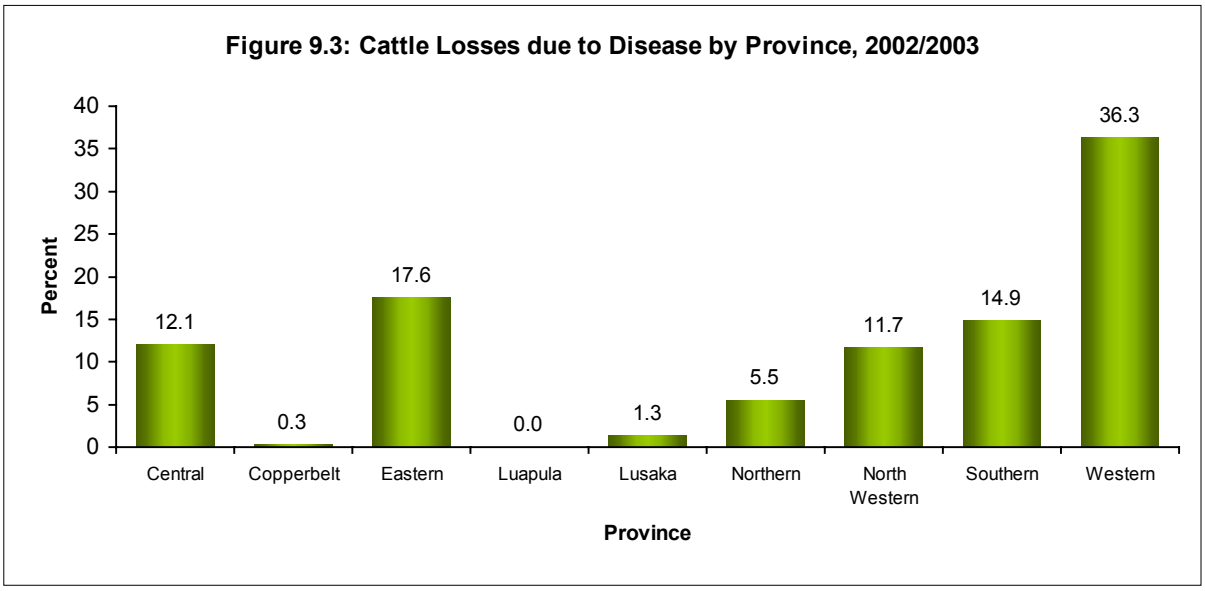
9.1.2 Cattle Ownership

The 2002/2003 Post Harvest Survey collected data on cattle ownership by gender of owner. The estimated total number of cattle owned by household members was 1,006,618 representing 92 percent of the total cattle raised. Non-household members whose cattle were raised on their behalf by household members owned the remaining 8 percent. Of the total cattle owned countrywide, 83.9 percent belonged to male members of the households. At provincial level, the highest proportion of cattle owned by female members was reported in Luapula Province with 36.7 percent, followed by Western Province with 20.7 percent.



