RNR CENSUS OF BHUTAN
2019

Renewable Natural Resources Statistics Division
Directorate Services

ROYAL GOVERNMENT OF BHUTAN
MINISTRY OF AGRICULTURE AND FORESTS

FOREWORD

With great pleasure, I present the report of RNR Census 2019. The census is the third RNR census of Bhutan and I want to take the opportunity to congratulate the RNR Statistics Division, Ministry of Agriculture and Forests with this accomplishment, as it adds an important component to the statistical framework of the country.

The RNR Census 2019 provides a wealth of information that will enhance our understanding of the operations of the agricultural holdings within the economy. As such, the report presents additional information which will create and enhance the evidence-based decisions that is required to develop and implement effective policies and programmes related to RNR sector in the country.

The report covers the profiles of agricultural holdings in terms of their geographic distribution, general characteristics, demography, land and land use, irrigation, crops, agricultural practices, livestock and forestry. It also includes analyses of farming households and constraints faced in their agricultural operations.

It is my sincere hope that the report will be a key source of information for policy makers, planners, the business community and international partners for the development of the country. Without the support of the extension officers, agricultural holdings including insitutions and farming households, the RNR Census 2019 would not have been possible. In this regard, I would like to extend sincere appreciation to agricultural holdings and all the officials who administered the census for their support and cooperation.

Tashi Delek!

PREFACE

The RNR Census of Bhutan 2019 report presents the results of the third RNR census. The main objective of the RNR Census of Bhutan 2019 is to collect information of RNR sector such as the number of agricultural holdings (farmers and farm holdings), geographic distribution therein, number of agricultural holdings by type of main RNR activity, by type of purpose of production, dzongkhag distribution of the holdings by type of land and their use and reasons for leaving land fallow. It also includes information on the number of agricultural holdings by different kinds of inputs used, farm machineries or equipment used and owned, methods of irrigation, different types of crops, vegetables and fruits grown, type of livestock reared, and type of constraints faced in the agricultural operations. The other objective of the RNR Census 2019 is also to establish benchmark information and indicators for RNR sector in the country. Such information is essential for economic development planning purposes and to provide a frame for follow-up surveys.

The census enumeration was performed by extension officers, supervised by respective sector heads in the dzongkhags and overall national supervision by the staff of the RNR Statistics Division (RSD) from 1 March 2019- 15 April 2019. The census was facilitated by a Computer Assisted Personal Interviewing (CAPI) system.

While efforts were put for ensuring comprehensive and efficient collection of RNR data, the census team did confront many challenges. However, the information reported in this report provides opportunities for evidence-based policy formulation for supporting the RNR sector in the country.

I extend my appreciation to the staff of the RNR Statistics Division and all others including the agriultural holdings for their support and cooperation in the successful conduct of the census. Further, I would also like to extend our sincere appreciation to the EU RDCCRP (Rural Development and Climate Change Response Programme), FAO and FSAPP (Food Security and Agriculture Productivity Project) for providing both financial and technical support for the census.

ACKNOWLEDGEMENT

The RNR Statistics Division, Directorate Services, Ministry of Agriculture and Forests has successfully conducted the third RNR Census from 1 March 2019 to 15 April 2019.

For the preparation and administration of the census, the RNR Statistics Division collaborated with many agencies of the government, agricultural holdings including institutional and households. The Directorate Services is highly appreciative of the support and cooperation rendered during the course of the census.

We would like to thank the RNR census team, the national census coordinator and agricultural holdings for their support and cooperation. Finally, we owe our deepest gratitude for the technical guidance and support of Technical Working Group (TWG-RNR Census) members for their unwavering support and facilitation in the smooth conduct of the census.


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ACRONYMS

BDBL	Bhutan Development Bank Limited
CAPI	Computer Assisted Personal Interviewing
CSO	Civil Society Organization
EA	Enumeration Area
EU RDCCRP	European Union Rural Development and Climate Change Response Programme
FSAPP	Food Security and Agriculture Productivity
FAO	United Nation - Food and Agriculture Organization
GDP	Gross Domestic Product
GPS	Global Positioning System
IdCA	Indepth Country Assessment
MoAF	Ministry of Agriculture and Forests
NSB	National Statistics Bureau
NWFP	Non-Wood Forest Product
PHCB	Population and Housing Census of Bhutan
REDCL	Rural Enterprise Development Corporation Limited
RNR	Renewable Natural Resources
RSD	Renewable Natural Resources Statistics Division
RS-TWG	RNR Statistics Technical Working Group
SYB	Statistical Yearbook of Bhutan
WCA	World Programme for the Census of Agriculture

EXECUTIVE SUMMARY

The RNR Census 2019 enumerated a total of 66,587 agricultural holdings. The census results showed that the majority of the holdings' main RNR activity is 'crop production' followed by 'crop and livestock production'.

Bhutanese farms are still predominantly subsistence oriented, producing mainly for 'own consumption with some sale' with 53 percent, followed by 'only for own consumption' with 37 percent. There are only a handful producing 'mainly for sale with some own consumption or only for sale'. However, the level of income diversification is substantial, with 45 percent of holdings having at least one or more economic activities apart from their main RNR activity.

In terms of the demography, the average household size of the holdings is 4 persons. There is no difference in the average household size between male-headed and female-headed households. By main occupation, about 67 percent of the population aged 15 years and above are farmers. There is a clear evidence that in the prime working age groups, there are more females than males on the farms. If the situation continues, the productivity of the farming sector may decline.

The average holding size of Bhutanese farms is 3.7 acres. However, not all the land at one's disposal is cultivated though. The 66,587 agricultural holdings cultivate 189,465 acres, leaving 66,120 acres fallow, of which 8,957.87 acres are fallow wetland (chuzhing). Among the reasons for leaving wetland fallow, irrigation problem still continues to be the most common reason, followed by crop damage by wildlife and labor shortage.

For the first time the census is also able to generate figures under seven internationally comparable basic land use classes. The acreage under each class are temporary crops (133,690), temporary meadows and pastures (5,579), temporary fallow (66,122), permanent crops (28,234), permanent meadows and pastures (5,207), farm buildings and farmyards (7,557) and forests/wooded land (4,240).

About 48 percent of the holdings irrigated their land, which is 37,522 acres inclusive of both dryland and wetland. This represents about 20 percent of the total cultivated land area. Across the dzongkhags, Punakha (92.99 percent) recorded the highest proportion of holdings irrigating their land compared to some 18.52 percent for Pema Gatshel. Surface water by far is the main source of irrigation with 84.28 percent. Some households (11.56 percent) also use municipal water for irrigation, while the use of groundwater is barely one percent.

A multitude of crops are grown. The census recorded 11 cereals, 9 oilseeds and legumes, 5 roots and tubers, 20 vegetables and 28 fruits or permanent crops. Among the cereals, the crop with the highest harvested area is maize (36,835.95 acres), followed by irrigated paddy (36,670.21 acres). The rest of the cereals combined is only 12,713.65 acres. The maize and irrigated paddy are the two most important crops in the cereal basket accounting for 31 percent of the total agricultural land in Bhutan.

With regard to vegetables, chili – technically a spice but in Bhutanese context is a vegetable accounted for the largest share (4,030.67 acres), reflecting its indispensability in Bhutanese dish. Other notable vegetables are beans (3,423.15 acres), cabbage (1,792.04 acres) and spinach or sags (1,780 acres).

Among the root or tuber crops, potato is the highest with its harvested area (11,130.70 acres) equal to almost more than half of the area of all the 20 vegetables combined. Arecanut seems to be the most important if we go by the total number of trees (3.4 million) among the fruit crops, followed by mandarin (1.8 million) and hazelnut (1.05 million). Apple (0.29 million) which was once a major fruit crop in Bhutan, now stands nowhere in the competition.

In terms of the cash crops, cardamom is the highest with a total area of 21,394.75 acres, which is nearly twice the area under potato. The real area under cardamom would be much higher than reported here, as farmers hide the area of the crop when grown in state owned land.

The total cereal production is 124,624.80 MT, out of which paddy is 63,404.95 MT and maize 55,259 MT. The total vegetable production is 43,136.57 MT, with chili accounting for about 17 percent of the total vegetable production. Potato production is 44,278 MT, more than the entire gamut of vegetables combined due to its sheer weight per unit volume.

Mushroom cultivation, despite close attention and promotion by the ministry, it is yet a small RNR activity. There are 818 holdings in the business, producing a total of 34 MT. In the fruits section, mandarin is the highest produced crop with 26,528 MT followed by arecanut with 11,681 MT. Although the number of hazelnut trees cross six digits figure, yet its production is negligible as the crop is yet to reach the production stage.

Comparing the holdings by the use of agricultural inputs, 94.84 percent uses farmyard manure or compost, followed by 25.32 percent of the holdings using chemical fertilizer. Although details on the type and quantity of each input was not asked, this section still reveals some interesting observations.

The RNR Census 2019 also collected information on the crop land under protective cover. The protective cover refers to the use of plastic houses, glass

houses or shades to protect crops from elements or for enhancing production by holdings. About 5 percent of the holdings use protective cover. The total area under protective cover is 220.87 acres, with Sarpang dzongkhag having the highest area of 29.53 acres.

The distribution of holdings by the type of livestock reared differ across the dzongkhag.

About 77 percent of the holdings rear bovine animals, the most common being cattle and other bovines include yaks and zo-zoms which are limited to only few dzongkhags having highland communities. Among the cattle, despite the relentless push by the authorities to replace the local breeds with improved European breeds over the last several decades, they seem to hold their ground quite well with improved cattle breeds accounting for 36 percent of the total cattle population.

About 67 percent of those rearing bovines practice grazing system, followed by 3 percent for industrial and 30 percent for mixed system. This shows that the feeding system is largely forage based. Further, by type of grazing system, 87 percent practices sedentary pastoral or ranching, followed by 10 percent semi-nomadic, semi-pastoral or transhumant and 3 percent nomadic or totally pastoral.

In terms of other livestock population, the population of small ruminants – sheep and goats – seems to take on a literal meaning, in that their numbers are really small compared to their larger ruminant counterparts. Sheep and goats combined population is about 62,022. That of equines – horses, mules, hinnies and asses – about 15,494 is even much less. Next in the line of tiny numbers is that of pigs with a total population of 11,263. However, the situation is completely different for poultry with a total population of 927,174.

The Census also collected 7,338 holdings who practiced beekeeping, which is about 11 percent of total holdings. Across the dzongkhags, Samtse, Chukha, Sarpang, Dagana and Tsirang have the highest number of holdings rearing bees, largely of local species. Bumthang dzongkhag is quite unique in that, while it has only 80 holdings rearing bees, total bee hives is 1,357 and all of them are of improved species.

Rearing fish in ponds is relatively a rare thing in Bhutan. However, the census recorded 527 holdings, mostly in the warm southern dzongkhags. Holdings in Samtse and Tsirang dzongkhags mostly rear fish.

The RNR Census 2019 also collected information on machinery or equipment used, owned and hired in 2018. About 50 percent of the holdings use at least one or more types of machines or equipment. By the number of holdings who reported

using a particular machine or equipment, the top 5 are power tiller, milling machine, chain saw, manually operated thresher and tractor. The machines are either owned or hired. Across the dzongkhag, the top three dzongkhags owning highest number of powertillers are Paro (898 holders), Wangdue Phodrang (836 holders) and Punakha (702 holders). On the other hand, the bottom three with least number of holdings owning powertillers are Pema Gatshel (32 holders), Samdrup Jongkhar (40 holders) and Samtse (48 holders).

Tilling of the soil for crop cultivation is a major source of drudgery on farms and hence efforts to mechanize farming through import and distribution of powertillers and tractors was a major activity since the 1980s. However, the census recorded that animal power still remains the main source of power for tillage for majority of the holdings (55 percent), followed by machine power (26 percent) and manual power (19 percent).

Forest resources play an integral role in the livelihood of farming households. About 86 percent of the holdings collect at least one or several kinds of wood and non-wood forest products. Among the non-wood forest products, fern shoots or tops is the most commonly collected item followed by mushroom.

In terms of the access to credit for performing operations related to agriculture, livestock and forestry, about 12.04 percent of the total farming households have access to credit facility. Among the various credit sources such as relatives, neighbors, commercial banks, groups or CSOs, Bhutan Development Bank Limited (BDBL) is the most common source of credit for the holdings.

Agricultural holdings hire mangers to run their farm, be it casual or permanent workers. While it is observed to be uncommon (0.68 percent) for holders, among the private limited companies and others category holdings, it is practiced to some extent with 52 percent. Of the hired managers, 83 percent are males, clearly indicating the preference for males in managerial or supervisory roles in the RNR sector. On an average, a holding saw about 6 occasions in a year where casual workers are hired, and an average of 53 man-days done by casual workers.

The RNR Census 2019 also collected information on the constraints or difficulties faced by farming households. About 88 percent of the holdings reported facing some form of constraints that limit their agricultural production or assets. The three most important constraints faced by holdings are irrigation problem, followed by labor shortage, and crop damage by wild animals.

1 INTRODUCTION

1.1 Background

1.1.1. Country Profile

The Renewable Natural Resources (RNR) practices in Bhutan is still predominantly based on the traditional subsistence oriented mixed farming system that includes cropping, livestock rearing and use of non-wood forest products for sustenance. As per National Accounts Statistics 2018, the share of the primary sector is 17.37 percent. Among the components of RNR Sector, Crops (Agriculture) contributes 10.64 percent of the total GDP.

The SDGs 2030-to end poverty in all its forms everywhere and to end hunger, achieving food security, improving nutrition and promoting sustainable agriculture are key highlights of the agenda. In the country, the RNR Sector's FYPs also highlights enhancement of food security, poverty reduction and income generation as its main objectives. Thus, generation of reliable and timely RNR statistics, which includes agriculture, livestock and forestry sectors plays a crucial role in identifying resources, issues, and thrust areas for evidence-based planning and formulation.

This is the 3rd RNR Census being conducted. The Census provides an updated benchmark of RNR data at the lowest administrative level, which will be useful for the formulation of agricultural and rural development policies and improvement of food security of the population.

The Census is in conformity with the World Programme for the Census of Agriculture 2020 (WCA), and covers all aspects specifically the farm holdings and holders, who are engaged in agriculture, forestry and livestock including aquaculture. In addition, the census followed uniform concepts of WCA which makes results comparable at regional and international level.

1.1.2. Earlier RNR Census

The MoAF has conducted two RNR Censuses in 2000 and 2009. In 2000, the nationwide census was conducted, but the achieved coverage was only 87 percent. Non-response was on account of seasonal migration, and farming households on move for pilgrimage, business trip, etc. The RNR Census of 2009, although it was a significant step towards meeting data needs with comprehensive coverage on RNR Sector, it lagged to establish a baseline information for collection of RNR Statistics through follow up surveys, particularly listing the farm holdings, use of agricultural inputs, assessment of their progress, constraints, resources, productivity, etc., over the years.

The IdCA (Indepth Country Assessment) 2014 recommends the need for strengthening and adopting methodological reforms on the existing crop surveys and livestock census programme, so that such data collection programmes could be converted as follow-up surveys based on the frame of RNR Census. Further, it recommends to converge the existing system of data collection of agriculture, livestock and forestry towards the base frame prepared through the RNR Census. Conducting such surveys as a follow-up of the RNR Census would be cost efficient and will lead to more sound statistics. It also mentions that the earlier Censuses were not specific on using the definitions and the guidelines of the WCA, as it was conducted as a household survey and not specific on the agricultural operational holdings.

1.1.3. Lessons learnt and Scope for Improvement

Although the past two censuses put in effort to gather comprehensive information on RNR sector, the following were some of the lessons learnt and noted for improvement in the future censuses:

- Two RNR Censuses conducted in 2000 and 2009 used the household enquiry approach. The earlier RNR Census programmes were not focussed on the farm holdings and operators who are engaged in agriculture (including livestock holdings and aquaculture holdings);
- Although items covered in the questionnaire were comprehensive, it could not be used as a farm register which could serve as baseline information for future Agriculture Surveys. The current RNR Census 2019 results produce a farm register and all future RNR surveys could be linked to the Census to reduce cost, save time and resources, by updating the register without having to conduct a separate survey. The frame of PHCB 2017 was also utilized in the preparation of the frame of RNR Census. Pre-testing of instruments and Pilot Study were also carried out to ensure data quality of the current census; and
- In earlier censuses, data was collected, validated and processed with less technological innovations, which had resulted in no proper archival system to archive the results and unit level data for further research and policy evaluation. Technological innovations are important for data accuracy, and validation can be carried out efficiently and time lag in publication of results can be reduced. Final data at the lowest level of administration can also be digitized and used for research studies.

1.2 Objective of the census

To gauge the data gap of the country for having a reliable database of its farmers/ farm holdings, the role of the RNR Census is of much value, for it prepares list of households and holdings engaged in agriculture as the first step. In addition, the RNR Census 2019 was designed to cover all holdings that are engaged in RNR sector. It also used technological innovations for digitization and processing of data to facilitate timely release and archival of results, besides the use of GIS to interconnect the results with similar and relevant statistics (like access to markets, connectivity to road, etc.) for easy interpretation. The following are specific objectives of the RNR Census 2019:

- To establish a statistically sound system of data collection with an integrated approach of follow-up surveys, in conformity with WCA of the FAO of United Nations;
- To meet data requirements of the RNR Sector in the country, with an objective to build a farm register covering structural characteristics of operational holdings in the country; and
- To provide baseline data on RNR Sector on time and also to strengthen the statistical system of the country by way of provisioning efficient use of the existing facilities, capacity building on human resources, infrastructure, technological innovations, etc.

1.3 Outcome of census data

The census data provides valuable information to support FYPs with benchmark information for the policy maker, planners, academia, etc. The following are specific outcome of the Census:

- Structural data on RNR Sector at spatial and temporal scale;
- data on land tenure and land use;
- data on livestock;
- data on characteristics of agricultural holdings;
- data on agricultural employment and farm economy;
- data on agricultural machinery and equipment;
- information on agricultural production methods;
- farm labour and gender statistics on the contribution of women and men to agricultural production and their access to agricultural resources;
- information on rural infrastructure at the community level; and
- Benchmark data for current statistics and baseline data for evaluation of impacts of agriculture and rural development programmes, etc.

1.4 Census scope and coverage

The RNR Census is a statistical survey conducted on the full set of agricultural holdings operating in the country. It covers all the holdings in the rural and semi-urban area that depend their livelihood from engaging in RNR activities i.e. agriculture, livestock and forestry activities.

1.5 Census Procedures

Undertaking a census is complex and resource intensive. It entails extensive preparation and planning both in terms of human capacity and financial resources. Such an exercise by nature has administrative and political influence and therefore demands authority and integrated views and commitment from all the relevant stakeholders. Therefore, for these reasons, arrangement of the layers of people in the hierarchy with defined distinct roles and responsibilities was established.

1.5.1. Technical Working Group

The RNR Statistics Technical Working Group (RS-TWG) was constituted with representation of the major stakeholders both from within and outside MoAF. A focal person from each line departments in the ministry and the National Statistics Bureau represents as the member of the TWG. The RS-TWG provides overall guidance to the development and implementation process of all the major activities related to RNR statistical releases.