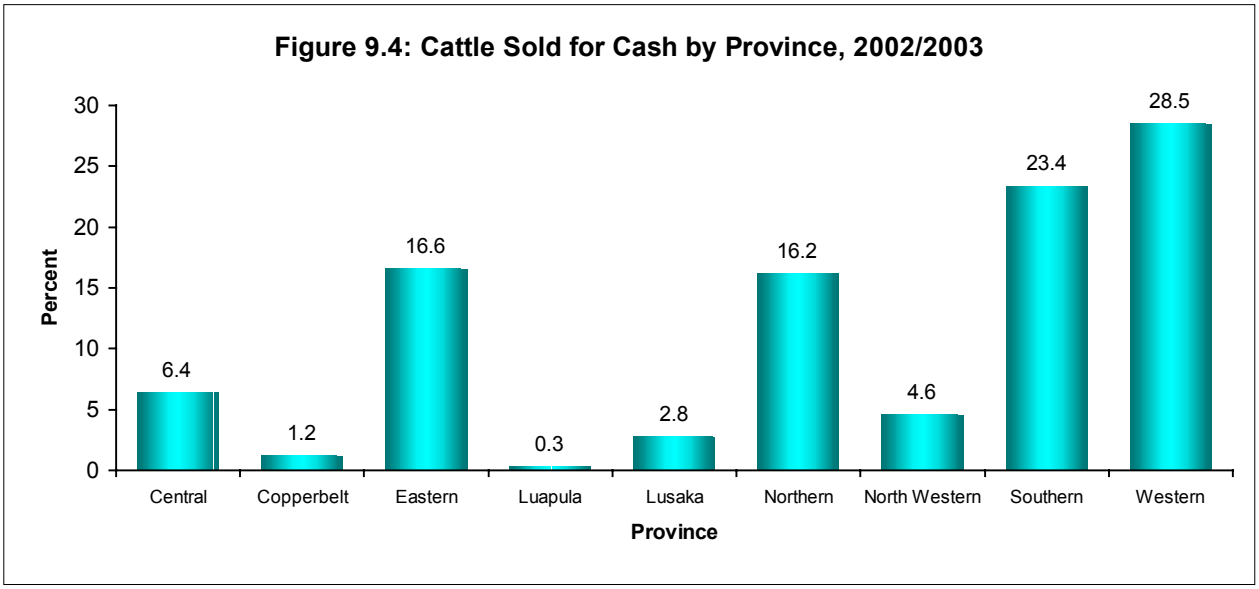
9.1.3 Cattle Losses due to Disease

The 2002/2003 Agricultural Season, recorded a total of 250,611 cattle losses in the country due to disease. The highest number was recorded in Western Province at 36.3 percent, followed by Eastern and Southern Provinces at 17.6 and 14.9 percent respectively. The remaining provinces had less than 13 percent each, with Luapula, Copperbelt and Lusaka reporting 1.3 percent or less.



9.1.4 Cattle Sold for Cash and Value of Sales

During the 2002/2003 Agriculture Season an estimated total of 61,936 cattle were sold for cash at a total value of K32,400,000,000. Of the total cattle sold nationwide, Western Province accounted for 28.5 percent, while Southern, Eastern and Northern provinces accounted for 23.4, 16.6 and 16.2 percent respectively. Luapula and Copperbelt provinces recorded the lowest number with 1.3 and 0.3 percent respectively. The average price varied across provinces with the highest price recorded in the Copperbelt Province at K1,052,000.00, followed by Central Province at K744,100.00. The lowest average price was recorded in Northern Province at K392, 800.00. (Refer to Table 1 on cattle sales for cash in the Appendix).

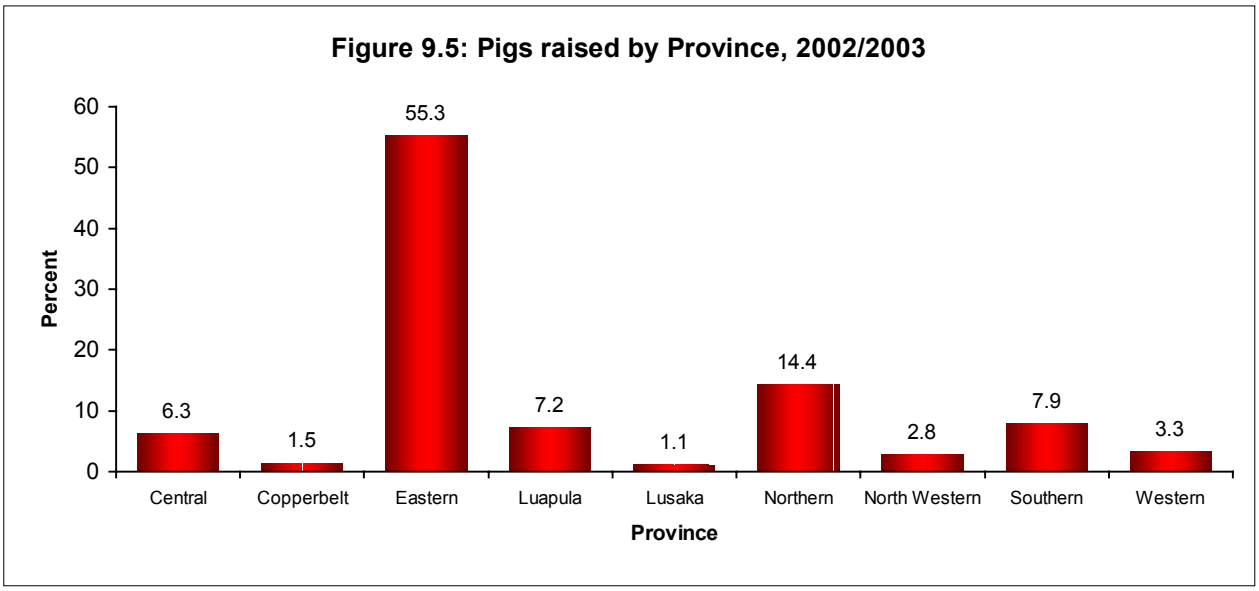


9.2 Households Rearing Pigs

During the 2002/2003 Agricultural Season, 110,070 households reported raising pigs as compared to 106,491 the previous season. The largest number of households that reported raising pigs was in Eastern Province contributing 43.7 percent of the total number of households rearing pigs, followed by Northern Province with 20.7 percent. The least number of pig raising households were reported in Lusaka (0.9 percent), Copperbelt (1.8 percent) and North-western Provinces (2.5 percent). Generally, the number of households rearing pigs showed a slight increase from the previous season. (Refer to Table 9 on pigs in the Appendix).