The RS-TWG functions as a think tank to define and realize the broad vision for the RNR statistical system and provides professional guidance on technical matters such as selecting better approaches (list frame/area frame/linking censuses etc.), calendar of censuses and surveys, integrated framework for surveys, etc. It also provides overall policy guidance and advices on the conduct of the RNR Census and other statistical publications.

During the RNR census, the members are involved with the planning and preparation of technical aspects of data collection materials which among many other involves designing of questionnaire, development of methodologies, estimation of timeframe and budgetary requirements, training of supervisors and enumerators.

1.5.2. Dzongkhag RNR Census Coordinators

There are 20 dzongkhag census coordinators appointed from the livestock and agriculture sectors. They are responsible for overall coordination in the dzongkhag to implement the census. Their specific roles included liaising with the local leaders, mobilizing field supervisors and enumerators, and also monitor progress based on the work plan. Further, they also supervise the submission of completed assignments by the enumerators.

1.6 The Preparatory Phase

The WCA 2020 recommends the conduct of RNR census right after the Population and housing census (PHCB), which was conducted in Bhutan in 2017. The RNR frame list was updated using the PHCB frame provided by NSB. The RNR extension agents updated the frame list with support from Gewog administrative records and prior listings.

The RNR Statistics Division (RSD) coordinated and monitored the overall census activity. The Census team visited and trained district agriculture and livestock extension officials on the use of CAPI and questionnaire for data collection modality.

The RSD spearheaded in procuring of tablets, printing of guidelines for the distribution of tablet to the enumerators, developing enumerator's manual and questionnaire for backup. The development of training programmes and training itself to enumerators and substitute enumerators for timely data collection were carried out. To speed up the whole census processes, a total of 6 teams were formed at the RSD.

1.7 Census Field Enumeration

The RNR Census covers all the holdings in the rural and semi-urban area that depend their livelihood by engaging in RNR activities particularly in agriculture, livestock and forestry activities. The enumerators enumerated every holding as per the predetermined frame list.

The Enumeration Area (EA) for the RNR census is the area covered by the enumerators in which, most cases is their respective assigned gewogs.

With the recent developments in new technologies, particularly information and communication technologies and geo-referencing devices, it provides new opportunities to improve timeliness and also reduces the potential for enumerator and data processing errors, thereby improving quality checks and the overall quality of data.

In the current RNR census, the *Computer-Assisted Personal Interviewing (CAPI)* method was employed. The method involves the enumerator conducting an interview with the respondent using an electronic questionnaire on a mobile device, such as that of a tablet, laptop or smartphone. The use of such technology has the advantage in providing real-time sample selection in sections wherever necessary.

The CAPI also has an option to record the GPS information of the holding and this increases efficiencies and improves the quality of data. For instance, the use

of CAPI led to improvements in data quality, including timeliness, reduction of undercoverage and response errors.

1.8 Quality Assurance

The quality of census data is of primary importance for accuracy, relevance, reliability and validity of results. The RSD team implemented measures to prevent unacceptable practices and to minimize errors in the data collection. Establishment of effective and efficient strategies towards improvement of the quality of a census helps to achieve the timely collection of high-quality data and the results. The RSD team pre-defined operational standards on the structure, process and outcome of the census. The procedures were made transparent and were systematically monitored.

To ensure data quality, utmost attention was paid particularly for the census operation, starting from the design of the questionnaire and manual, standardization of the training of enumerators, monitoring of the field work, data validation and cleaning to data tabulation, and finally on the report writing. Several stakeholder consultations and roundtable meetings were carried out to discuss and review the content of the questionnaire before finalizing it.

During the enumeration each Dzongkhag census coordinators supervised and provided support to the enumerators where necessary. The team from RSD was formed as focal for each dzongkhag dedicated in monitoring the data received at the headquarter and entering on their data log every day. Since the use of CAPI based questionnaire enables the headquarter to receive data online, it was easier for the focal persons to download the data and validate concurrently. Thus, data validation and cleaning were done instantly which effectively reduced time otherwise incurred for data processing and cleaning. Further, adoption of the collection of the GPS enabled to monitor the progress of the enumerators.

A post enumeration survey helps to re-validate information collected from the respondents. The RSD team also conducted post enumeration survey by selecting a few households at random from every gewog and then a telephonic interview was carried out. Only a few pertinent questions were asked to the respondents.

1.9 Non-respondents

The census covered a total of 66,587 holdings that were engaged in the RNR sector. This includes both households and institutions. A total of 66,070 households and a total of 517 intitutional holdings (which includes Dratshang/Monastery, Private Company, Groups/ Cooperatives and Others) were covered.

The Census coverage was 97.48 percent of the total eligible holdings as per the frame list while 0.61 percent of the holdings were gungtongs. The non-response

or the absentees is 1.91 percent of the farming holdings. With the updated frame list used for the RNR census, the non-response rate reduced to 1.91 percent compared to 6.77 percent in the last 2009 RNR Census.

1.10 Limitations

The 3rd RNR census although it was successfully completed, it encountered a few limitations and these were documented so that such issues are addressed in the future censuses.

The purpose of the census was to get the true picture of the farming households. However, due to various reasons such as that of seasonal migrations particularly people on move for pilgrimage, etc, the census duration had to be extended from 1st March 2019 to April 15th 2019.

While the data collection through CAPI based programme enabled storing data directly into the server, there were problems regarding the connectivity and syncing of data. In addition, the GPS coordinates of some household could not be obtained due to location of houses in deep gorges.

Further, land conversion units have changed in some parts of the country, especially regarding the conversion of land area. For example, in the earlier days land area were measured by how much area oxen can plough the field in a day. With the recent introduction of power tillers in communities, the land area declared by farmers have become uncertain and unreliable.

2 GENERAL CHARACTERISTICS OF AGRICULTURAL HOLDINGS

2.1 Introduction

The chapter presents the general characteristics of the agricultural holdings, including aspects of the respondents and other items by type, location, main farming activity, main purpose of production and income. Most of these aspects fall under essential items list and therefore such items are included in the census of every other country allowing international comparisons.

2.2 Type of agricultural holdings

As per the results of the RNR Census of Bhutan 2019, Table 2.1 shows that almost all the holdings are located in the rural area and a few (0.5 percent) holdings are in the urban area. The urban area holdings are mostly holding that grow vegetables on small plots for commercial purpose. The household sector accounts for 99.22 percent of the overall holdings while the non-household sector is negligible. The non-household sector includes entities such as the following:

- A *private limited company* or large commercial farms such as Druk Horticulture Farm, etc.;
- *Agriculture groups or cooperatives* that are run by a group of farmers who leases land either from government or community, share labour and market the produce for joint profit;
- *Monasteries* that often lease out land to others but sometimes may employ a caretaker/ manager to run the farm or sometimes the monks/ students of a Shedra may grow vegetables for their own consumption; and
- The '*others*' category includes those holdings other than those categorized above such as labour camp holdings, kukhor-owned holdings that are usually managed by a caretaker and armed force premises holdings who also rears some chickens or goats, etc.

Text box 2.1. Agricultural holdings by type, and by urban-rural

An agricultural holding is defined as an economic unit under single management comprising all livestock kept and all land used wholly or partly for agriculture production purposes, regardless of the ownership (WCA 2020). In developing countries, the majority of the holdings are in the household sector, i.e. holdings that are predominantly run by families.

Table 2.1. Agricultural holdings, by type, and by urban-rural

Holding type	Urban	Rural	Total	Urban	Rural	Total
	(Number)			(Percentage)		
Household	316	65,754	66,070	0.48	99.52	100.00
Private Ltd Company	4	21	25	16.00		100.00
Groups/Co-operative	1	104	105	0.95	99.05	100.00
Monastery	0	92	92	-	100.00	100.00
Others	11	284	295	3.73	96.27	100.00
Total	**332**	**66,255**	**66,587**	**0.50**	**99.50**	**100.00**

2.3 Main RNR activity

The main *RNR activity* refers to activities like agriculture, livestock and forestry activities and it pertains to the total value of the farms' production in 2018. An agricultural holding may engage in more than one RNR activity. However, the main RNR activity of an agricultural holding refers to the activity that earns the largest income.

Text box 2.2. Agricultural holdings by main RNR activity

The main RNR activity pertains to contribution from RNR activity to holdings' main livelihood. For example, when majority of the total value of the holdings' production in the household comes from crop production, it is refered to as *'Crop production'.*

The following are the main RNR activity:
Livestock production - when majority of the total value of the holdings' production in the household comes from livestock production.

Crop and livestock - when crop and livestock production in the household has equal value to the holdings' production.

Forestry and logging - when majority of the total value of the holdings' production in the household comes from engaging in forestry and logging.

Fishery and aquaculture - when majority of the total value of the holdings' production in the household comes from engaging in fishery and aquaculture activities.

Others - when majority of the total value of the holdings' production in the household comes from activities other than the above.

Figure 2.1 shows the main RNR activity of the agricultural holdings. The distribution of agricultural holdings by main RNR activity is dominated by 'crop production' with 56.39 percent, followed by crop and livestock production with 38.51 percent.

Figure 2.1. Percentage distribution of agricultural households by main RNR activity

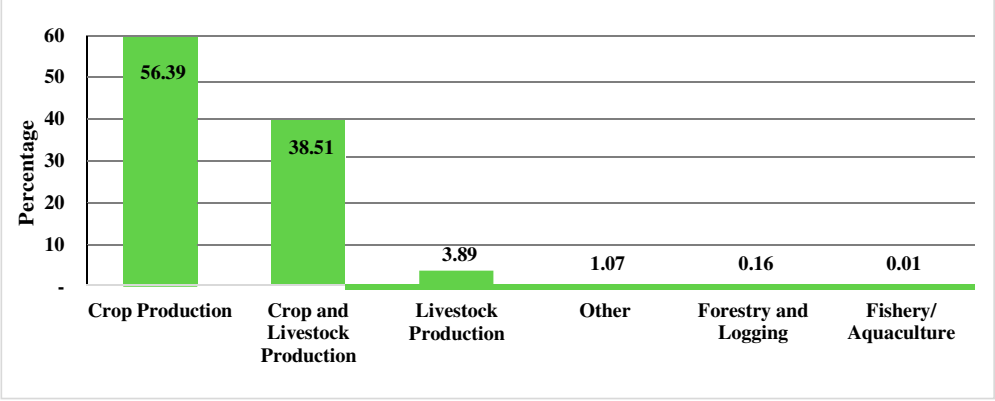


Table 2.2 presents the distribution of agricultural holdings, by dzongkhag, and by main RNR activity. While the 'Crop production' is the main RNR activity for many dzongkhags, there are other dzongkhags like Gasa, Haa and Trashi Yangtse with 'Crop and livestock production' as the main RNR activity. For fishery/ aquaculture, the southern dzongkhags such as Sarpang, Samtse, etc. are hardly visible having any holdings. This is because of the fact that holdings in these dzongkhags may have fish ponds but it is not their main RNR activity.

Table 2.2. Agricultural holdings, by dzongkhag, and by main RNR activity

Dzongkhag	Crop production	Livestock production	Crop and Livestock production	Forestry	Fishery/ Aquaculture	Others	Total
			(Number)				
Bumthang	1,027	299	104	1	0	45	1,476
Chhukha	2,982	224	922	2	0	25	4,155
Dagana	2,513	66	1,627	3	0	26	4,235
Gasa	90	12	395	0	0	76	573
Haa	327	78	942	7	1	20	1,375
Lhuntse	1,186	31	767	0	0	24	2,008
Monggar	2,580	45	2,524	1	0	9	5,159
Paro	1,969	70	1,224	0	0	18	3,281
Pema Gatshel	1,836	35	1,561	2	0	22	3,456
Punakha	2,026	33	522	1	2	15	2,599
Samdrup Jongkhar	1,935	81	1,881	9	1	26	3,933
Samtse	4,873	167	3,840	2	0	115	8,997
Sarpang	2,495	232	2,123	3	0	22	4,875
Thimphu	673	173	517	23	1	45	1,432

Dzongkhag	Crop production	Livestock production	Crop and Livestock production	Forestry	Fishery/ Aquaculture	Others	Total
			(Number)				
Trashigang	2,254	383	3,256	33	0	68	5,994
Trashi Yangtse	2,228	22	176	14	0	35	2,475
Trongsa	1,034	235	174	2	0	21	1,466
Tsirang	2,094	153	1,374	2	1	30	3,654
Wangdue Phodrang	1,668	165	1,504	0	1	31	3,369
Zhemgang	1,760	67	207	3	0	38	2,075
Total	**37,550**	**2,571**	**25,640**	**108**	**7**	**711**	**66,587**

2.4 Main purpose of production

The main purpose of production concept allows one to make a quick estimate of the level of commercialization attained by the farming sector. The main purpose of the consumption of production are classified as follows:

- *Only for own consumption*- if the purpose of the holdings' production is for self-consumption and not for sale or if all of the holdings' production is for self-consumption and not for commercial purpose.
- *Mainly for own consumption with some sales*- if the larger portion of the holdings' production is for self-consumption and lesser portion for sale of the production for cash or in exchange for other produce or products.
- *Mainly for sale with some own consumption*- if the larger portion of the holdings' production is for sale of the produces for cash or in exchange for other produce or products and lesser portion for self-consumption.
- *Only for sale*- if all of the holdings' production is for commercial purpose and not of consumption.

Table 2.3 shows Agricultural holdings across the subsistence or commercialization level, by purpose of production. The agricultural holdings in Bhutan are still predominantly subsistence oriented, majority producing mainly for own consumption with some sales (53.02 percent), followed by only for own consumption (36.67 percent). There are 9.38 percent of agricultural holdings with 'mainly for sale with some own consumption'.

Table 2.3. Agricultural holdings, by purpose of production

Purpose of production	Number	Percentage
Only for own consumption	24,417	36.67
Mainly for own consumption with some sales	35,305	53.02
Mainly for sale with some own consumption	6,247	9.38
Only for sale	618	0.93
Total	**66,587**	**100.00**

Table 2.4 shows the percentage distribution of holdings across the subsistence or commercialization level by Dzongkhags. It is observed that the agricultural holdings in the dzongkhags that has better access to market or those located in urban areas are comparatively more commercialized than their rural counterparts.

Table 2.4. Agricultural holdings, by dzongkhag, and by purpose of production

Dzongkhag	Only for own consumption	Mainly for own consumption with some sale	Mainly for sale with some consumption	Only for sale
	(Percentage)			
Bumthang	25.00	51.22	20.00	3.12
Chhukha	19.00	64.72	15.00	0.75
Dagana	53.00	42.13	4.00	1.82
Gasa	71.03	28.27	0.17	0.52
Haa	26.00	60.22	13.00	0.73
Lhuntse	74.00	25.00	1.00	0.20
Monggar	43.00	50.69	6.00	0.08
Paro	21.00	60.10	19.00	0.18
Pema Gatshel	44.00	52.63	3.00	0.75
Punakha	26.00	66.10	7.00	0.12
Samdrup Jongkhar	36.00	61.63	2.00	0.28
Samtse	41.00	47.29	10.00	1.90
Sarpang	24.00	64.59	9.00	1.74
Thimphu	25.00	48.74	24.00	1.89
Trashigang	30.00	60.08	9.00	0.27
Trashi Yangtse	57.00	40.36	2.00	0.85
Trongsa	31.00	61.32	8.00	0.34
Tsirang	37.00	55.86	7.00	0.96
Wangdue Phodrang	25.00	46.45	28.00	0.80
Zhemgang	56.00	39.95	4.00	0.48
Total	**37.00**	**53.02**	**9.00**	**0.93**

Table 2.5 shows the distribution of agricultural holdings across the subsistence or commercialization level, by main purpose of production. It is observed for obvious reason that it is mostly the private entities, groups or cooperatives that are commercial oriented compared to household sector that are largely subsistence oriented.

Table 2.5. Agricultural holdings, by main purpose of production, by type of holding

Holding Type	Only for own consumption	Mainly for own consumption with some sale	Mainly for sale with some consumption	Only for sale
	(Percentage)			
Household	36.61	53.29	9.25	0.84
Private Ltd Company	24.00	4.00	56.00	16.00
Groups/Co-operative	1.90	3.81	78.10	16.19
Monastery	79.35	14.13	1.09	5.43
Others	50.17	26.10	12.20	11.53
Total	**36.67**	**53.02**	**9.38**	**0.93**

2.5 Size of holdings

The size of holdings refers to the total area of own land available plus land leased-in minus the land lease-out from the total land owned. The statistics on the size of holdings are important indicators to guage the accessibility of land by different types of holdings.

Table 2.6 shows summary statistics of agricultural holding, by type of holdings. The mean holding size is 3.7 acres irrespective of holding type. However, by the type of holdings, the mean holding size of the household sector is much smaller compared to the other holding types.

Table 2.6. Summary statistics of agricultural holding, by type of holding

Holding Type	Number of holdings	Total area (acres)	Mean	Median
Household	66070	246,912	3.67	2.68
Private Ltd Company	25	170	6.81	4.00
Groups/Co-operative	105	869	8.27	4.27
Monastery	92	661.77	7.19	3.17
Others	295	2,020	6.85	1.33
Total	**66,587**	**250,633**	**3.76**	**2.67**

Further, if we look at the mean holding size of household sector by their main purpose of production, it is observed that there is virtually no significant difference in the average holding size between commercial oriented holdings and the subsistence-oriented holdings. Table 2.7 shows summary statistics of households, by their main purpose of production.

Table 2.7. Summary statistics of households, by main purpose of production

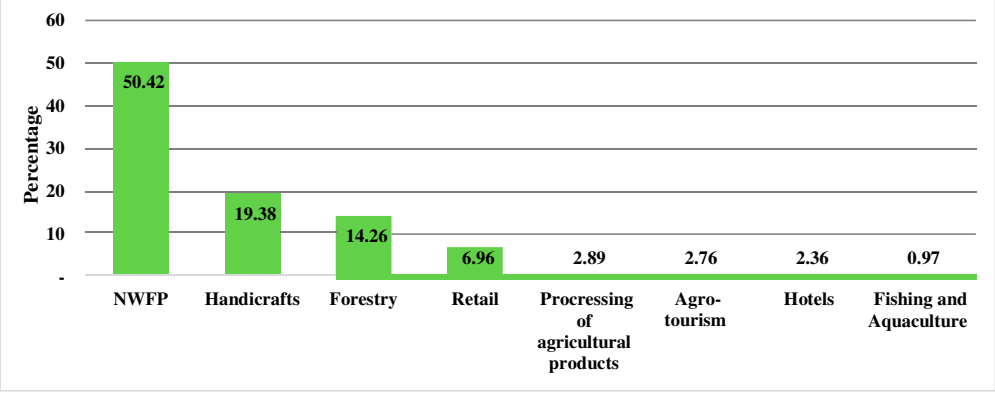
Purpose of production	Number of observations	Mean	Median
Only for own consumption	24188	3.30	2.33
Mainly for own consumption with some sales	35210	3.94	3.00
Mainly for sale with some own consumption	6114	3.66	2.60
Only for sale	558	3.31	2.00
Total	**66,070**	**3.67**	**2.68**

2.6 Other economic activities

A household may engage in other economic activites other than agricultural production. For example, a household may operate a shop or restaurant, in addition to operating the holding.