9.2.1. Number of Pigs Raised

The 2002/2003 Post Harvest Survey reported a total of 497,318 pigs at the beginning of the season compared to 512,819 in the previous season. During the season the population of pigs reduced to 373,262 representing a 24.9 percent decline countrywide. At provincial level, higher reductions were recorded in Lusaka, North-Western, Copperbelt and Northern provinces at 46.7, 37.5, 36.6 and 32.2 percent respectively. Eastern Province accounted for 55.3 percent of the total number of pigs raised while the remaining provinces together accounted for 44.7 percent. The lowest numbers of pigs raised were reported in Lusaka and Copperbelt provinces at 1.1 and 1.5 percent, respectively.



9.2.2 Pig Ownership

The 2002/2003 Post Harvest Survey collected data on pig ownership by gender of owner. The estimated total number of pigs owned by household members was 363,119 representing 98percent of the total pigs reared. Of the total pigs owned countrywide, 74.8 percent belonged to male members of households. Eastern Province recorded 55.5 percent of the total number pigs owned by male members. At provincial level, the highest proportion of pigs owned by female members was reported in Southern Province at 38.0 percent, followed by North-Western Province at 29.4 percent and Eastern Province at 26.9 percent. The lowest proportion of female members owning pigs was in Luapula and Western provinces at 10.9 and 11.3 percent respectively. (Refer to Table 9 on pigs in the Appendix).

9.2.3 Pig Losses Due to Disease

A total of 179,607 pigs were lost due to disease during the 2002/2003 Agricultural Season. Of the total losses Eastern Province accounted for 75.2 percent deaths due to diseases compared to the other provinces. The remaining provinces together accounted for 24.8 percent with Copperbelt and North-Western reporting 0.6 percent each. (Refer to Table 9 on pigs in the Appendix).

9.2.4 Pigs Sold for Cash and Value of Sales

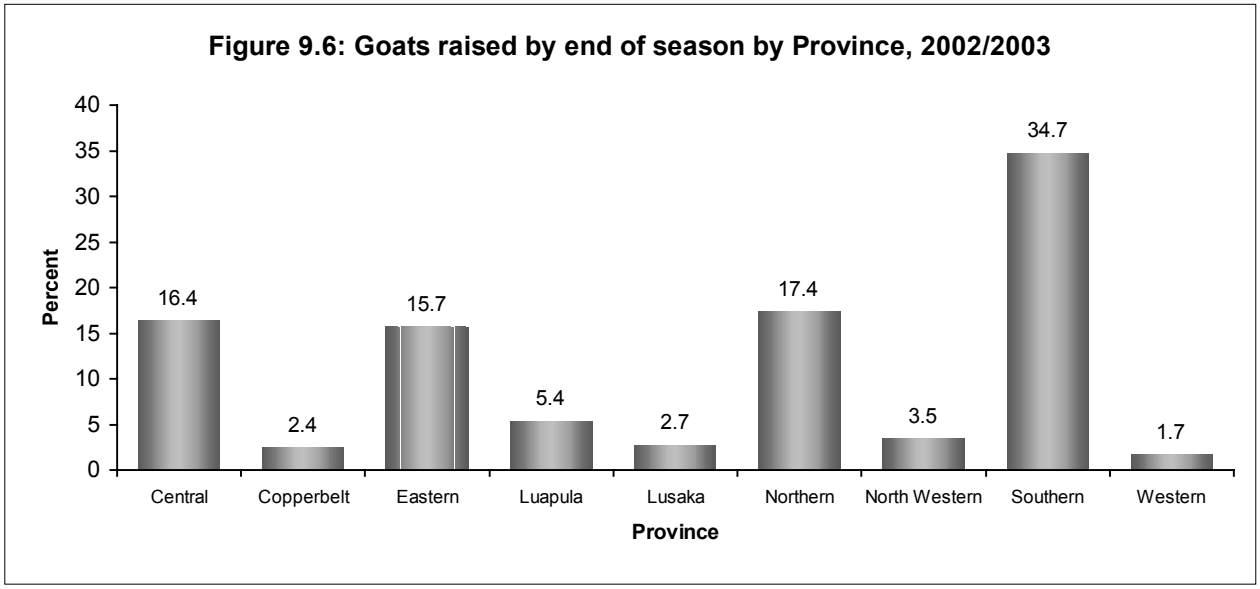
During the 2002/2003 Agriculture Season a total of 111,952 pigs were sold for cash at a total value of K7,498,734,410. Eastern Province accounted for 27.7 percent of the cash sales, followed by Northern Province at 23.8 percent. Lusaka and Copperbelt provinces recorded the lowest numbers of pigs sold for cash at less than 4 percent each. The highest average price was recorded in the Copperbelt Province at K162,000.00, followed by Southern Province at K97,000.00. The lowest average price was recorded in Western Province at K35,000.00. (Refer to Table 9 on pig sales for cash in the Appendix)