Figure 2.2 shows type of economic activities prevalent among the households. The farming households are engaged primarily in the production of either crop, livestock or both. About 45 percent of the holdings reported that they have at least one or more economic activities apart from their main RNR activity. For example, if we look at the holdings whose main RNR activity is either crop, livestock or both, the most common activity prevalent is NWFP collection.

Figure 2.2. Percentage distribution of other economic activity prevalent among the households



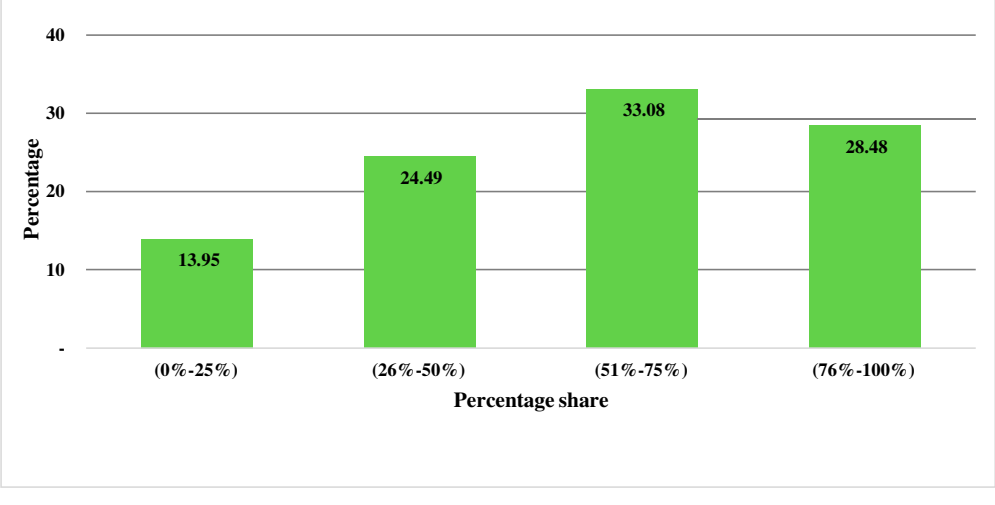
2.7 Share of income from RNR production

To gauge the extent to which the households rely on their own production for the total household income, the households were asked to respond to the question on 'what percentage of the total households' income comes from RNR production?'. The share of income from RNR production were categorized into the following:

- *0% - 25%:* the households' income generation of RNR production from the holding constitures a quarter of the households' total income.
- *26%-50%:* the households' income generation of RNR production from the holding constitutes a half of the households' total income.
- *51%-75%:* the households' income generation of RNR production from the holding constitutes three-fourth of the households' total income.
- *76%-100%:* the households' income generation of RNR production from the holding constitutes all of the households' total income.

Figure 2.3 shows proportion of agricultural holdings with share of income from RNR production. Looking at the share of income from a holdings' main RNR activity relative to other non-RNR activities such as running a retail shop, driving a car, agro-tourism, etc, the RNR production activities constitutes to be the main driver of the holdings' income generation.

Figure 2.3. Proportion of agricultural holdings to the share of income from RNR production



3 DEMOGRAPHIC CHARACTERISTICS OF AGRICULTURAL HOLDINGS

3.1 Introduction

Understanding the demographic characteristics of the households are important to gain a better knowledge of the social dimensions of the farming households. The information on demography was asked only to the household sector and not to all other holding types. The demographic information was also asked to all household members who are usually resident in the household, shares meals together, and would have a household head who makes the major economic or social decision.

3.2 Household size

There are 66,070 households distributed in different dzongkhags. Table 3.1 shows the summary statistics of households, by dzongkhag and by size. The national average household size is observed at 4 persons. Across the dzongkhags, Lhuentse has the highest average household size with 6 persons and Tsirang has the lowest. There is no significant difference in the average household size between male and female headed households.

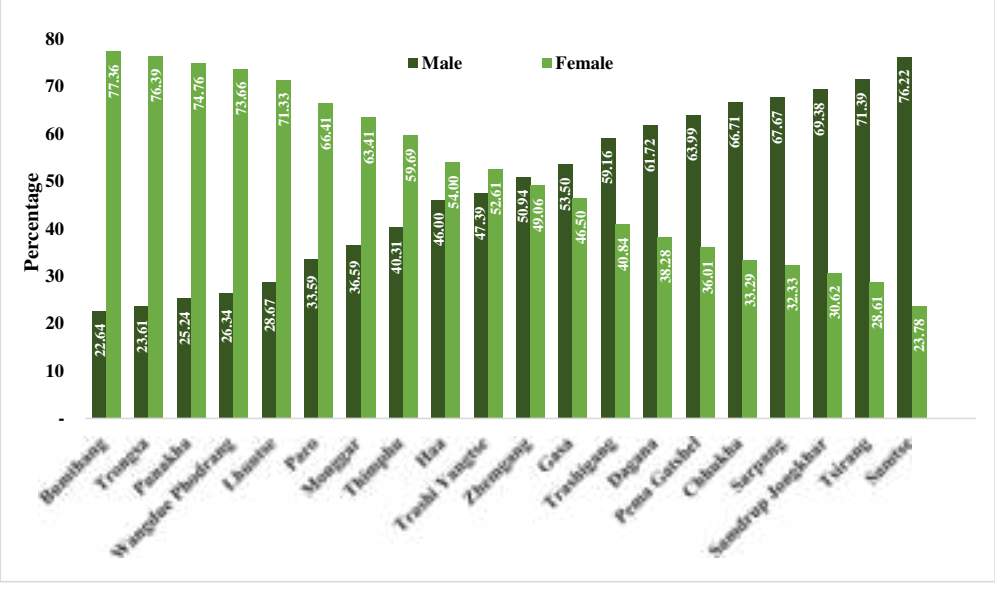
Table 3.1. Summary statistics of households, by dzongkhag, and by size

Dzongkhag	Mean	Median
Bumthang	5	5
Chhukha	5	4
Dagana	4	4
Gasa	4	4
Haa	4	4
Lhuntse	6	5
Monggar	5	4
Paro	4	4
Pema Gatshel	4	4
Punakha	4	4
Samdrup Jongkhar	4	4
Samtse	4	4
Sarpang	5	4
Thimphu	4	4
Trashigang	4	4
Trashi Yangtse	4	4
Trongsa	4	4
Tsirang	4	3
Wangdue Phodrang	4	4
Zhemgang	5	5
Total	**4**	**4**

3.3 Gender distribution of household head

Figure 3.1 shows the share of male and female headed households of the agricultural holdings across the dzongkhags. In general, households are more likely to have more males compared to females as head of the households. Of the total, slightly about 54 percent of households are headed by male compared to 46 percent of female. However, there are dzongkhags such as Bumthang, Lhuentse, Punakha, Trongsa and Wangdue Phodrang with higher number of female-headed households compared to their male counterpart.

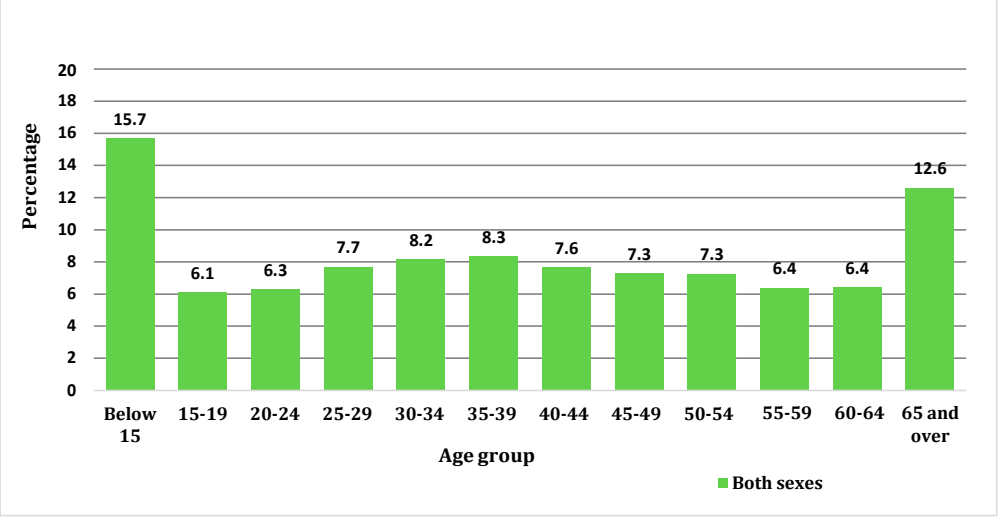
Figure 3.1. Percentage distribution of household head of the agricultural holdings, by dzongkhag, and by sex



3.4 Population in the household sector holdings

The household sector which consisted of 66,070 holdings have a total population of 227,187 persons. Fig 3.2 shows the percentage distribution of the population by age group. The working youth population in the household sector is about 12.44 percent and there is 12.6 percent of the total household sector who are 65 years and above.

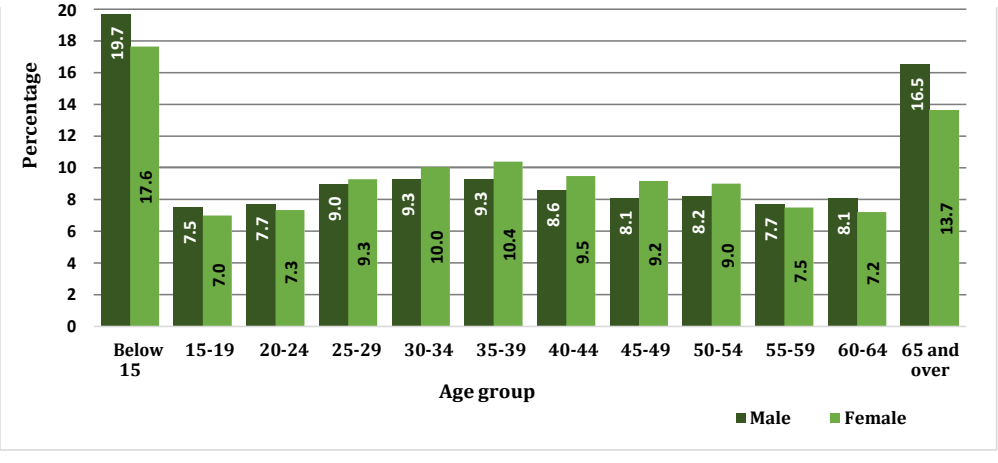
Figure 3.2. Proportion of the population in the household sector, by age group



3.5 Age profile by gender

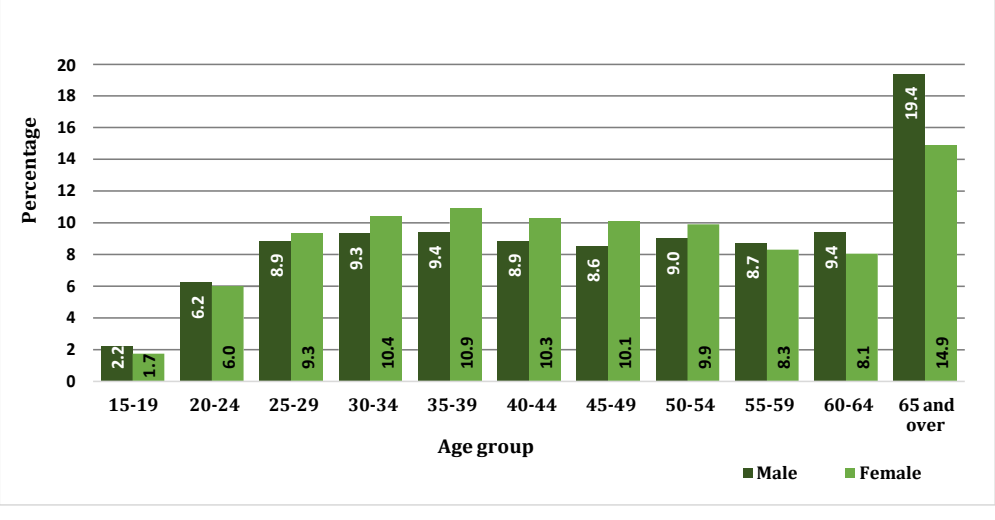
A detailed age profile by gender of farming households can be obtained from Figure 3.3. The figure shows a concentration of females in the young and adult ages, with a tail extending into older ages. The distribution by gender shows overrepresentation of females in the age categories upto 54 years, with significant difference at the age categories from 25-59 years which is the prime working age on farms. There is a clear evidence that in the prime working age groups, there are more females than males on the farms. However, it is noticeable that the distribution of both the males and females declines in the older age categories.

Figure 3.3. Proportion of farming population, by age group, and by sex



Further, the difference between males and females seems even more pronounced in the prime working age groups, when we do analysis for those people whose occupation was reported as 'farmers' or 'in farming'. Figure 3.4 shows the distribution of males and females whose occupation is farmer by various age categories. Similarly, the distribution by gender for farming households shows a consistent overrepresentation of females in the prime working age category from 20-64 years. This means that females tend to participate more in the farming occupation compared to their male counterpart.

Figure 3.4. Proportion of households whose occupation is farmer, by age group, and by sex

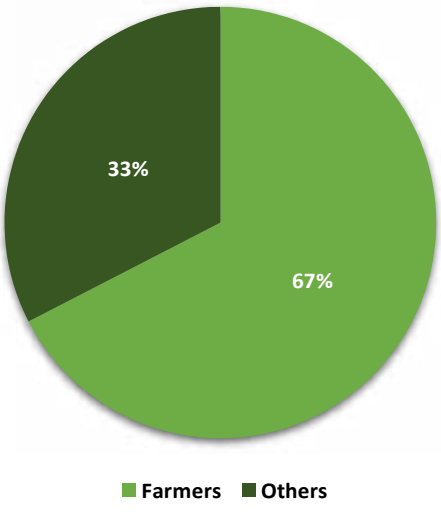


3.6 Actual farmers population

Figure 3.5 shows the proportion of occupation as farmers and others in agricultural farming population. From the total of 227,187 persons, some are farmers, school going children, monks who stay with family members but hardly do any farming job.

In order to estimate the number of people who were actual farmers by occupation, each household member aged 15 years and over were asked on their main occupation. The 'main occupation' here refers to a household member who may help with farming chores on a regular basis but his/her main occupation may be something else like driving a taxi during the day or working on the roadsides. By the main occupation, only 67 percent of the population aged 15 years and above is recorded as farmers.

Figure 3.5. Proportion of occupation as farmers and others among the farming population



3.7 Educational profile of farmers

The educational profile of farmers here refers to the highest grade of formal education completed or attended by household members. As shown in Table 3.2, the educational profile of farmers includes a larger share of population with no schooling with 65.87 percent or with primary level of education with 11.65 percent. Table 3.2 shows the farming population by level of education attained by gender.

Table 3.2. Farming population by level of education attained, and by gender

Education level attained	Male	Female	Total	Male	Female	Total
	(Number)			(Percentage)		
ECCD/Day care	1,668	2,052	3,720	44.84	55.16	100.00
Primary	11,304	6,547	17,851	63.32	36.68	100.00
Lower Secondary	2,921	2,623	5,544	52.69	47.31	100.00
Middle Secondary	3,577	3,765	7,342	48.72	51.28	100.00
Higher Secondary	1,787	1,343	3,130	57.09	42.91	100.00
Masters and Above	29	4	33	87.88	12.12	100.00
Non-formal Education	3,630	7,557	11,187	32.45	67.55	100.00
Bachelor's degree	432	161	593	72.85	27.15	100.00
Diploma	116	19	135	85.93	14.07	100.00
VTI/TTI/RTI Certificate	68	27	95	71.58	28.42	100.00
No schooling	41,246	59,648	100,894	40.88	59.12	100.00
Others	1,971	682	2,653	74.29	25.71	100.00
Total	**68,749**	**84,428**	**153,177**	**44.88**	**55.12**	**100.00**

There is a large gender difference in terms of educational attainment among farmers. Almost 60 percent of female farmers have no education, compared to around 41 percent of the male farmers. About 68 percent of female farmers have no formal education compared to 33 percent of male farmers. Among the educated farmers, males have higher educational attainment compared to females.

4 LAND AND LAND USE

4.1 Introduction

The chapter presents the total acreage of different types of land owned, leased-in, leased-out, left fallow and operational by the holdings in the various dzongkhags. The operational land is the total area of land owned and leased-in minus the total area of land leased-out and left fallow.

Further, the chapter presents the holding area or size followed by the break-down of holding by various land use types. The type of land operated/managed by the holdings are categorized as follow:

- *Chhuzhing*- an area, which has access to naturally or artificially provided irrigation to grow crops. These are rain fed wetlands too but terraced.
- *Kamzhing*- agricultural land where crops are grown without irrigation.
- *Khimsa*- a piece of plot on which a mixed variety of crops are grown around the house mostly for self-consumption.
- *Ngulthodumra*- a land on which fruits are grown in compact plantation. The compact plantation includes plants, trees and shrubs planted in a regular and systematic manner, such as an orchard. Fruit trees planted here and there in scattered manner, or on land predominantly used for temporary crops, should not be considered as orchard.

Text box 4.1. Agricultural land holdings by type of land use

The land use types are based on the legal definition, and not by the actual land use. For example, Mr. Khandu may have orchard growing fruit trees. However, if the land is simply registered in the thram as khimsa, then the type of land use is 'khimsa' and not the 'orchard'.

4.2 Land area by type

The information on the land area type pertains to the type of land the household owns in the gewog they are currently residing in. The area reported are the actual physical area on the ground operated, which can be more (or sometimes even less) than the registered lag-thram.

However, additional acreage of 4,291 acres of land (as missing out cases in the census) were included for wetland. These are cases observed in some dzongkhags where the household owners were missing during the census enumeration, yet the household may be doing the RNR activity. For example, a household is from Punakha dzongkhag and he was missed during the census enumeration as he resides in Thimphu dzongkhag for some reasons. The household in reality, lets

say, does paddy harvest in Punakha. Such were the missing cases and additional acreage of wetland are included for analysis.

Table 4.1 shows the dzongkhag-wise total acres of land owned, operated, leased-in or out and left fallow by type of land. The fallow land is uncultivated land from the total land area by the households. During the census, it is observed that a total of 250,062 acres of land in the country is being owned by the agricultural holdings, from which 7.25 percent are being leased-in, 5.04 percent are being leased-out and 26.44 percent are fallow land. The total land operated is about 75.77 percent from the total land owned.

Table 4.1. Total land, by dzongkhag, and by type of land area

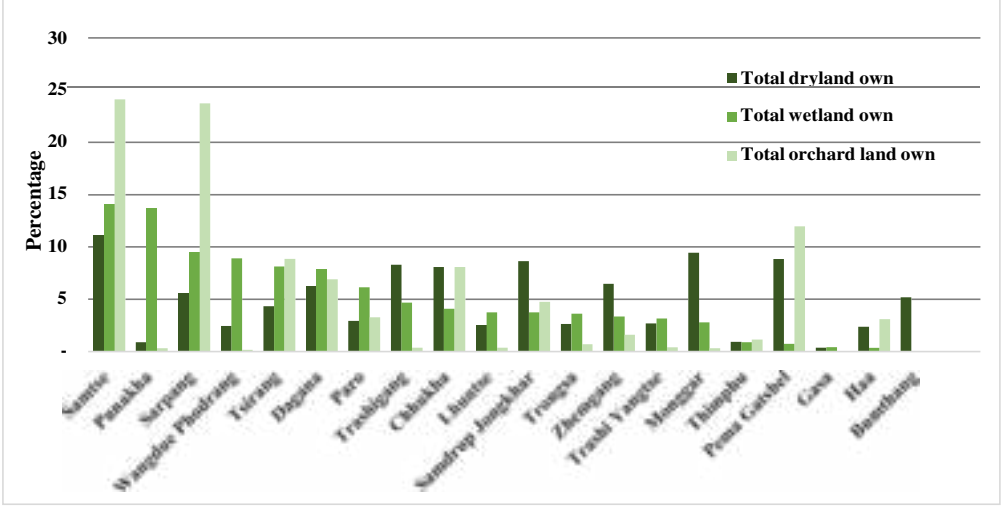
Dzongkhag	Total own	Leased-in	Leased-out	Fallow	Operational
	(Acre)				
Bumthang	9,712	918	309	3,713	6,608
Chhukha	18,082	916	924	3,203	14,871
Dagana	16,737	1,502	817	2,634	14,789
Gasa	876	17	20	168	705
Haa	5,034	173	113	878	4,216
Lhuntse	6,706	326	319	1,839	4,874
Monggar	19,513	609	376	6,072	13,674
Paro	8,969	826	571	930	8,293
Pema Gatshel	18,366	380	356	8,845	9,545
Punakha	8,503	1,841	801	1,112	8,431
Samdrup Jongkhar	18,712	922	631	4,600	14,403
Samtse	30,261	3,034	2,886	4,470	25,938
Sarpang	17,705	2,039	1,298	3,352	15,094
Thimphu	2,347	352	107	320	2,272
Trashigang	18,402	744	669	8,888	9,588
Trashi Yangtse	6,767	324	220	3,070	3,801
Trongsa	6,830	420	336	2,771	4,143
Tsirang	13,288	1,123	711	1,860	11,840
Wangdue Phodrang	9,174	1,305	805	1,879	7,795
Zhemgang	14,078	365	342	5,516	8,585
Total	250,062	18,136	12,611	66,120	189,465

4.2.1. Land owned by dzongkhags

From the total of 250,062 acres of land owned, about 74.20 percent (185,533 acres) are dry land, about 18.95 percent (47,395.59 acres) are wetland, about 3.21 percent (8,083.62 acres) are khimsa, and about 3.64 percent (9,091.82 acres) are orchard land.

Figure 4.1 shows the total land ownership, by dzongkhag (in percentages), and by the type of land. Of the total dryland owned, Samtse (11.17 percent) and Monggar (9.45 percent) dzongkhags have the highest proportion of dryland owned while Punakha (0.98 percent) and Gasa (0.35 percent) dzongkhags have the lowest. For wetland, Samtse (14.07 percent) and Punakha (13.69 percent) dzongkhags have the highest proportion of wetland owned of the total wetland while Haa (0.36 percent) and Bumthang (0.01 percent) have the lowest. For the orchard land, Samtse (24.12 percent) and Sarpang (23.72 percent) have the highest proportion of the total orchard land owned while Bumthang (0.03 percent) has the lowest. The distribution of land owned, leased-in or out, fallow and operation, by different types of land, and by dzongkhag is provided in *Annex I, Table A4.1-A4.4.*

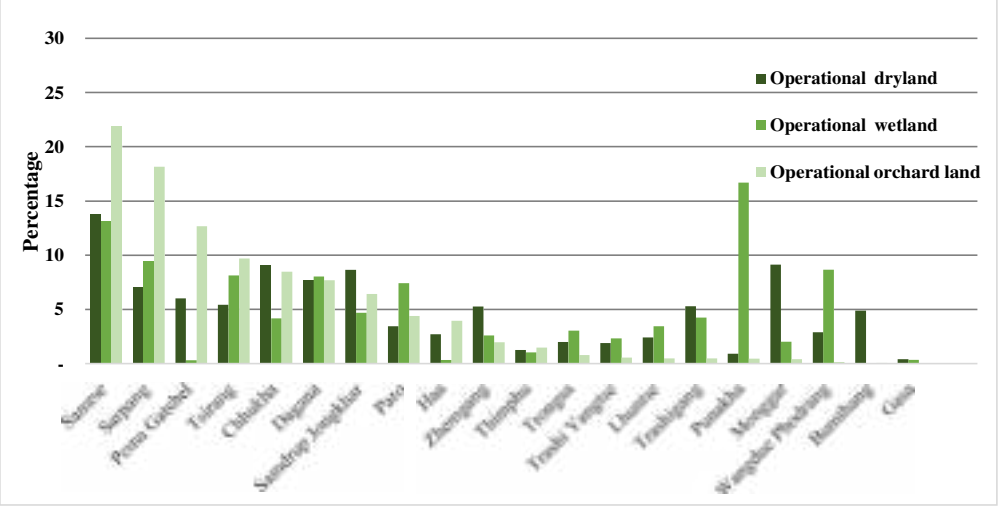
Figure 4.1. Total land ownership, by dzongkhag (in percentages), and by land type



4.2.2. Operational land by dzongkhag

Figure 4.2 shows the total operation land, by dzongkhag and by type of land. From the total of 250,062 acres of the total land owned, about 53.49 percent (133,764 acres) are operational dryland, 16.45 percent (41,145.86 acres) are operational wetland and 2.68 percent (6,707.20 acres) are operational orchard land. Across the dzongkhag, Samtse (13.75 percent) and Monggar (9.12 percent) have the highest operational dryland, Punakha (16.69 percent) and Samtse (13.11 percent) have the highest operational wetland, and Samtse (21.87 percent) and Sarpang (18.14 percent) have the highest operational orchard land.

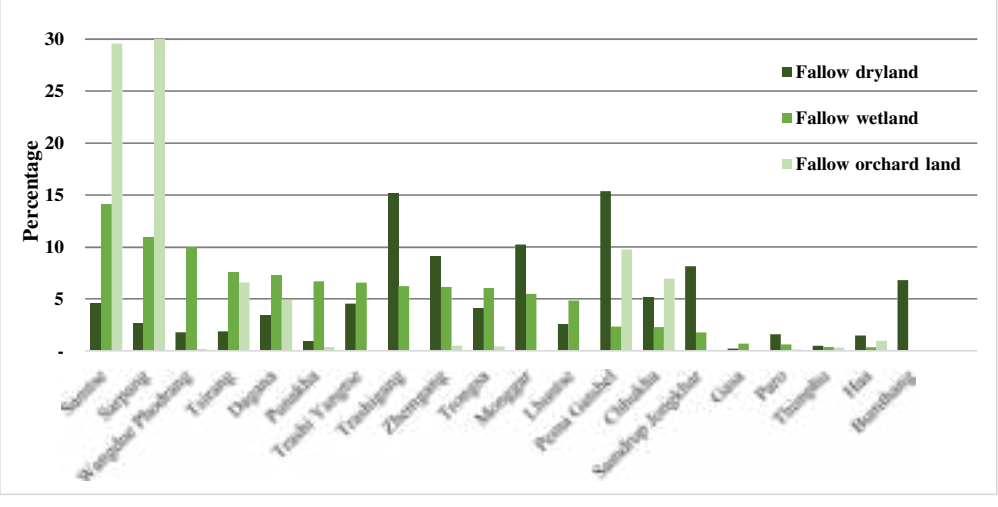
Figure 4.2. Total operational land, by dzongkhag (in percentages), and by land type



4.2.3. Fallow land by dzongkhag

Figure 4.3 shows the percentage distribution of fallow land, by dzongkhag and by type of land. From the total of 250,062 acres of the total land owned, 21.84 percent (54,614 acres) are fallow dryland, about 3.58 percent (8,957.87 acres) are fallow wetland, and 0.94 percent (2,350.15 acres) are fallow orchard land. Across the dzongkhag, Pema Gatshel (15.35 percent) and Trashigang (15.17 percent) have the highest fallow dryland, Samtse (14.09 percent) and Sarpang (10.96 percent) have the highest fallow wetland, and Sarpang (39.33 percent) and Samtse (29.58 percent) have the highest fallow orchard land.

Figure 4.3. Total fallow land, by dzongkhag (in percentages), and by land type



4.3 Leased-in land

Agricultural holders often lease in land from others for a variety of reasons- inadequate area of own land, own land may be far away from residence, there may be many lands available for lease at cheap rates.

Table 4.2 provides agricultural holdings and total land leased-in, by type of holdings. Almost 22.04 percent of the household leased-in land, about 24 percent by the private limited company, 21.90 percent by the Groups/Co-operatives, 13.04 percent by the Monastery and about 34.58 percent by the others. The 'others' category includes armed force premise holdings, private companies and so on.

Table 4.2. Agricultural holdings and total land leased-in, by type of holdings

Holding Type	Holdings	Land leased-in	Land leased-in
	(Number)		(Proportion)
Household	66070	14,561	22.04
Private Ltd Company	25	6	24.00
Groups/Co-operative	105	23	21.90
Monastery	92	12	13.04
Others	295	102	34.58
Total	**66,587**	**14,704**	**22.08**

4.4 Leased-out land

Table 4.3 shows the agricultural holdings, by type of lessor, and by type of land. The statistics on lessors are important to understand from whom the holders are leasing in land. For any land types, the majority of the holdings leased-in land from other farmers, followed by Dratshang/ monasteries and the government for all types of land.

Table 4.3. Agricultural holdings, by type of lessor, and by type of land

Type of Lessor	Wetland	Dryland	Khimsa	Orchard
	(Percentage)			
Other farmers	87.15	92.20	91.44	98.26
Dratshang/ Monastery	11.62	2.77	3.42	0.58
Community	1.00	0.93	0.68	0.58
Government	0.23	4.10	4.45	0.58
Total	**100**	**100**	**100**	**100**

4.5 Area of holding according to land use types

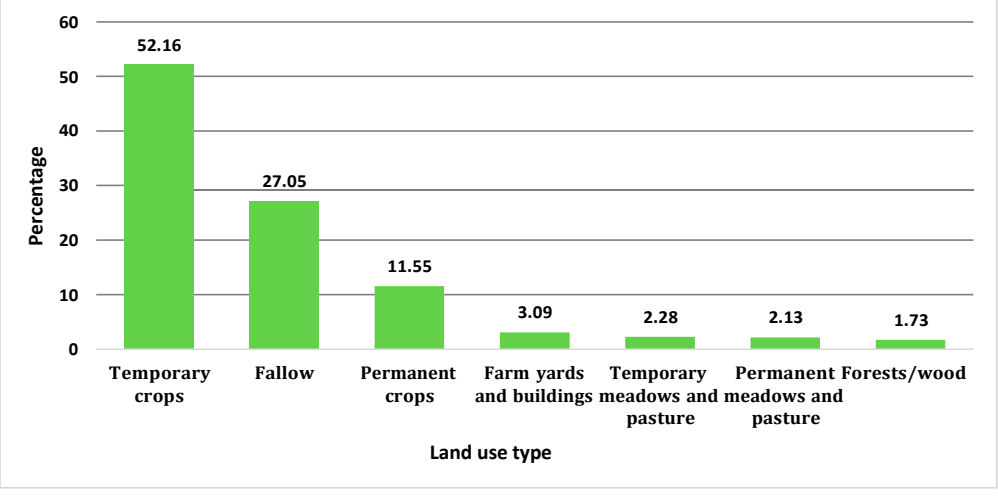
Understanding how the area of a holding is further broken down by various land use types provides a wealth of knowledge on how farmers make farm management decisions to adapt to the social and environmental conditions. The WCA 2020 recommends presenting the breakdown of a holdings' land area according to various land use types as hereunder:

- area under *temporary crops*- land under temporary crops includes all land used for crops with a less than one-year growing cycle;
- area under *temporary meadows and pastures*- temporary meadows and pastures are ones which are less than 5 years old, and if more than 5 years old, then it is permanent;
- area left *temporarily fallow*- land temporarily fallow refers to arable land at prolonged rest (at least one agricultural year) before re-cultivation due to reasons such as flood damage, lack of water, unavailability of inputs or other reasons;
- area under *permanent crops/ orchards*- land under permanent crops refers to long-term crops which do not have to be replanted for several years such as apple orchard, cardamom orchard, etc;
- area under *farm yards and buildings*- land under farm buildings and farmyards refers to surfaces occupied by operating farm buildings such as barns, cellars, silos, garage for tractors, animal sheds and also the holders' house if it sits on the agricultural land; and
- area under *forests and other wooded land*- land under forests/ woods refers to land under trees, be it planted or naturally grown, forming a sort of woodland; the holder may extract timber from it or simply use for other purposes.

4.5.1. Agricultural holdings by land use types

Fig 4.4 shows how an average Bhutanese farm is broken down into various land use types. The 'temporary crops' and 'fallow' represent higher distribution of the land use share with respectively 52.16 percent and 27.05 percent.

Figure 4.4. Proportion of an average Bhutanese farm by various land use type



4.5.2. Land use types by dzongkhag

Table 4.4 presents the distribution of agricultural holdings, by dzongkhag, and by type of land use. For example, an average farm in Bumthang dzongkhag allots 26.25 percent of its total area to growing temporary crops, 11.03 percent to temporary meadows and pasture, 37.53 percent to fallow and so on. Bumthang dzongkhag has holdings on an average of 12.77 percent under forests or woods – substantially higher than any other holdings in other dzongkhags. Further, agricultural holders in Bumthang grows temporary meadows and pastures than any holders in others dzongkhags, followed by Gasa. Haa dzongkhag, on the other hand, is the highest for permanent meadows and pasture. For the area under farm yards and buildings, Paro dzongkhag is the highest and Zhemgang dzongkhag is the lowest.

Table 4.4. Agricultural holdings, by dzongkhag, and by type of land use

Dzongkhag	Temporary crops	Temporary meadows and pasture	Fallow	Permanent crops	Permanent meadows and pastures	Farm yards and buildings	Forests/ wood
	(Percentage)						
Bumthang	26.25	11.03	37.53	2.58	8.72	1.12	12.77
Chhukha	63.45	1.80	17.62	11.96	1.12	2.83	1.21
Dagana	62.06	1.60	15.36	15.84	1.34	3.05	0.74
Gasa	62.51	8.05	19.89	1.43	3.15	4.79	0.18
Haa	59.15	2.12	17.49	5.46	10.64	3.88	1.26
Lhuntse	55.17	3.66	29.72	5.81	1.66	2.08	1.90
Monggar	55.95	1.07	31.28	5.39	2.09	3.00	1.22
Paro	62.82	2.28	12.97	14.45	1.12	5.10	1.26

Dzongkhag	Temporary crops	Temporary meadows and pasture	Fallow	Permanent crops	Permanent meadows and pastures	Farm yards and buildings	Forests/ wood
	(Percentage)						
Pema Gatshel	34.20	1.52	48.42	10.64	0.83	2.10	2.27
Punakha	70.18	1.35	19.00	4.01	0.07	3.54	1.85
Samdrup Jongkhar	48.62	5.02	24.29	13.62	4.16	2.78	1.52
Samtse	59.25	1.26	14.64	18.64	0.86	4.46	0.88
Sarpang	49.35	2.56	19.33	22.94	1.74	3.23	0.84
Thimphu	47.04	2.88	18.81	21.14	1.57	7.33	1.23
Trashigang	39.40	0.47	51.53	3.50	1.38	2.83	0.89
Trashi Yangtse	39.99	0.52	48.99	3.37	0.27	2.85	4.00
Trongsa	42.98	1.76	41.74	3.29	7.13	1.84	1.27
Tsirang	64.83	2.52	14.44	12.95	0.76	3.74	0.77
Wangdue Phodrang	66.67	1.69	21.75	2.07	3.15	4.14	0.52
Zhemgang	42.33	0.89	38.32	15.66	0.38	1.09	1.32

4.6 Aggregated land use classes

According to WCA 2020, the land use types in the above classification can be further aggregated as:

- *Arable land*- is land that is used in most years for growing temporary crops, temporary meadows and pastures as well as land that is lying fallow but which could easily be brought back under cultivation. It does not include land under permanent crops/ orchards;
- *Cropland*- is the total of arable land and land under permanent crops;
- *Agricultural land*- is the total of cropland and permanent meadows and pastures;
- *Land used for agriculture*- is the total of "agricultural land" and "land under farm buildings and farmyards".

Fig 4.5 shows the aggregate land use classes according to the WCA classification of land use. Based on the information of the census, there are 205,393 acres of arable land, 233,637 acres of cropland, 238,835 acres of agricultural land and 246,392 acres of land used for agriculture.

Figure 4.5. Classification of land use (figures in the parenthesis are total acreage for each class)

<table>
<tr><th>Basic land use classes</th><th colspan="4">Aggregate land use classes</th></tr>
<tr><td>Land under temporary crops (133690)</td><td rowspan="3">Arable land (205393)</td><td rowspan="4">Cropland (233637)</td><td rowspan="5">Agricul-tural land (238835)</td><td rowspan="6">Land used for agri-culture (246392)</td></tr>
<tr><td>Land under temporary meadows and pastures (5579)</td></tr>
<tr><td>Land temporarily fallow (66122)</td></tr>
<tr><td colspan="2">Land under permanent crops (28234)</td></tr>
<tr><td colspan="3">Land under permanent meadows and pastures (5207)</td></tr>
<tr><td colspan="4">Land under farm buildings and farmyards (7557)</td></tr>
<tr><td colspan="5">Forest and other wooded land (4240)</td></tr>
<tr><td colspan="5">Area used for aquaculture (including inland and coastal waters if part of the holding)</td></tr>
<tr><td colspan="5">Other area not elsewhere classified</td></tr>
</table>

4.7 Reasons for keeping land fallow

There are several reasons for keeping the land fallow. However, only main reason was asked for leaving the land fallow by each land type, be it in the same gewog where the holder resides or in another gewog. For this particular report, analysis pertaining to wetland located in the same gewog where the holder resides are presented.

From the total agricultural holdings, some 9,368 holdings who owned or leased-in wetland reported leaving wetland fallow either wholly or partly 8,234 acres of land. Table 4.5 presents the frequency and percentage distribution of the main reasons for leaving wetland fallow. Almost majority of the holdings reported irrigation problems (33.6 percent) as the main reason followed by crop damage by wildlife (24.65 percent) and labour shortage (19.32 percent) for leaving the wetland fallow.