9.3 Households Rearing Goats

The 2002/2003 Post Harvest Survey estimated the total number of households rearing goats at 190,036 as compared to 176,786 in the previous season. Of the households reporting, Southern Province accounted for 25.5 percent, Northern Province contributed 23.1 percent and Eastern Province 19.4 percent. Copperbelt, Lusaka and Western provinces had the lowest number of households raising goats with less than 3.0 percent each. There was an increase in households rearing goats in Northern, Central and Western provinces compared to the previous season with 46.7, 25.3 and 17.4 percentage increase respectively.

9.3.1 Number of Goats Raised

During the 2002/2003 Agricultural Season the population of goats declined by 10 percent from 1,140,968 at the start of the season to 1,025,344 by the end of the season. The population of goats declined in most provinces apart from Copperbelt, Luapula and Southern provinces. Copperbelt and Luapula provinces recorded 18.9 and 8.1 percent increase respectively. The highest decline was reported in Western Province at 38.1percent, followed by Lusaka and Northern provinces at 28.6 percent and 23.1percent respectively. The largest number of goats was reported in Southern Province at 34.7 percent while Western Province had the least with only 1.7 percent.



9.3.2 Goat Ownership

The 2002/2003 Post Harvest Survey collected data on goat ownership by sex of owner. The estimated total number of goats owned by household members was 989,610 representing 96.5 percent of the total goats raised. Non-household members whose goats were raised on their behalf by household members owned the remaining 3.5 percent. Of the total goats owned by household members 72.4 percent belonged to male members. Southern Province contributed 34.4 percent of the total number of goats owned by male members. The proportion of goats owned by female members, at provincial level, was highest in Lusaka and Copperbelt provinces at about 32 percent each. The lowest proportion was recorded in Western Province at 18.5 percent. (Refer to Table 10 on goats in the appendix)

9.3.3 Goat Losses Due to Disease

A national total of 189,739 goats were lost due to disease during the 2002/2003 Agricultural Season. Of total losses due to disease, Southern Province recorded the highest number with 39.0 percent, followed by Northern Province with 17.8 percent. The remaining provinces recorded less than 12.0 percent each with Copperbelt, Luapula, Lusaka, Northwestern and Western provinces reporting less than 5.0 percent each. (Refer to Table 10 on goats in the Appendix)

9.3.4 Goats Sold for Cash and Value of Sales

During the 2002/2003 Agricultural Season a total of 246,172 goats were sold for cash countrywide at a total value of K8,691,977,416. Of the total sales, Southern Province accounted for 33.3 percent, followed by Central and Northern provinces with 17.4 and 16.6 percent respectively. The lowest was recorded in Western Province at 1.7 percent. The highest average price per goat was reported in North-Western Province at K63,200.00, followed by Luapula Province at K42,220.00. The least average price was recorded in Western Province at about k30,000.00. (Refer to Table 10 on goat sales in the appendix)