Table 4.5. Agricultural holdings, by type of main reasons for keeping wetland fallow

Reasons for fallow	Number of holdings	Percentage	Number of holdings	Percentage	Number of holdings	Percentage	Number of holdings	Percentage
	Wetland		Dryland		Khimsa		Orchard	
As part of crop rotation practice	50	0.53	783	3.30	13	1.50	97	6.97
Want to convert to other land type	94	1.00	320	1.35	16	1.85	42	3.02
Irrigation problems	3,148	33.60	619	2.61	6	0.69	24	1.73
Wildlife damage	2,309	24.65	6,284	26.47	42	4.84	329	23.65
Labour shortage	1,810	19.32	7,682	32.36	262	30.22	146	10.50
Low soil fertility	196	2.09	1,117	4.71	30	3.46	109	7.84
Too far from home	940	10.03	4,691	19.76	54	6.23	306	22.00
Other reasons	821	8.76	2,244	9.45	444	51.21	338	24.30
Total	**9,368**	**100.00**	**23740**	**100.00**	**867**	**100.00**	**1391**	**100.00**

5 AGRICULTURAL PRACTICES

5.1 Introduction

The information on the agricultural practices by the farming community for crop and livestock production are important aspects to consider. Agricultural holdings use different kinds of inputs in various types of crops. For example, they use different kinds of farm machinery and equipment for crop and livestock productions. In this chapter, information on tillage practices, presence of protective cover in their field and access to credit facility for purposes related to the operations of the farming households are supplementary information provided for agricultural research and policy formulation.

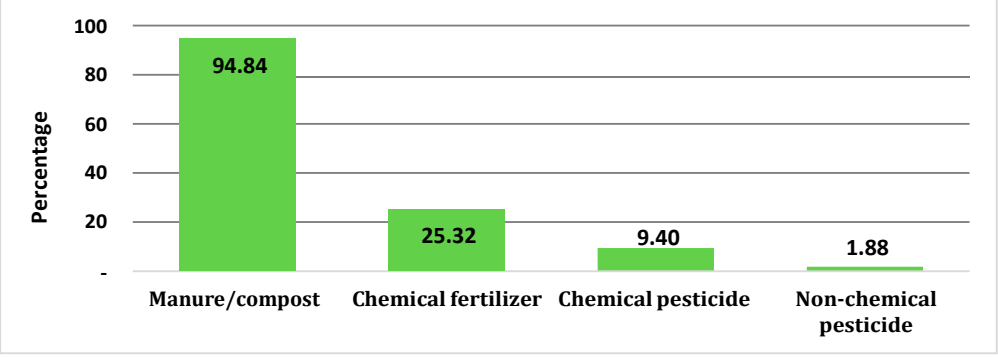
5.2 Inputs

The information on the type of inputs applied on the crops by the holdings are necessary provisions to enhance their crop productivity and ward off the pest and diseases. The types of inputs applied on the cereal by the household includes the following:

- *Chemical fertilizer*- manufactured chemical compounds such as phosphate, potassium, nitrogen and other mixed and complex fertilizers applied to soil to enhance or improve the production.
- *Manure*- fertilizer prepared from organic material (e.g. animal excreta, vegetable wastes, etc.).
- *Pesticides*- materials intended to mitigate, control or eliminate pests in plants or animals, or to control the behavior or physiology of pests or crops during production or storage (e.g. butachlor, chlorpyrifos, mancozeb, etc.).

Figure 5.1 presents proportions that the holdings use each type of inputs to the total agricultural holdings in the country. From the total farm holdings in the country, 94.84 percent uses farmyard manure or compost, followed by chemical fertilizer with 25.32 percent as a major source of soil nutrients for the crop production. Only about respectively 9.40 percent and 1.88 percent of the total holdings in the country uses chemical and non-chemical pesticides as the source for plant protection against pests or diseases and other unwanted vegetation.

Figure 5.1. Proportion of inputs being used by the farmers



5.2.1. Use of different kinds of agricultural inputs by dzongkhag

Table 5.1 presents percentage distribution of agricultural holdings using different kinds of inputs to the total holdings in each dzongkhag by different input types. Across the dzongkhags, Tsirang dzongkhag (about 99.21 percent) has the highest percentage of holdings using the manure type of input while Pema Gatshel dzongkhag (about 87.09 percent) has the lowest percentage of holdings in the country. Unlike farmyard manure, chemical fertilizer is not widely used input. For example, Paro dzongkhag (about 73.91 percent) has the highest percentage of holdings using chemical fertilizer compared to Gasa dzongkhag (about 0.35 percent). Chemical pesticides and non-chemical pesticides are relatively the least used input.

Table 5.1. Agricultural holdings, by dzongkhag, and by different kinds of inputs used

Dzongkhag	Total number of holdings	Manure/ compost	Chemical fertiliser	Chemical pesticide	Non-chemical pesticide
		(Percentage)			
Bumthang	1,476	89.5	68.02	29.67	2.98
Chhukha	4,155	96.4	11.02	4.21	2.19
Dagana	4,235	97.3	5.57	3.47	0.31
Gasa	573	97.4	0.35	0.35	0.52
Haa	1,375	96.7	36.87	29.24	1.31
Lhuntse	2,008	97.0	22.31	8.52	4.28
Monggar	5,159	95.1	17.52	2.44	0.48
Paro	3,281	97.0	73.91	34.41	0.40
Pema Gatshel	3,456	87.1	13.17	1.22	3.79
Punakha	2,599	96.6	58.64	23.09	0.08
Samdrup Jongkhar	3,933	93.1	1.68	0.56	2.19
Samtse	8,997	94.7	2.79	1.13	4.66
Sarpang	4,875	94.4	2.50	1.23	0.27
Thimphu	1,432	88.7	48.81	18.92	4.05
Trashigang	2,475	96.8	62.14	11.76	1.41

Dzongkhag	Total number of holdings	Manure/ compost	Chemical fertiliser	Chemical pesticide	Non-chemical pesticide
		(Percentage)			
Trashi Yangtse	5,994	93.4	58.76	16.23	0.17
Trongsa	1,466	92.4	35.81	1.84	0.27
Tsirang	3,654	99.2	3.53	1.12	3.64
Wangdue Phodrang	3,369	96.9	59.75	36.51	1.96
Zhemgang	2,075	95.0	1.45	0.34	-

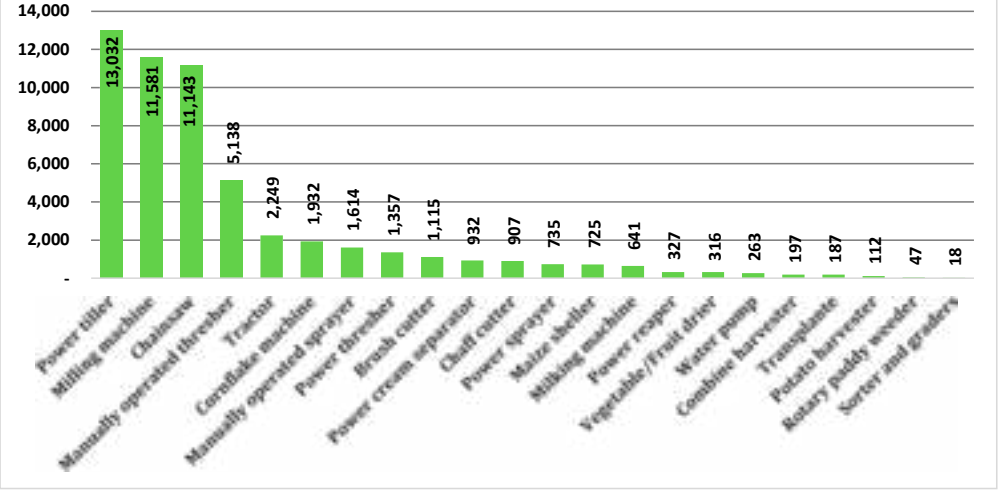
5.3 Farm mechanization

Holdings use machinery and equipment on the holding and they mostly include a simple hand tool such as a hoe to a complex machinery, such as a combine harvester. The information on the use of machinery and equipment on the holdings provide a wealth of knowledge on the level of farm mechanization. A holder usually sources the machinery and equipment for use either by hiring from other relatives or neighbors or hire from gewog centres, state owned enterprise which caters farm machinery at subsidized rate. In most cases, holders themselves own machinery and equipment.

5.3.1. Use of farm machinery and equipment by type

Figure 5.2 shows number of holdings using different types of farm machineries and equipment in 2018. The top 5 farm machineries and equipment used by the agricultural holdings are power tiller, milling machine, chain saw, manually operated thresher and tractor.

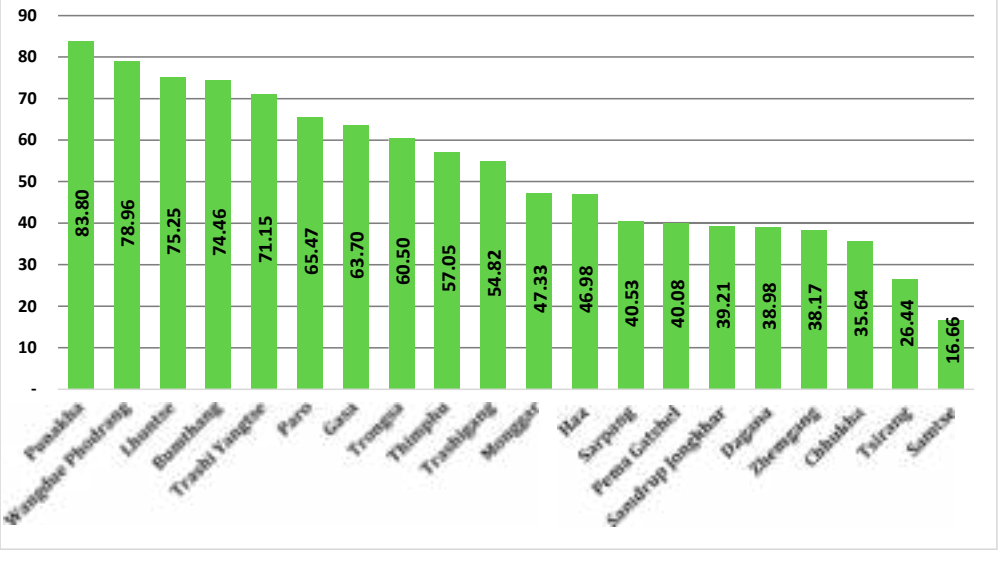
Figure 5.2. Number of holdings using different types of farm machineries and equipment



5.3.2. Use of farm machinery and equipment by dzongkhag

Figure 5.3 shows the agricultural holdings, by dzongkhag, and by type of farm machineries and equipment used. Across dzongkhags, Punakha dzongkhag followed by Wangdue Phodrang Dzongkhag has recorded the highest proportion of holdings using the farm machinery and equipment with repectively 83.80 percent and 78.96 percent. On the other hand, Samtse dzongkhag has the least proportion of holdings using the farm equipment and machineries. At the national level, about 46.69 percent of the holdings are using the farm machineries and equipment.

Figure 5.3. Percentage of holdings using different types of farm machineries and equipment by dzongkhag



5.3.3. Farm machineries and equipment owned

The top 5 machinery or equipment owned by the holdings in the country were the chainsaw, milling machine, power tiller, manually operated thresher and manually operated sprayer.

5.3.4. Farm machineries and equipment owned by dzongkhag

Across the dzongkhag, Wangdue Phodrang has the highest number of holdings owning chainsaw while Monggar dzongkhag has the highest number of holdings owning milling machine, followed by Trashigang dzongkhag. Further, Paro dzongkhag has the highest number of holdings owning power tiller while Wangdue Phodrang dzongkhag has the highest number of holdings owning manually operated thresher and sprayer.

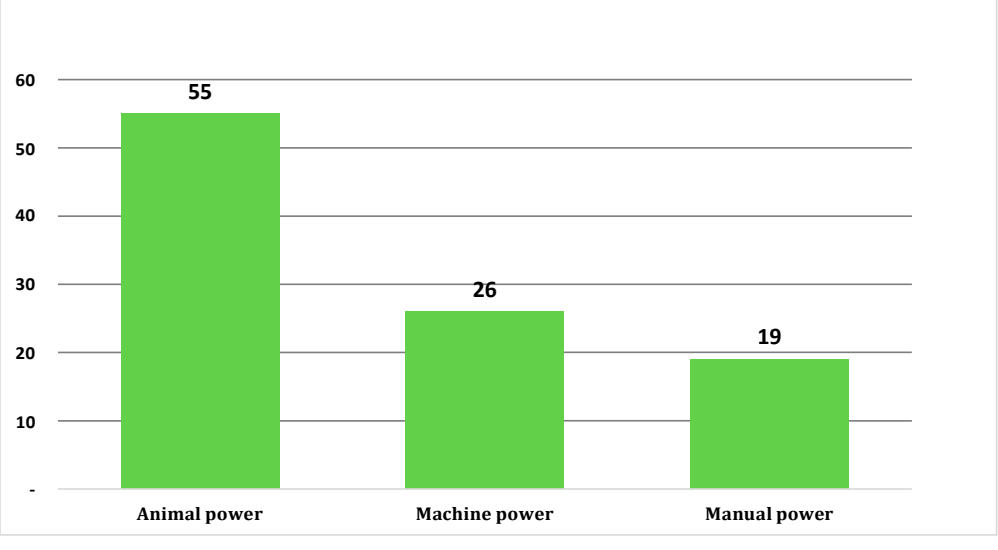
5.4 Tillage by type

Tillage refers to the preparation of soil for the purpose of crop production by using methods such as digging, stirring and overturning of the soil. There are 3 types of power sources:

- *Animal power* refers to using oxen to till the land;
- *Machine power* refers to using farm machines such as power tiller to till the land; and
- *Manual power* refers to manually tilling the land using hoes, spades, etc.

Figure 5.4 shows the main power source for land tillage used by the holdings. Among the holdings, the animal power (55 percent) is still the main source of power for land tillage, followed by machine power (26 percent).

Figure 5.4. Percentage of holdings using different types of power sources to till their land

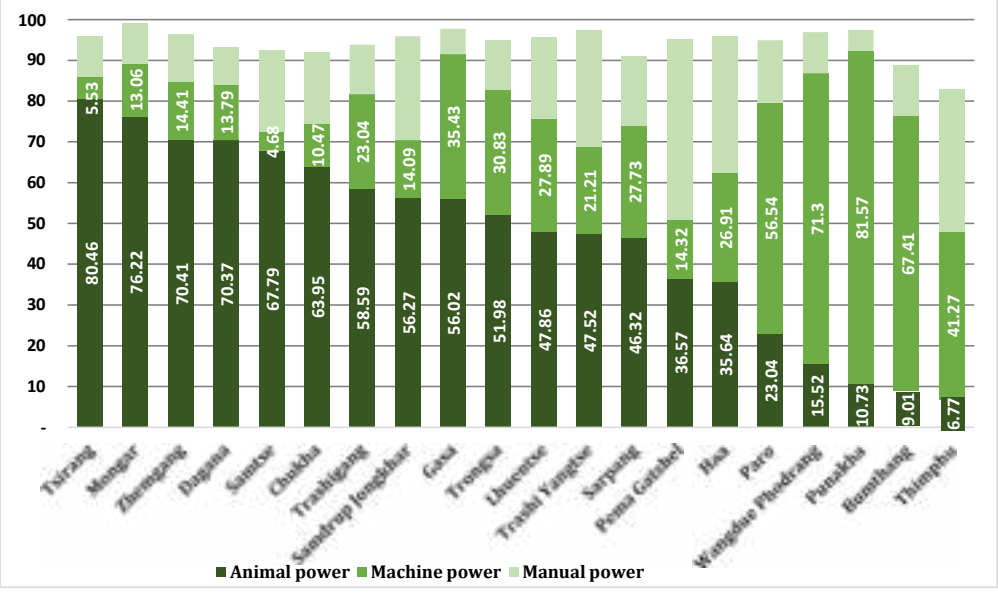


5.4.1. Tillage by type and by dzongkhag

Figure 5.5 shows the agricultural holdings, by dzongkhag, and by different sources of power to till their land. Across the dzongkhag, animal power is the commonly used power source in many dzongkhags. Tsirang (80.46 percent) dzongkhag, followed by Monggar (76.22 percent) and Zhemgang (70.41 percent) have the highest percentage of holdings using animal power source for land tilage. On the other hand, machine power is also the commonly used in dzongkhags like Punakha (81.57 percent), Wangdue Phodrang (71.30 percent), Bumthang (67.41 percent) and Paro (56.54 percent). The manual power source for land tillage is commonly used in Pema Gatshel (44.39 percent) dzongkhag. The corresponding

table with number of agricultural holdings, by dzongkhag, and by different sources of power for land tillage is provided in *Annex I, Table A5.1*.

Figure 5.5. Percentage of holdings using different types of power sources to till their land by dzongkhag



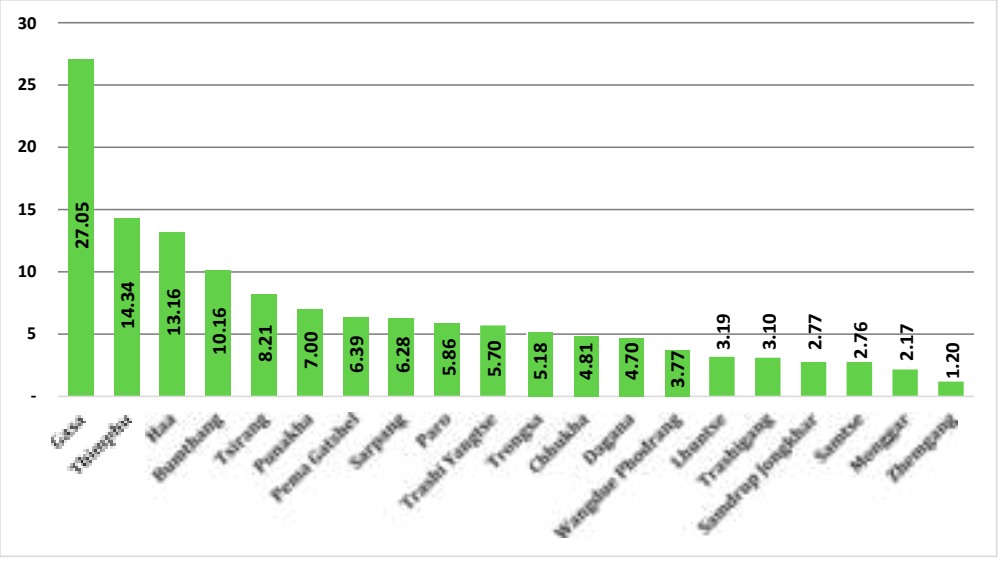
5.5 Protective cover

Agricultural holdings use protective cover in their field to enhance productivity of their crops. Protective cover here refers to providing roof of glass, plastic or other material over a permanent structure, used for protecting crops against the weather, pests or diseases. Structures like farm buildings or yards are excluded as protective cover.