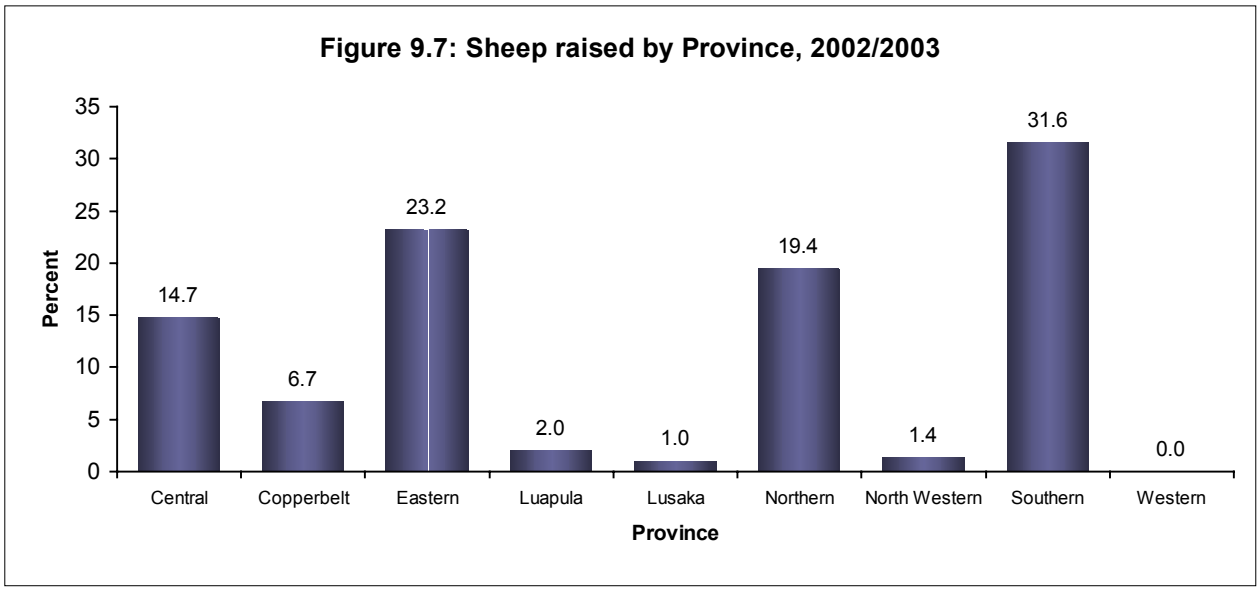
9.4 Sheep Rearing Households

Sheep rearing was reported by 6,782 households during the 2002/2003 Agriculture Season compared to 9,096 households in the previous season, representing a 25.4 percent decline. Generally, households rearing sheep declined countrywide. Northern Province recorded the highest number of households raising sheep with 32.5 percent of the total sheep rearing households, followed by Eastern Province with 29.1 percent. The lowest sheep rearing households were recorded in Lusaka and North- Western provinces at 1.5 percent and 1.7 percent, respectively. (Refer to table 11 on sheep in the Appendix).

9.4.1 Number of Sheep Raised

The 2002/2003 Post Harvest Survey estimated sheep population at 40,336 countrywide representing a 4.2 percent decline compared to 42,115 at the beginning of the season. Of the total sheep raised, the highest number was reported in Southern Province with 31.6 percent, followed by Eastern and Northern province at 23.2 and 19.4

percent respectively. The lowest number was reported in Lusaka and North-Western provinces with less than 2.0 percent each.
(Refer to table 11 on sheep in the Appendix).

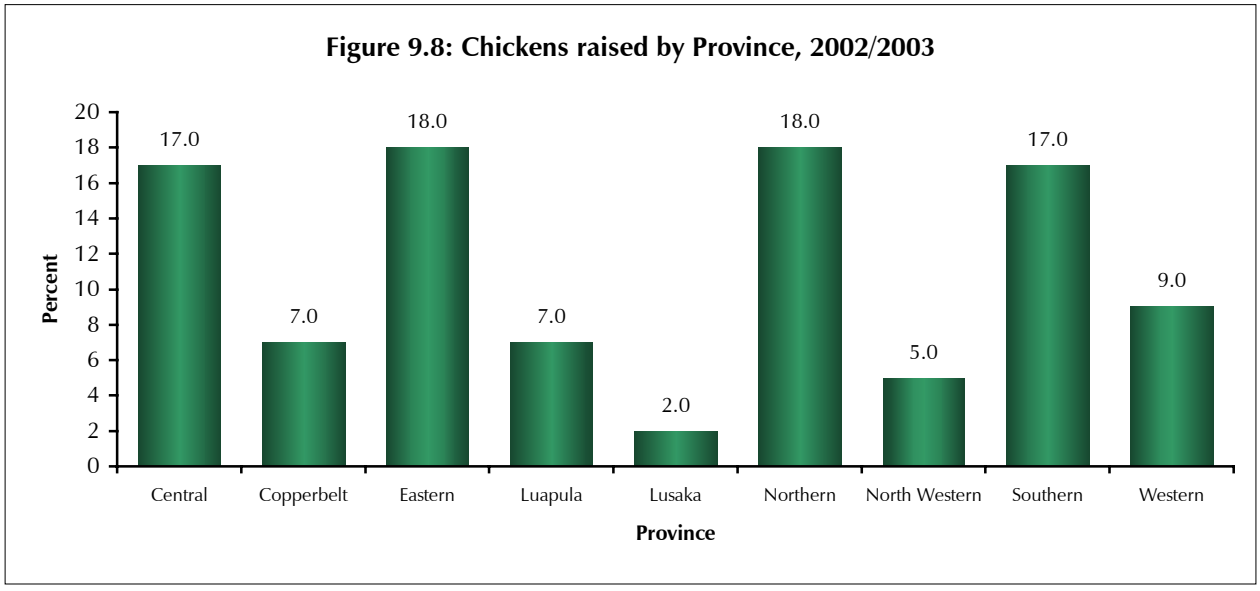


9.5 Households Rearing Chickens

The 2002/2003 Post Harvest Survey recorded a total of 720,013 households rearing chickens compared to 586,621 in the previous season. A 22.7 percent increase in households rearing chickens was reported countrywide, with Eastern and Northern provinces reporting the highest number of households at 21 percent each. Southern Province reported 14 percent. The lowest was in Copperbelt, North-western and Lusaka provinces at 6 and 2 percent respectively.