5.5.1. Protective cover by dzongkhag

Figure 5.6 presents the percentage of holdings using protective cover by dzongkhag. At the national level, about 5 percent of the total agricultural holdings is under the protective cover. Across the dzongkhag, Gasa (27.05 percent) has the highest percentage of holdings that uses protective cover, followed by Thimphu and Haa with respectively 14.34 percent and 13.16 percent. Zhemgang dzongkhag, on the other hand has the lowest percentage of holdings that uses protective cover.

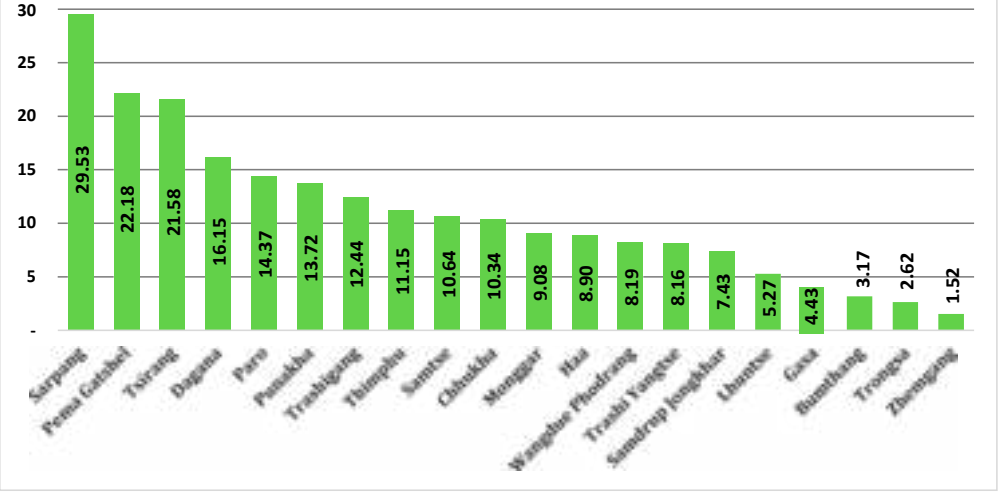
Figure 5.6. Percentage of holdings using protective cover by dzongkhag



5.5.2. Protective cover by land area, and by dzongkhag

Figure 5.7 presents the total area under protective cover by dzongkhag. In total there are about 220.87 acre of land under the protective cover. Across the dzongkhag by land area, Sarpang followed by Pema Gatshel dzongkhags have the highest area under the protective cover, respectively with 29.53 acres and 22.18 acres. Zhemgang (1.52 acre) and Trongsa (2.62 acre) dzongkhags have the lowest in terms of land area under protective cover.

Figure 5.7. Total area under protective cover by dzongkhag



5.6 Access to Credit

Credit for agricultural purposes refers to any type of credit availed for purposes related to the operations of the farming households. This includes credit for purchasing crop and livestock inputs, construction of farm buildings and purchasing farm machinery. Households source credit from different financial institutions (BDBL or Commercial banks in Bhutan) or some avail credit from family or friends, money lender, Government (rural shemes or projects) and Non-profit Government Organization (NGOs), etc.

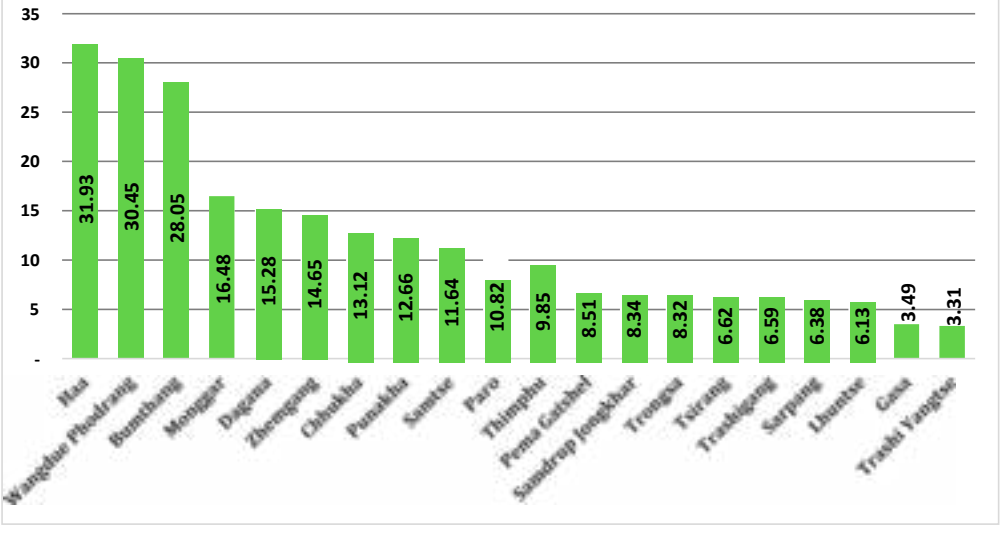
Text box 5.1. Agricultural land holdings by type of acess to credit

During the census, if the household responded that the credit was accessed for construction of the holder's house or for any other family businesses or for consumption expenditure related to non-agricultural operations, these were not enumerated. Any credit accessed by households, but not related to agricultural operations were excluded.

5.6.1. Access to Credit by households by dzongkhag

About 12.04 percent of the total farming households in the country reported to have accessed credit for performing operations related to agriculture, livestock and forestry. Across the dzongkhag, Haa (31.93 percent) has the highest proportion of households who availed credit, followed by Wangdue Phodrang (30.45 percent) and Bumthang (28.05 percent). Trashi Yangtse (3.31 percent) and Gasa (3.49 percent) are dzongkhags with lowest access to credit.

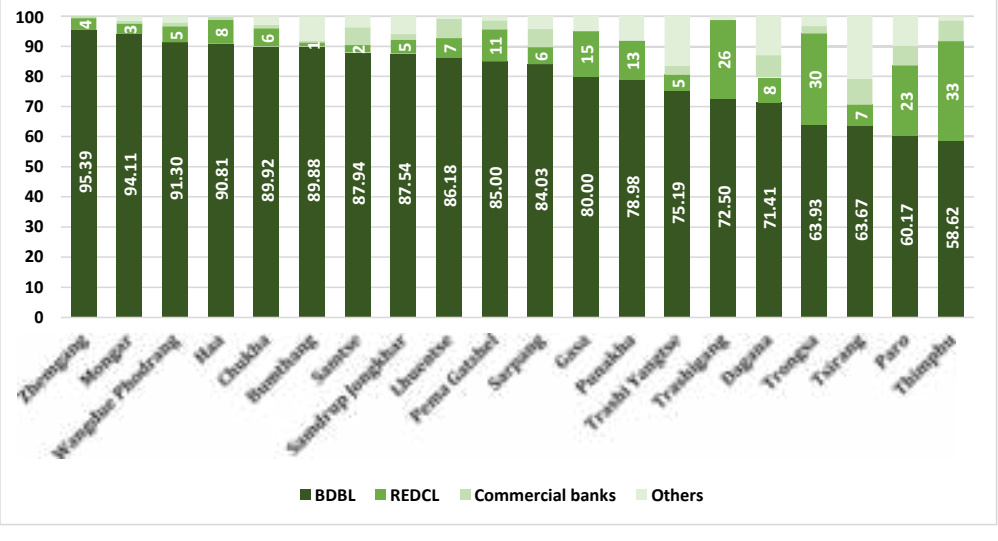
Figure 5.8. Percentage of household who availed credit by dzongkhag



5.6.2. Access to Credit by households by different sources

Figure 5.9 shows the percentage distribution of households who availed credit from different sources and by dzongkhag. Among the different credit sources, the common sources are Bhutan Developmental Bank Limited (BDBL) and Rural Enterprise Development Corporation Limited (REDCL). Even across the dzongkhag, BDBL is the most common source of credit to many households. The distribution of households by different credit sources, and by dzongkhag is provided in *Annex I, Table A5.2.*

Figure 5.9. Percentage of holdings who availed credit by different sources and by dzongkhag



5.7 Hiring of labour

The RNR census also collected information on the hiring of managers, casual workers and permanent workers. These are important information to understand the situation of the labour inputs into the RNR sector.

5.7.1. Hiring of managers

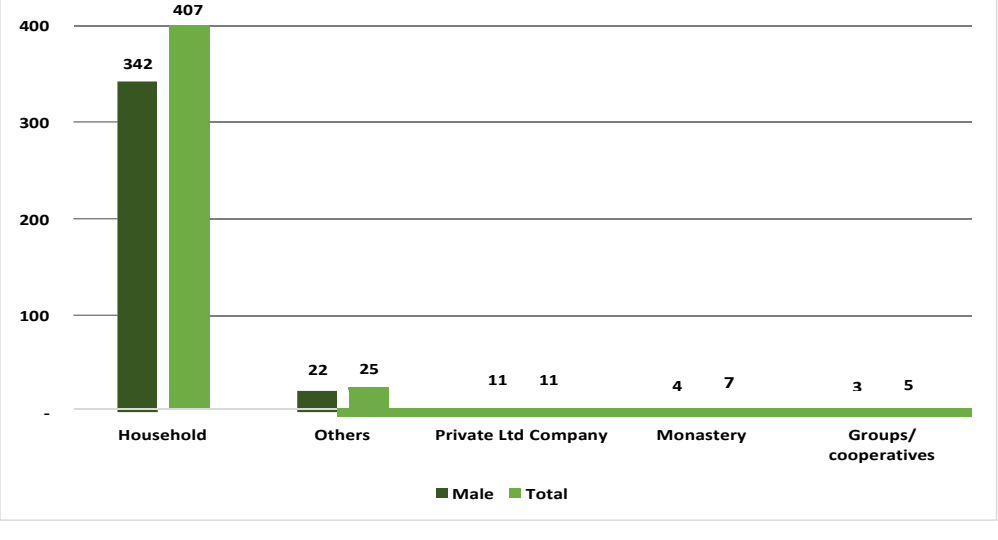
Employing a hired manager to run the farm by a holder is found to be very uncommon with only 455 holdings from the total 66,587 holdings. Table 5.2 presents the number of hired managers by different holdings, by dzongkhag. Across the dzongkhag, Tsirang has the highest number of holdings (39.56 percent) who hired managers, followed by Paro (10.33 percent) and Sarpang (7.25 percent).

Table 5.2. Agricultural holdings, by dzongkhag, and by the number of managers hired

Dzongkhag	Households	Private Ltd. Company	Groups/ Cooperatives	Monastery	Others	Total
	(Number)					
Bumthang	1	1	2	1	2	7
Chhukha	22	3	-	-	2	27
Dagana	11	1	-	-	1	13
Gasa	-	-	-	-	-	-
Haa	14	-	-	-	-	14
Lhuntse	31	-	-	-	-	31
Monggar	15	-	-	-	-	15
Paro	41	2	-	1	3	47
Pema Gatshel	5	-	-	-	-	5
Punakha	8	1	-	-	5	14
Samdrup Jongkhar	1	-	-	-	-	1
Samtse	22	-	-	-	1	23
Sarpang	26	1	-	3	3	33
Thimphu	14	1	-	-	3	18
Trashigang	7	-	1	-	1	9
Trashi Yangtse	3	-	2	-	-	5
Trongsa	-	-	-	1	-	1
Tsirang	175	1	-	-	4	180
Wangdue Phodrang	5	-	-	1	-	6
Zhemgang	6	-	-	-	-	6
Total	**407**	**11**	**5**	**7**	**25**	**455**

Figure 5.10 shows the distribution of hired managers by gender, and by type of holding. Of the hired managers, 83 percent were males, clearly indicating the higher preference of holders for males in managerial or supervisory roles.

Figure 5.10. Number of hired managers by gender, and by type of holding



5.7.2. Hiring of casual workers

Hiring of workers on casual basis, as and when required, is a very common practice on Bhutanese farms. Casual workers are required for various occasions like sowing, weeding, harvesting, manure spreading, so on and so forth.

On an average a holding saw about 6 occasions in a year where casual workers were hired, and an average of 53 man-days were done by casual workers. On an average 18 different individuals were hired as casual workers by a holding, out of which 11 are females.

The most common form of payment to casual workers are exchange of labour (about 66 percent), followed by cash with meals (about 22 percent). Holdings hiring permanent workers was observed to be rare with only 0.70 percent of the total holdings.

6 IRRIGATION

6.1 Introduction

Irrigation and drainage continue to be important sources of productivity to farming households. Irrigated agricultural area refers to area equipped to provide water via artificial means of irrigation such as by diverting streams, flooding, or spraying to the crops.

Irrigation in general refers to purposely providing land with water, other than rain, for improving pastures or crop production. The main methods used for irrigating the fields by the holders are:

- *Surface Irrigation* is where water is applied and distributed over and across the field/surface of the field by gravity;
- *Sprinkler irrigation* refers to pipe networks through which water moves under pressure before being delivered to the crop via sprinkler nozzles;
- *Localized irrigation* is a system whereby water is distributed under low pressure through a piped network, in a pre-determined pattern, and applied as a small discharge to each plant. E.g. drip and micro irrigation.

There are several sources of water supply for surface irrigation. The most common sources are surface water, ground water, mixed surface and ground water, and municipal water supply. These sources of water are defined as follows:

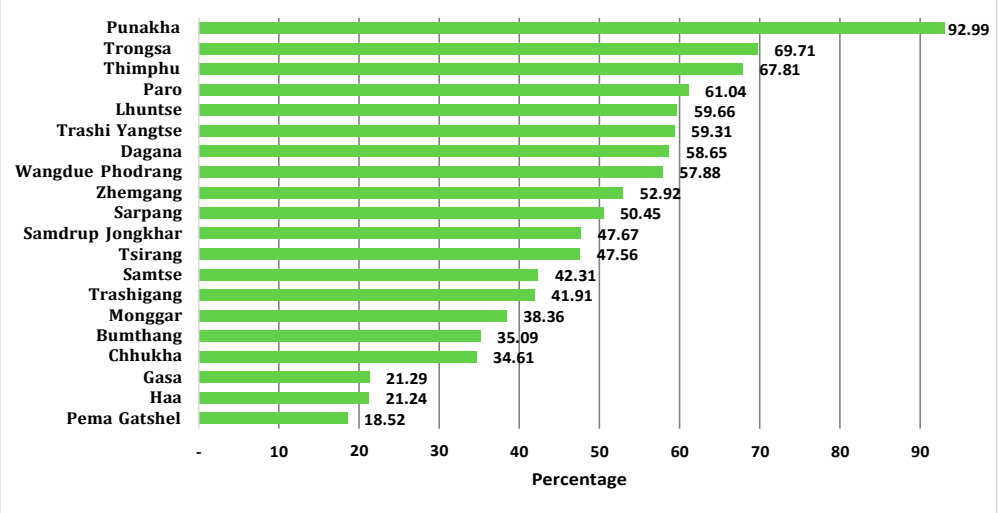
- *Surface water* is water found on the earth's surface that is naturally open to the atmosphere, in streams, rivers, ponds, lakes, wetlands or oceans.
- *Groundwater* is water stored underground in aquifers – i.e., water in soil in the saturated zone beneath the water table, where the soil voids are filled with water. It is usually pumped from wells.
- *Mixed Surface and Ground water* is irrigation water supplied both from the earth's surface and pumped from underground.
- *Municipal water supply* is a source of water withdrawn from the public piped distribution network.

6.2 Irrigated area by dzongkhag

Figure 6.1 presents percentage distribution of holdings who irrigated their land by dzongkhag. A total of 32,023 households irrigated their land in the country which is about 48.1 percent of the total farming households. Across the dzongkhag, Punakha (about 92.99 percent) has the highest percentage of holdings who irrigated their land, followed by Trongsa (about 69.71 percent).

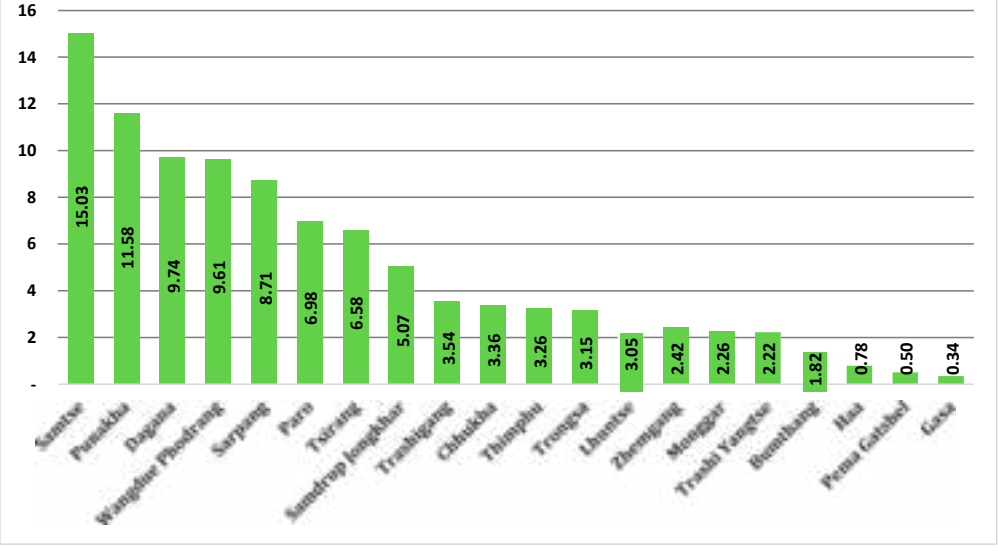
Pema Gatshel (about 18.52 percent) and Haa (21.24 percent) dzongkhags have the lowest percentage of households who irrigated their land.

Figure 6.1. Percentage of household irrigating their land by dzongkhag



About 37,522 acres (inclusive of both dryland and wetland) was irrigated. Figure 6.2 presents the total area irrigated by dzongkhag. Samtse (15.03 percent) and Punakha (11.58 percent) dzongkhags have the largest proportion of area irrigated. On the other hand, dzongkhags like Gasa (0.34 percent), Pema Gatshel (0.50 percent) and Haa (0.78 percent) have the least area irrigated compared to other dzongkhags.

Figure 6.2. Percentage of area irrigated by dzongkhag



6.3 Irrigation Method

The surface irrigation (89.15 percent) is the widely used method of irrigation in all of the dzongkhags followed by sprinkler (8.50 percent) and localized irrigation (2.36 percent). Table 6.1 shows the detail percentage distribution of agricultural holdings, by dzongkhag, and by method of irrigation. Across the dzongkhag, Gasa uses the surface irrigation method, while sprinkler irrigation is common in Pema Gatshel (25.47 percent) and Monggar (22.27 percent) dzongkhags. The localized method of irrigation is used in Zhemgang (12.11 percent) dzongkhag.

Table 6.1. Agricultural holdings, by dzongkhag, and by method of irrigation

Dzongkhag	Surface irrigation	Sprinkler irrigation	Localized irrigation
	(Percentage)		
Bumthang	91.31	1.93	6.76
Chhukha	83.94	10.92	5.15
Dagana	83.49	13.94	2.57
Gasa	100.00	-	-
Haa	90.75	8.22	1.03
Lhuntse	99.58	0.33	0.08
Monggar	77.73	22.27	-
Paro	98.25	1.45	0.30
Pema Gatshel	73.75	25.47	0.78
Punakha	96.64	2.24	1.12
Samdrup Jongkhar	79.09	16.91	4.00
Samtse	84.32	15.31	0.37
Sarpang	82.56	12.11	5.33
Thimphu	95.44	3.73	0.83
Trashigang	94.49	4.56	0.95
Trashi Yangtse	95.27	1.59	3.14
Trongsa	99.71	0.29	-
Tsirang	91.83	7.31	0.86
Wangdue Phodrang	96.32	0.10	3.58
Zhemgang	86.52	1.37	12.11
Total	**89.15**	**8.50**	**2.36**

6.4 Sources of water supply for Surface Irrigation

The sources of water supply for surface irrigation are either surface water (84.28 percent) or municipal water supply (11.56 percent) for many dzongkhags (Table 6.2). The ground water (0.93 percent) or surface and ground water (3.23 percent) are used as the source of water for surface irrigation. However, the proportion of agricultural holdings using these sources of water are insignificant.

Table 6.2. Agricultural holdings, by dzongkhag, and by sources of water supply for surface irrigation

Dzongkhag	Surface water	Ground water	Surface and ground water	Municipal water
	(Percentage)			
Bumthang	91.12	0.19	0.58	8.11
Chhukha	79.14	5.56	0.28	15.02
Dagana	83.41	2.61	5.50	8.47
Gasa	100.00	-	-	-
Haa	86.30	1.03	0.34	12.33
Lhuntse	99.42	0.08	0.17	0.33
Monggar	54.55	0.91	3.74	40.81
Paro	96.16	-	0.20	3.64
Pema Gatshel	50.78	2.66	2.34	44.22
Punakha	99.09	-	0.04	0.87
Samdrup Jongkhar	57.07	0.48	10.72	31.73
Samtse	90.78	0.58	2.84	5.81
Sarpang	84.35	0.08	5.00	10.57
Thimphu	96.99	1.04	0.52	1.45
Trashigang	75.78	1.35	5.97	16.91
Trashi Yangtse	88.70	0.48	1.23	9.60
Trongsa	98.83	-	0.78	0.39
Tsirang	92.58	1.09	3.74	2.59
Wangdue Phodrang	89.71	0.36	5.83	4.09
Zhemgang	79.60	0.18	-	20.22
Total	**84.28**	**0.93**	**3.23**	**11.56**

7 CROPS

7.1 Introduction

Self-sufficiency is one of the means towards enhancing food and nutrition security. Self-sufficiency in cereals (rice, maize, wheat, barley, buckwheat and millet), vegetables (chilies, cabbage, cauliflower, beans, potatoes, etc.) and fruits production are thus identified as the thrust areas for the agriculture sector.

The information in this chapter includes statistics on area, production and yield of major crops viz cereals, oil seeds, pulses and spices, vegetables, fruit crops, roots & tubers and other horticultural crops cultivated in Bhutan disaggregated by Dzongkhag.

7.2 Agricultural holdings growing different types of crops

Table 7.1 shows the distribution of agricultural holdings, by dzongkhag, and by different types of crop growers. From the total of 55,587 households, 83.45 percent grow cereal, followed by vegetables (80.57 percent) and fruit (71.21 percent).

Table 7.1. Agricultural holdings, by dzongkhag, and by different types of crop growers

Dzongkhag	Total household	Cereal growers	Oil seed and legume growers	Vegetable growers	Mushroom growers	Root and Tuber growers	Fruit growers	Cardamom growers
		(Percentage)						
Bumthang	1,476	66.87	9.62	58.06	1.56	74.19	47.36	0.47
Chhukha	4,155	78.56	64.52	90.57	1.16	63.75	71.79	70.23
Dagana	4,235	85.41	51.05	72.28	0.40	41.20	83.68	64.16
Gasa	573	89.18	21.47	90.92	2.62	76.79	20.07	0.70
Haa	1,375	79.64	37.02	87.35	1.89	66.69	45.89	34.33
Lhuntse	2,008	89.99	47.81	89.34	0.70	85.36	70.97	14.79
Monggar	5,159	97.03	65.42	88.06	1.30	86.64	81.49	16.42
Paro	3,281	71.41	33.77	81.59	3.47	57.09	56.87	1.68
Pema Gatshel	3,456	90.36	76.91	89.24	1.30	71.82	93.32	54.17
Punakha	2,599	93.42	48.17	77.65	0.62	13.66	57.41	6.73
Samdrup Jongkhar	3,933	91.51	66.92	84.26	0.38	51.51	76.35	31.07
Samtse	8,997	80.37	39.16	75.13	0.64	42.17	72.62	57.17
Sarpang	4,875	75.10	59.10	74.71	1.58	36.59	84.25	35.86
Thimphu	1,432	33.38	30.24	86.17	2.72	58.45	42.81	0.28
Trashigang	5,994	87.82	46.46	70.12	2.19	69.62	60.16	15.42
Trashi Yangtse	2,475	93.86	57.82	85.54	1.05	79.92	69.62	5.33
Trongsa	1,466	86.36	36.83	71.15	3.00	46.18	66.51	29.26
Tsirang	3,654	90.20	72.71	88.70	0.55	57.36	89.57	75.94

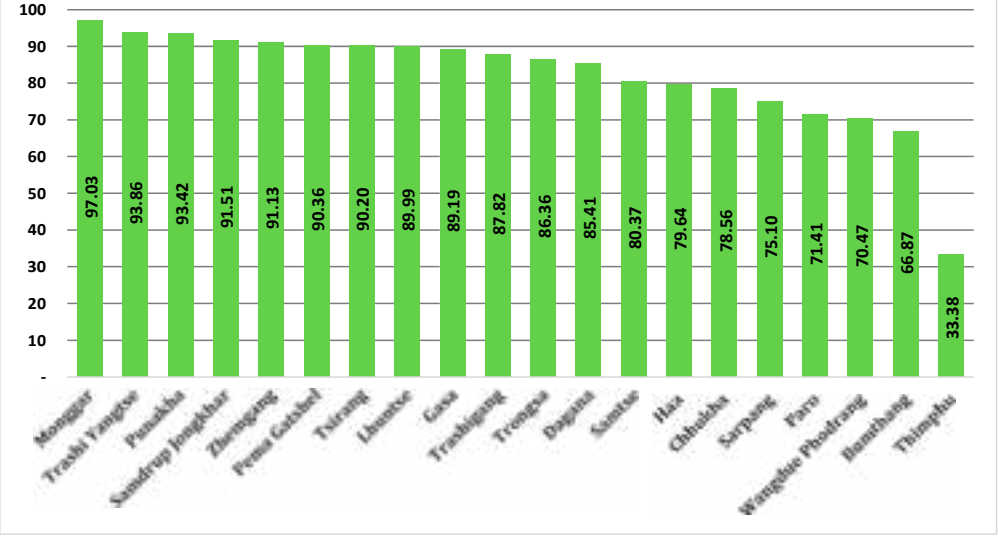
Dzongkhag	Total household	Cereal growers	Oil seed and legume growers	Vegetable growers	Mushroom growers	Root and Tuber growers	Fruit growers	Cardamom growers
		(Percentage)						
Wangdue Phodrang	3,369	70.47	42.24	85.01	0.36	58.33	48.17	6.00
Zhemgang	2,075	91.13	48.10	82.41	0.53	43.52	85.54	58.46
Total	**66,587**	**83.45**	**51.47**	**80.57**	**1.23**	**57.03**	**71.21**	**34.78**

7.3 Cereal growers, area and production

The major cereal crops grown in the country are paddy and maize. Other minor cereals include wheat, barley, buckwheat, millet, amaranthus and quinoa. Quinoa is cereal crop that the country has recently started growing. The production figures of crops are as reported by the agricultural holdings. However, the production of paddy and maize are computed by multiplying the harvest area of the holding as reported in the census with the crop cut yield of the respective gewogs (i.e. area harvested by the households [as reported] * crop cut yield of the gewog).

Figure 7.1 presents percentage of holdings growing cereals by dzongkhags. From the total holdings enumerated, 83.45 percent (about 55,564 holdings) of holdings reported growing cereal crops. Across the dzongkhag, Monggar (97.03 percent) has the highest percentage of holdings growing cereals, followed by Trashi Yangtse (93.86 percent) and Punakha (93.42 percent). Thimphu dzongkhag (33.38 percent) has the least percentage of holdings growing cereal crops. Maize is the predominant cereal crop grown by more than 63.65 percent of the total holdings while amaranthus and quinoa are least grown in the country.

Figure 7.1. Percentage of holdings growing cereals by dzongkhag

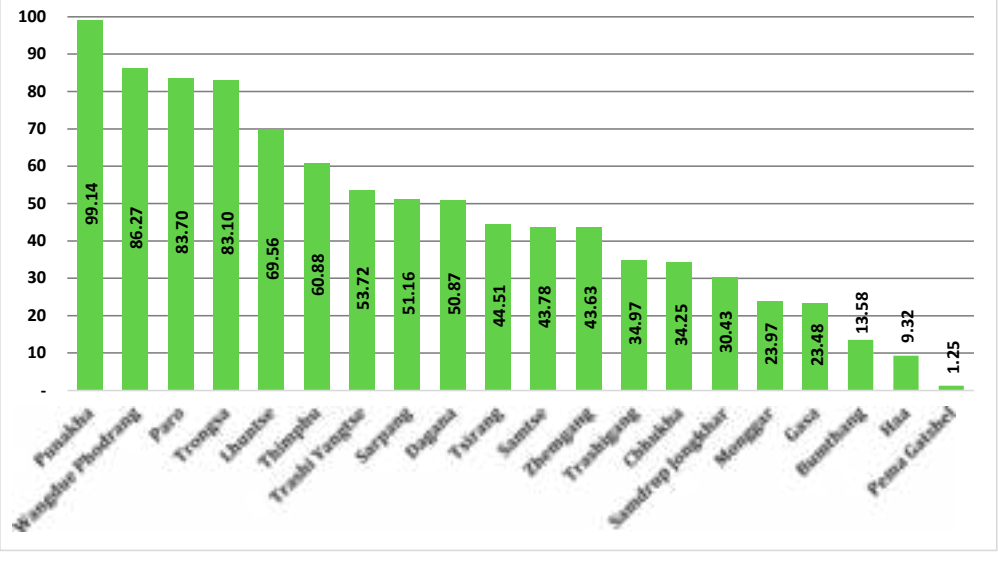


7.4 Irrigated Paddy and Maize

Rice is the main staple food in the country and attaining rice self-sufficiency has always been the top most priority in the agricultural policy agenda. The irrigated paddy, being one of the major food grains, the country is promoting with all the new technologies.

About 25,084 holdings in the country grow irrigated paddy. Across the dzongkhag, Punakha (99.14 percent), followed by Wangdue Phodrang (86.27 percent) and Paro (83.70 percent) have the highest percentage of irrigated paddy growers while Pema Gatshel dzongkhag (1.25 percent) has the least percentage. Figure 7.2 presents percentage distribution of holdings growing paddy by dzongkhag.

Figure 7.2. Percentage of holdings growing paddy by dzongkhag



The detail number of growers, harvest area and production for irrigated paddy and maize in 2018 are provided in Table 7.2. The total irrigated paddy production is 63,404.95 MT from a total area of 36,670.21 acres of wetland in the country. The maize production, on the other hand is about 55,254.36 MT from a total area of 36,835.95 acres of land.

Table 7.2. Harvested area and production for irrigated paddy and maize

Dzongkhag	Harvest area (Acre)	Production (MT)	Harvest area (Acre)	Production (MT)
	(Irrigated Paddy)		(Maize)	
Bumthang	102.78	164.56	0.25	0.38
Chhukha	1,293.44	1,852.52	2,022.21	2,500.62
Dagana	2,473.50	2,313.27	4,041.46	4,894.27
Gasa	135.96	183.24	5.73	4.11
Haa	153.27	232.08	242.72	260.25
Lhuntse	1,315.94	2,565.83	1,375.76	2,886.60
Monggar	700.44	810.99	6,986.99	9,770.95
Paro	3,064.01	7,038.39	20.49	31.10
Pema Gatshel	27.13	31.74	2,692.00	4,554.87
Punakha	6,926.85	16,389.69	141.69	255.02
Samdrup Jongkhar	1,864.71	3,131.63	2,637.74	3,706.65
Samtse	4,393.82	6,056.99	3,588.13	4,982.60
Sarpang	3,170.81	4,343.45	2,107.14	3,165.90
Thimphu	391.75	994.03	20.16	30.60
Trashigang	1,467.11	3,079.78	3,544.99	8,276.68
Trashi Yangtse	838.67	1,382.85	1,128.62	2,127.72
Trongsa	1,216.61	1,732.00	423.53	761.02
Tsirang	2,798.16	3,344.14	3,143.22	3,640.95
Wangdue Phodrang	3,515.43	6,684.25	221.42	375.00
Zhemgang	819.82	1,073.50	2,491.70	3,029.07
Total	**36,670.21**	**63,404.93**	**36,835.95**	**55,254.36**

7.5 Oilseeds and Legumes

Among the various oilseeds and legumes, mustard, soyabeans and lentils are the most commonly grown by the farmers in the country. Table 7.3 presents the number of growers, harvest area and production for most commonly grown oilseeds and legumes.

7.6 Vegetables

Table 7.4 presents number of growers, harvest area and production of most commonly grown vegetables in the country. Among the vegetables, the most commonly grown are spinach and sags, chilli, and radish with respectively 69.40 percent, 64.36 percent and 57.53 percent. Cabbage, cauliflower, chilli and beans are the most commercially viable vegetables grown by many holders in the country.

Table 7.3. Number of growers, harvest area and production for most commonly grown oilseeds and legumes

Dzongkhag	Number of growers	Harvest area (Acre)	Production (MT)	Number of growers	Harvest area (Acre)	Production (MT)	Number of growers	Harvest area (Acre)	Production (MT)
	(Mustard)			(Soyabean)			(Lentil)		
Bumthang	79	32.00	8.97	-	-	-	-	-	-
Chhukha	412	103.00	28.92	237	19.59	3.81	727	132.90	16.00
Dagana	374	115.00	23.25	99	13.16	2.24	149	97.91	44.00
Gasa	28	5.00	1.63	-	-	-	-	-	-
Haa	57	15.00	4.08	-	-	-	-	-	-
Lhuntse	32	6.00	3.45	90	14.47	5.47	5	1.34	1.00
Monggar	197	53.00	14.02	179	42.54	6.11	2	0.56	-
Paro	184	77.00	15.66	1	0.30	0.05	-	-	-
Pema Gatshel	91	33.00	5.12	1,007	106.44	26.94	222	39.77	11.00
Punakha	132	33.00	10.20	21	1.75	2.30	3	7.07	2.00
Samdrup Jongkhar	167	62.00	18.36	399	34.84	18.82	353	70.14	19.00
Samtse	755	173.00	25.42	201	17.10	2.43	784	109.67	17.00
Sarpang	357	119.00	19.16	60	5.27	2.39	301	48.13	8.00
Thimphu	34	4.00	4.06	-	-	-	-	-	-
Trashigang	114	34.00	9.91	469	66.42	20.92	28	5.70	1.00
Trashi Yangtse	5	1.00	0.12	125	20.54	5.99	4	0.37	-
Trongsa	40	18.00	3.02	57	8.93	1.60	-	-	-
Tsirang	279	81.00	12.30	94	14.41	3.24	489	102.26	19.00
Wangdue Phodrang	226	70.00	19.20	26	2.72	2.09	4	0.04	-
Zhemgang	94	71.00	17.65	80	8.33	3.05	6	0.97	-
Total	**3,657**	**1,105.00**	**244.50**	**3,145**	**376.81**	**107.45**	**3,077**	**616.83**	**138.00**

Table 7.4. Number of growers, harvest area and production for most commonly grown vegetables

Dzongkhag	Number of growers	Harvest area (Acre)	Production (MT)	Number of growers	Harvest area (Acre)	Production (MT)	Number of growers	Harvest area (Acre)	Production (MT)	Number of growers	Harvest area (Acre)	Production (MT)
	(Cabbage)			(Cauliflower)			(Chilli)			(Bean)		
Bumthang	255	6.19	43.12	98	2.79	8.40	342	39.19	155.00	50	0.81	1.76
Chhukha	1,337	74.17	149.54	839	33.18	40.68	1,997	166.82	312.00	2,199	152.21	152.32
Dagana	1,029	89.75	50.79	781	48.88	45.69	1,815	150.72	82.00	1,665	340.34	73.41
Gasa	172	3.51	9.51	100	2.04	4.16	149	8.01	20.00	116	2.14	7.84
Haa	683	45.42	158.06	239	7.79	12.06	531	16.94	21.00	224	13.37	12.48
Lhuntse	915	71.72	77.78	628	74.22	42.31	1,693	248.08	413.00	932	110.89	75.70
Monggar	2,453	198.11	217.05	1,389	116.34	103.30	3,438	543.14	607.00	3,055	782.72	371.72
Paro	1,178	430.75	1,834.41	300	60.43	113.71	2,257	587.45	1,439.00	779	144.85	162.86
Pema Gatshel	1,635	71.52	110.88	810	19.60	28.41	2,136	151.20	128.00	2,033	251.34	108.24
Punakha	283	24.32	32.09	281	27.31	29.99	1,566	259.91	779.00	1,067	135.54	272.51
Samdrup Jongkhar	1,876	78.06	91.07	1,070	62.51	44.50	2,188	117.19	142.00	2,293	267.41	246.52
Samtse	2,454	199.86	88.30	1,729	110.48	65.86	2,705	163.29	102.00	2,883	179.01	86.17
Sarpang	2,333	60.69	105.96	1,545	42.96	69.01	2,129	102.58	69.00	2,509	157.51	139.58
Thimphu	540	44.36	207.53	434	69.47	177.73	864	159.24	478.00	365	16.07	42.64
Trashigang	1,621	89.86	135.08	784	79.24	48.47	2,871	363.26	624.00	2,072	401.56	135.91
Trashi Yangtse	1,363	43.62	123.77	795	44.25	52.48	1,737	191.58	313.00	1,068	45.45	49.65
Trongsa	529	30.12	73.74	316	19.19	31.98	855	122.38	225.00	477	21.83	35.13
Tsirang	1,556	100.55	134.90	1,357	114.09	146.84	2,387	147.99	149.00	2,462	290.72	166.14
Wangdue Phodrang	844	76.44	355.64	540	53.58	115.13	1,692	386.88	990.00	1,218	68.17	99.67
Zhemgang	931	53.02	35.87	481	12.73	8.92	1,172	104.82	85.00	805	41.21	33.91
Total	**23,987**	**1,792.04**	**4,035.09**	**14,516**	**1,001.08**	**1,189.63**	**34,524**	**4,030.67**	**7,133.00**	**28,272**	**3,423.15**	**2,274.16**

7.7 Mushroom

There are about 818 holdings growing different kinds of Mushroom. Among the various mushroom grown, the most common are Oyester (50.12 percent), followed by Shitake (45.97 percent). Across the dzongkhag, Trashigang (16.01 percent) and Paro (13.94 percent) have the highest numbers of holders growing mushroom. A total of 33.84 MT of mushrooms were produced in the country.