9.5.1 Number of Chickens Raised

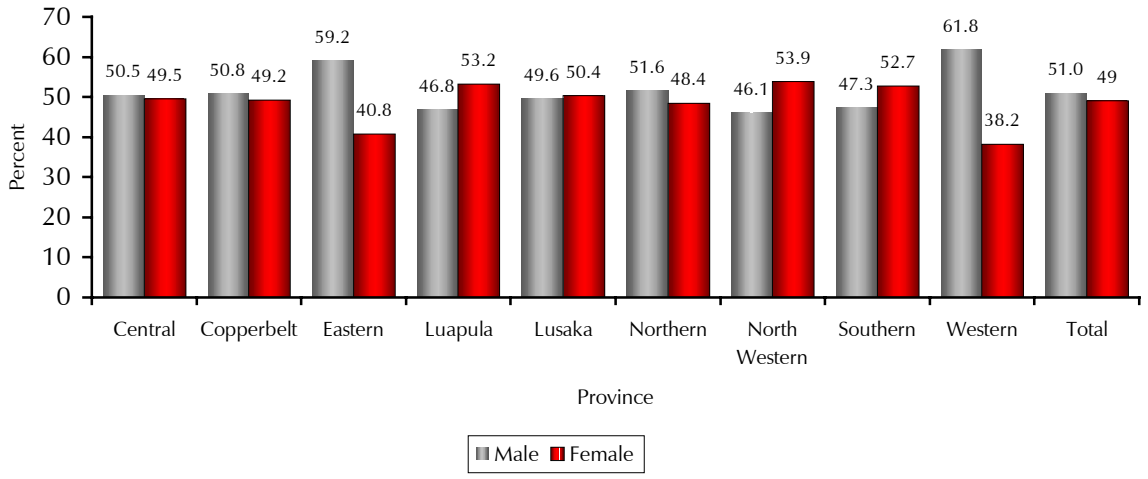
The 2002/2003 Agriculture Season reported a total of 6,886,395 mainly traditional chickens raised by end of season nationwide compared to 5,325,093 the previous season. Eastern and Northern Provinces contributed the highest number of chickens at 18 percent each. Southern province reported 17 percent. Lusaka Province had the least number of chickens at 2 percent only. For details, refer to Figure 9.9.



9.5.2 Chickens Ownership

The 2002/2003 Agriculture season recorded a total of 6,715,337 chickens owned by household members. At national level, male members owned 51.2 percent while female members had 48.8 percent. At provincial level, male members from Eastern contributed 21.7percent, while female members from Southern owned 18.6 percent.

Figure 9.9: Chickens belonging to the Household Members by Sex and Province, 2002/2003



9.5.3 Chickens Sold for Cash and Value of Sales

A total of ZMK 9,046,539,679 cash was obtained from the sale of 1,127,096 chickens in all the provinces. Southern Province reported the highest cash value, followed by Central and Eastern provinces. The highest average price was reported in Lusaka and Central provinces at about K11,000.00. The lowest was reported in Eastern and Western provinces at about K6,000.00 and K7,000.00 respectively.

9.5 Summary of findings

At national level households rearing cattle declined by 16.5 percent while cattle population declined by 21.8 Percent during the 2002/2003 Agricultural Season. The decline could mainly be attributed to disease with Western and Eastern provinces together accounting for 55.4 percent of the total losses countrywide. Of the total cattle raised,5.6 percent was sold for cash at a national average price of k523,120.

Households raising Pigs recorded a 3.4 percent increase countrywide, with Eastern Province contributing 60.2 percent of the total Pigs owned in the country.

Households raising goats recorded a 7.6 percent increase countrywide, with Southern Province contributing 26.4 percent of the total goats owned in the country.

A decline was recorded in households raising Sheep and number of sheep raised countrywide at the end of the season. Eastern and Southern Province together contributed 55.5 percent of the total number of sheep owned in the country.

The survey recorded a 23.1 percent increase in households raising chickens and 29.3 percent increase in number of chickens raised countrywide./

CHAPTER 10: CROP-ROTATION, AGRO-FORESTRY AND IRRIGATION

10.0 Introduction

This chapter has included the analysis of households that reported to have practiced crop rotation, agro-forestry and irrigation of maize fields including maize grown in gardens intended for dry grain use during the 2002/2003 Agricultural Season. The survey findings are presented in Table 10 .0 below.

Table 10:0: Households reporting practicing crop rotation, agro-forestry and irrigation of maize fields by Province during 2002/2003 Agricultural Season.

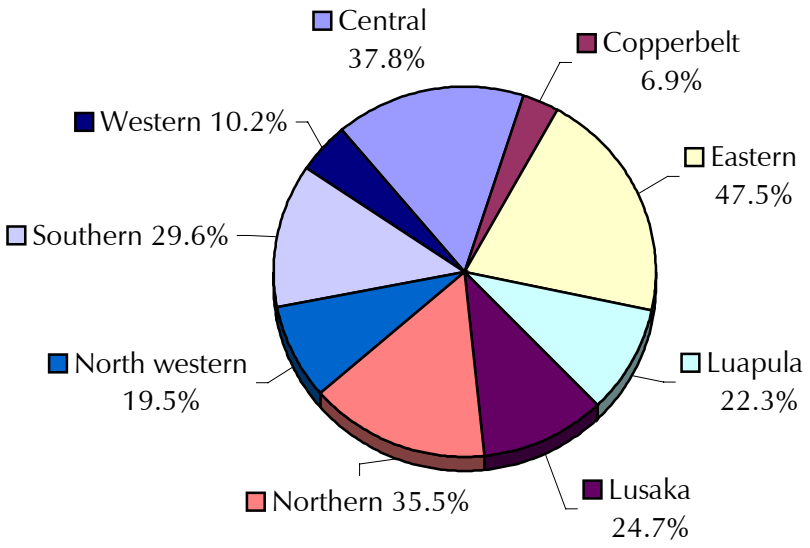
Province	Total Crop Growing Households	Households reporting Crop- rotation	Percent	Households reporting agro-forestry	Percent	Households reporting irrigation of Maize fields	Percent
Central	101,496	38,389	37.8	5,238	5.2	1,241	1.2
Copperbelt	63,216	4,355	6.9	1,484	2.3	3,714	5.9
Eastern	219,856	104,518	47.5	5,926	2.7	2,554	1.2
Luapula	98,497	21,919	22.3	2,545	2.6	680	0.7
Lusaka	16,439	4,063	24.7	1,156	7.0	281	1.7
Northern	182,502	64,824	35.5	8,628	4.7	2,750	1.5
North Western	70,507	13,715	19.5	576	0.8	6,266	8.9
Southern	116,103	34,335	29.6	7,618	6.6	2,254	1.9
Western	100,171	10,253	10.2	1,859	1.9	258	0.3
Zambia Total	**968,788**	**296,372**	**30.6**	**35,030**	**3.6**	**19,999**	**2.1**

10.1 Crop Rotation

During the 2002/2003 Agricultural Season a total of 296,372 or 30.6 percent of agricultural households reported to have practiced crop rotation. The estimated number of households in 2002/2003 Agricultural Season was however 25.8 percent lower than that reported to have practiced crop rotation during the 2002/2003 Agricultural Season (estimated at 399,478). Households which were considered to have practiced crop rotation, were those which had rotated crops that use different nutrients, for example, legumes with cereals or crops that are prone to different pest attacks.

Eastern Province recorded the largest number of households that practiced crop rotation accounting for 47.5 percent of the total crop-growing households in the province followed by Central Province, which recorded 37.8 percent of the total crop-growing households in the province. The lowest proportion of households that practiced crop rotation was recorded in Copperbelt Province with 6.9 percent of the total crop-growing households in the province.

Figure 10.1: Percentage Distribution of Number of Households reporting to have practiced Crop-Rotation during 2002/2003 Agricultural Year



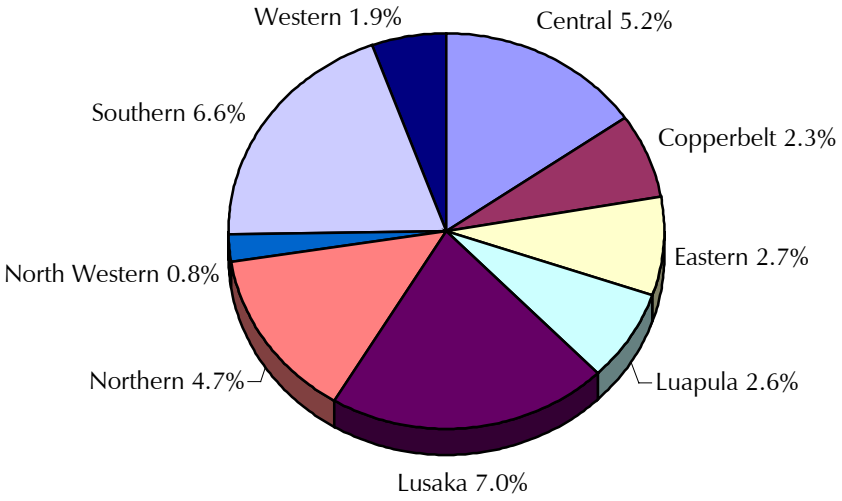
10.2 Agro-forestry

Agro-forestry is defined as the growing of trees and shrubs in association with crops or livestock. This farming system leads to improved crop yields especially for small-scale farmers who may not afford chemical fertilisers.

During the 2002/2003 Agricultural Season, the number of households that reported to have practiced agro-forestry was estimated at 35,030, at national level, representing about 3.6 percent of the total crop-growing households.

Lusaka Province recorded the largest proportion of households, which practiced agro-forestry at 7.0 percent of the total crop-growing households in the province. This was followed by Southern Province, which recorded 6.6 percent of the total crop-growing households. North-Western Province recorded the lowest number of households practicing agro-forestry at 0.8 percent of the total crop-growing households in the province.

Figure 10.2: Percentage Distribution of Number of Households reporting to have practiced Agro-Forestry during 2002/2003 Agricultural Year



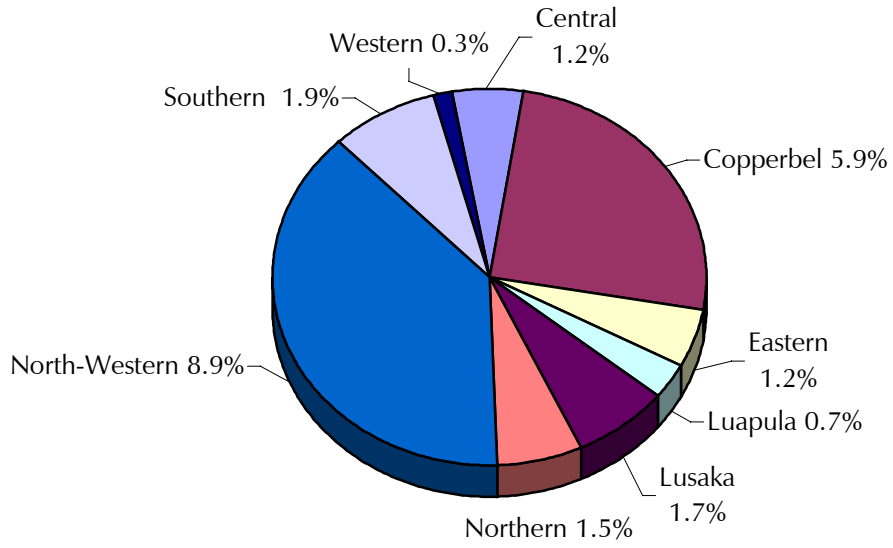
10.3 Irrigation of maize fields including maize grown in gardens intended for dry grain use

Agricultural households that practiced irrigation were those that supplied water to their crops through the use of sprinklers, furrows and other irrigation methods. Irrigation of cereals particularly maize is at times necessary especially if there are prolonged dry spells during the critical stage of the crop development during the agricultural season.

Almost 20,000 small and medium scale agricultural households reported to have irrigated their maize fields during the 2002/2003 Agricultural Season countrywide. The estimated number of households constitutes 2.1 percent of the total crop-growing households reported for the year.

North-western Province recorded the largest proportion of households that irrigated their maize fields at 8.9 percent of the total crop-growing households in the province. Copperbelt Province was second with 5.9 percent of the total crop-growing households in the province. The lowest proportion of households that irrigated their maize fields was recorded in Western Province at 0.3 percent of the total crop-growing households in the province.

Figure 10.3: Percentage Distribution of Number of Households reporting Irrigation of Maize Fields during 2002/2003 Agricultural Year



10.4 Summary of Findings

The findings in the 2002/2003 Post-Harvest Survey have shown that not many small and medium scale farmers have practiced crop rotation. Only about 30.6% of crop growing households at national level reported to have practiced crop rotation. In the case of agro-forestry and irrigation of maize fields very few small and medium scale farmers reported to have practiced them. At national level, about 3.6% reported to have practiced agro-forestry, and about 2.1% reported to have practiced irrigation of maize fields.

APPENDIX 1

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