Table 7.5. Agricultural holdings growing mushroom and production, by dzongkhag, and by types of mushroom

Dzongkhag	Number of growers	Oyster	Shitake	Button	Others	Production (MT)
Bumthang	23	-	23	-	-	0.23
Chhukha	48	12	36	-	-	2.08
Dagana	17	3	13	-	-	0.17
Gasa	15	15	-	-	-	1.18
Haa	26	2	-	1	24	0.29
Lhuntse	14	13	2	-	-	0.22
Monggar	67	61	8	-	-	1.59
Paro	114	28	88	-	-	5.16
Pema Gatshel	45	42	2	-	1	1.55
Punakha	16	7	10	-	-	1.71
Samdrup Jongkhar	15	5	8	-	3	0.78
Samtse	58	2	52	-	4	1.88
Sarpang	77	-	75	-	2	2.32
Thimphu	39	31	8	-	-	3.50
Trashigang	131	120	5	2	4	3.65
Trashi Yangtse	26	15	11	-	-	1.36
Trongsa	44	41	3	-	-	2.63
Tsirang	20	5	15	-	1	1.62
Wangdue Phodrang	12	5	9	-	1	0.50
Zhemgang	11	3	8	-	1	1.42
Total	**818**	**410**	**376**	**3**	**41**	**33.84**

7.8 Roots and tubers

Potato has been one of the highest cash crop exported to India and this generates a lot of revenue to the farming population. Table 7.6 presents number of potato growers, harvest area and production, by dzongkhag. A total of 44,278.01 MT of potatoes were produced, of which the highest productions were recorded in Wangdue Phodrang (35.37 percent), Paro (10.53 percent) and Trashigang (9.94 percent). There are about 34,318 holdings growing potatoes and highest number of growers are in Monggar (12.77 percent), Trashigang (11.98 percent) and Samtse (8.56 percent).

Table 7.6. Number of potato growers, harvest area and production, by dzongkhag

Dzongkhag	Number of growers	Harvest area (acre)	Production (MT)
Bumthang	1,086	798.53	3,926.07
Chhukha	1,876	576.18	2,515.55
Dagana	1,354	201.47	140.96
Gasa	443	36.98	118.58
Haa	855	360.68	2,267.68
Lhuntse	1,705	356.02	711.47
Monggar	4,383	1,580.44	3,235.33
Paro	1,821	1,033.19	4,661.30
Pema Gatshel	2,223	385.08	1,236.13
Punakha	346	48.36	154.93
Samdrup Jongkhar	1,852	350.01	536.11
Samtse	2,936	418.56	226.12
Sarpang	1,568	153.00	197.10
Thimphu	832	387.37	1,820.06
Trashigang	4,110	1,339.38	4,400.06
Trashi Yangtse	1,965	480.85	1,697.88
Trongsa	671	125.28	448.72
Tsirang	1,751	251.68	219.87
Wangdue Phodrang	1,938	2,134.47	15,661.85
Zhemgang	603	113.17	102.24
Total	**34,318**	**11,130.70**	**44,278.01**

7.9 Fruits

Table 7.7-7.9 present total number of trees, bearing number of trees and production of three major fruits grown by the holdings, by dzongkhag. These three major fruits are Apple, Arecanut and Mandarin.

There are 5,533 holdings growing apple (Table 7.7), the highest growers are in Paro (32.24 percent), Trashi Yangtse (10.55 percent) and Thimphu (10.45 percent). There is 3,684.42 MT of apple production, of which, Paro (65.62 percent) and Thimphu (20.50 percent) accounts for the highest production of apples.

Table 7.7. Total number of trees, bearing trees and production of Apple, by dzongkhag

Dzongkhag	Number of growers	Number of trees	Number of bearing tree	Production (MT)
Bumthang	404	4,409	3,902	94.43
Chhukha	130	5,286	3,374	70.52
Dagana	68	585	66	0.40
Gasa	12	79	3	0.02
Haa	435	21,002	14,495	293.32
Lhuntse	236	1,947	350	8.18
Monggar	362	2,671	653	6.64
Paro	1,784	183,407	135,636	2,417.72
Pema Gatshel	201	1,173	296	4.19
Punakha	14	21	11	0.17
Samdrup Jongkhar	100	1,169	60	0.79
Samtse	18	21	1	-
Sarpang	2	3	1	0.00
Thimphu	578	57,886	46,383	755.24
Trashigang	240	1,563	495	5.73
Trashi Yangtse	584	7,220	1,684	11.28
Trongsa	63	398	110	1.46
Tsirang	93	273	56	1.25
Wangdue Phodrang	193	1,201	544	13.07
Zhemgang	16	101	4	0.01
Total	**5,533**	**290,415**	**208,124**	**3,684.42**

There are 10,368 holdings growing arecanut (Table 7.8), and the highest percent of growers are in Samtse (36.59 percent) and Sarpang (29.98 percent). In terms of production, there is 11,680.66 MT of arecanut production, of which Samtse (42.81 percent of the total production) and Sarpang (32.64 percent) dzongkhags have the highest production.

Table 7.8. Total number of trees, bearing trees and production of Arecanut, by dzongkhag

Dzongkhag	Number of growers	Number of trees	Number of bearing tree	Production (MT)
Bumthang	1	-	-	-
Chhukha	797	212,650	113,457	1,027.40
Dagana	786	385,662	119,958	775.67
Gasa	-	-	-	-
Haa	1	110	100	3.00
Lhuntse	-	-	-	-

Dzongkhag	Number of growers	Number of trees	Number of bearing tree	Production (MT)
Monggar	62	1,953	609	3.00
Paro	-	-	-	-
Pema Gatshel	315	56,877	9,884	83.15
Punakha	1	-	-	-
Samdrup Jongkhar	961	147,696	65,498	921.36
Samtse	3,794	1,241,885	442,874	5,001.05
Sarpang	3,108	1,374,009	461,698	3,812.30
Thimphu	-	-	-	-
Trashigang	5	15	1	-
Trashi Yangtse	-	-	-	-
Trongsa	-	-	-	-
Tsirang	151	3,106	417	6.88
Wangdue Phodrang	2	13	-	-
Zhemgang	384	30,082	4,256	46.85
Total	**10,368**	**3,454,058**	**1,218,752**	**11,680.66**

There are 22,158 holdings growing mandarin in the country (Table 7.9), and the highest percent of growers are in Monggar (12.19 percent) and Tsirang (9.95 percent). In terms of production, there is 26,527.49 MT of mandarin production, of which Tsirang (18.16 percent) and Dagana (16.34 percent) dzongkhags have the highest production.

Table 7.9. Total number of trees, bearing trees and production of Mandarin, by dzongkhag

Dzongkhag	Number of growers	Number of trees	Number of bearing tree	Production (MT)
Bumthang	-	-	-	-
Chhukha	1,090	104,011	54,739	1,081.60
Dagana	2,116	222,255	110,151	4,333.54
Gasa	27	86	63	0.30
Haa	66	6,921	1,759	22.98
Lhuntse	681	29,580	12,276	269.66
Monggar	2,700	128,476	37,677	1,271.97
Paro	31	52	29	0.39
Pema Gatshel	2,058	325,527	180,283	2,621.27
Punakha	1,059	21,142	13,706	417.22
Samdrup Jongkhar	1,589	223,042	109,259	3,883.13
Samtse	1,744	104,089	44,334	953.45
Sarpang	993	131,912	94,209	2,502.93

Dzongkhag	Number of growers	Number of trees	Number of bearing tree	Production (MT)
Thimphu	1	1	1	-
Trashigang	1,908	53,171	15,912	701.01
Trashi Yangtse	839	24,602	9,893	313.18
Trongsa	537	19,711	6,768	182.95
Tsirang	2,204	157,703	88,873	4,816.77
Wangdue Phodrang	978	11,930	6,610	307.22
Zhemgang	1,537	240,647	82,598	2,847.92
Total	**22,158**	**1,804,858**	**869,140**	**26,527.49**

7.10 Other Permanent crops

Table 7.10 presents number of growers, harvest area and production of other permanent crops, by dzongkhags, and by types of crops. The three main permanent crops grown are cardamom, pineapple and sugarcane.

There are 23,157 holdings growing cardamom in the country, and the highest percent of growers are in Samtse (22.23 percent) and Chukha (12.77 percent). In terms of production, there is 1,541.98 MT of cardamom production, of which Samtse (29.74 percent) and Chukha (23.24 percent) dzongkhags have the highest production.

There are 4,723 holdings growing pineapple in the country, and the highest percent of growers are in Pema Gatshel (12.51 percent) and Chukha (10.78 percent). In terms of production, there is 278.92 MT of production, of which Pema Gatshel (44.75 percent) and Tsirang (9.91 percent) dzongkhags have the highest production.

There are 3,154 holdings growing sugarcane in the country, and the highest percent of growers are in Pema Gatshel (22.61 percent) and Sarpang (18.93 percent). In terms of production, there is 100.94 MT of production, of which Dagana (20.66 percent) and Samtse (20.38 percent) dzongkhags have the highest production.

Table 7.10. Harvest area and production of other permanent crops, by dzongkhag, and by types of crops

Dzongkhag	Number of growers	Harvest area (Acre)	Production (MT)	Number of growers	Harvest area (Acre)	Production (MT)	Number of growers	Harvest area (Acre)	Production (MT)
	(Cardamom)			(Pineapple)			(Sugarcane)		
Bumthang	-	-	-	-	-	-	-	-	-
Chhukha	2,957	4,735.40	358.32	509	210	19.48	255	769	6.79
Dagana	2,717	2,278.19	173.84	488	118	11.21	356	256	20.86
Gasa	4	0.03	0.02	4	0	0.05	-	-	-
Haa	472	829.88	59.85	45	1	1.34	-	-	-
Lhuntse	297	101.04	3.48	113	25	1.82	6	16	0.13
Monggar	847	362.32	10.10	274	113	6.96	159	28	5.31
Paro	16	23.14	1.34	2	-	-	-	-	-
Pema Gatshel	1,872	657.97	31.30	591	57	124.82	713	268	16.28
Punakha	175	125.49	2.15	276	64	8.52	1	-	-
Samdrup Jongkhar	1,222	368.64	36.41	286	57	15.41	209	30	5.80
Samtse	5,147	6,751.85	458.52	427	178	10.95	475	319	20.57
Sarpang	1,753	1,668.94	169.58	361	76	12.07	597	151	17.49
Thimphu	-	-	-	-	-	-	-	-	-
Trashigang	924	463.61	10.83	284	18	12.92	61	4	1.13
Trashi Yangtse	132	37.52	0.59	80	12	5.13	5	2	1.06
Trongsa	431	328.75	38.51	94	6	4.56	10	0	0.21
Tsirang	2,775	1,815.93	153.36	478	108	27.65	159	60	1.90
Wangdue Phodrang	203	119.19	2.73	316	29	11.58	8	0	0.03
Zhemgang	1,213	726.86	31.05	95	90	4.45	140	11	3.39
Total	**23,157**	**21,394.75**	**1,541.98**	**4,723**	**1,161.67**	**278.92**	**3,154.00**	**1,913.76**	**100.94**

8 LIVESTOCK

8.1 Introduction

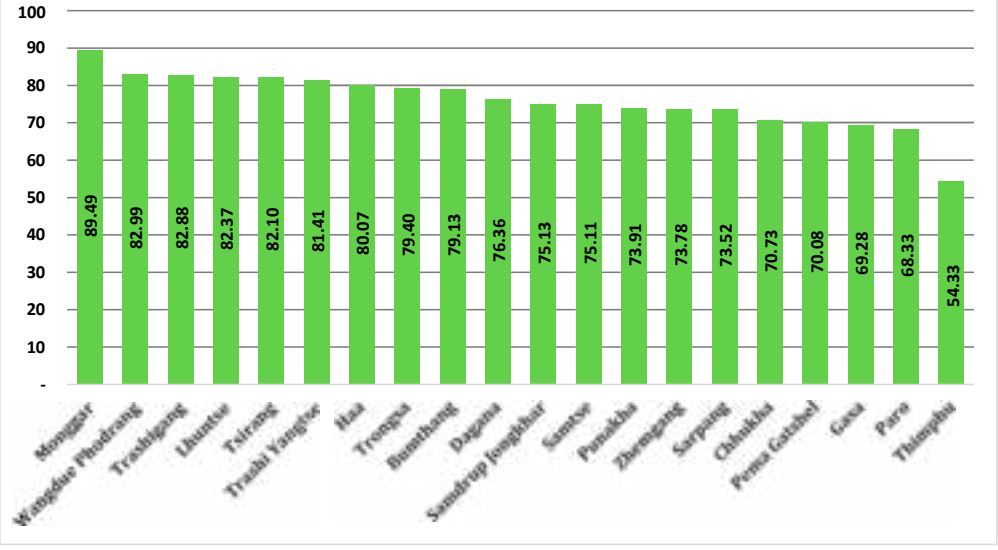
The livestock farming is an essential part of the farming system across the country and is known as an economic activity distinct from growing crops. The country has a wide range of livestock production system depending on the variations in environmental conditions. This includes cattle, yaks, buffaloes, horses, mules, donkeys, sheep, goats, pigs and poultry. Utility-dogs have also been included under the livestock as it provides admin-support services to the holders. The rearing and production of fishes have also become a part of the livestock programs supported by fisheries breeding centres in the country.

8.2 Bovine Animal

There are 51,244 holdings (76.96 percent) rearing bovine animals which includes Jersey Cross breed, Nublang (Thrabam), Jatsa-Jatsam, Yanku-yankum, Doethra-doethram, Jersey Pure breed, Doeb-doebum, Jaba, Yak, Brown Swiss cross, Zo-Zom, Mithun Pure, Holstein Freisan, Buffalo, Brown Swiss pure and Goleng.

Figure 8.1 presents the distribution of holdings rearing bovine animals, by dzongkhag. Across the dzongkhag, Monggar (89.49 percent) has the highest proportion of holdings, while Thimphu (54.33 percent) has the least proportion of holdings compared to rest of the dzongkhags.

Figure 8.1. Percentage of holdings rearing bovine animals by dzongkhag



The top three bovine animals reared by most of the holdings are Jersey Cross breed (27,771 holders), Nublang (Thrabam) (19,894 holders) and Jatsa-Jatsam (8,043 holders), while Brown Swiss pure and Goleng are the least reared bovine animal (Figure 8.2).

Figure 8.2. Number of holdings rearing bovine animals by type

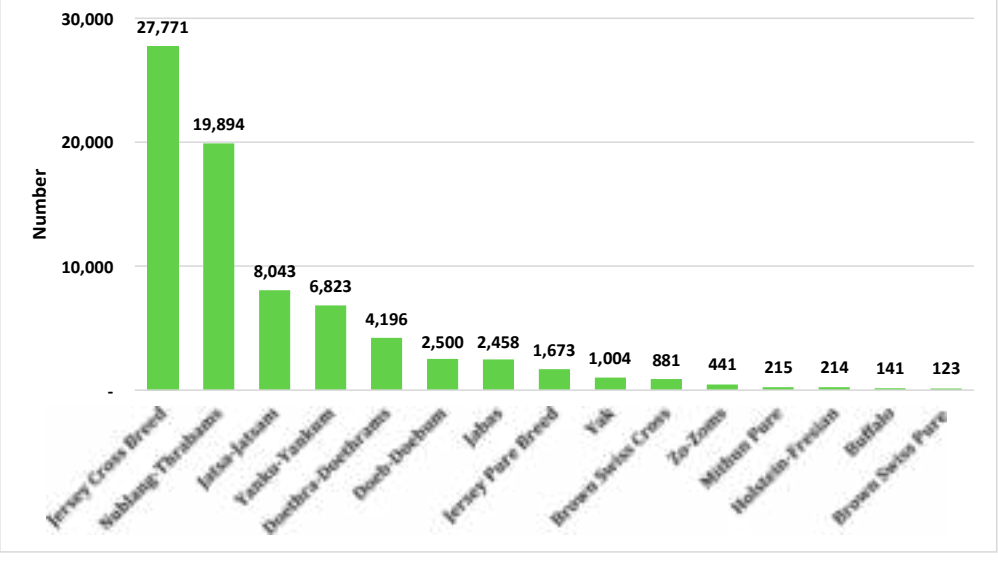


Table 8.1 presents bovine animals, by type, and by gender. The highest numbers of bovine animal reared are Nublang (Thrabam) (88,699 animals), followed by Jersey cross breed (87,971 animals) and Yak (36,183 animals).

Table 8.1. Bovine animals, by type, and by gender

Bovine Type	Number of holding	Number of Bovine animals	Number of female Bovine animal
Nublang-Thrabams	19,894	88,699	51,430
Jersey Cross Breed	27,771	87,971	66,336
Yak	1,004	36,183	21,338
Jatsa-Jatsam	8,043	23,639	15,389
Yanku-Yankum	6,823	21,614	14,510
Doethra-Doethrams	4,196	17,544	10,051
Jabas	2,458	9,017	5,317
Doeb-Doebum	2,500	8,084	5,051
Zo-Zoms	441	6,979	4,451
Jersey Pure Breed	1,673	4,201	3,463
Brown Swiss Cross	881	4,042	2,958

Bovine Type	Number of holding	Number of Bovine animals	Number of female Bovine animal
Holstein-Fresian	214	668	544
Mithun Pure	215	500	297
Buffalo	141	464	245
Brown Swiss Pure	123	429	341

8.3 Bovine animal per holding

Table 8.2 presents bovine animals, by dzongkhag, and by summary statitsics. The average bovine animal reared is 10 animals per holding. Across the dzongkhag, Thimphu (27 animals per holding) has the highest average of bovine animals per holding, followed by Gasa (26 animals per holding). Pema Gatshel and Tsirang have the lowest average bovine animals per holding (6 animals per holding). The number of bovine animals per holding ranges from as small as one animal to the maximum of 384 animals. The detailed distribution of bovine animals by type, and by dzongkhags are provided in Table 8.3-8.7.

Table 8.2. Bovine animals, by dzongkhag, and by summary statistics

Dzongkhag	Mean	Median	Min	Max
Bumthang	18	12	1	230
Chhukha	10	7	1	205
Dagana	8	6	1	89
Gasa	26	14	1	320
Haa	19	9	1	305
Lhuntse	12	9	1	190
Monggar	9	7	1	181
Paro	11	7	1	384
Pema Gatshel	6	5	1	39
Punakha	9	7	1	214
Samdrup Jongkhar	8	6	1	100
Samtse	8	6	1	233
Sarpang	9	7	1	111
Thimphu	27	8	1	350
Trashigang	12	6	1	303
Trashi Yangtse	8	6	1	201
Trongsa	12	10	1	124
Tsirang	6	5	1	43
Wangdue Phodrang	15	12	1	180
Zhemgang	10	7	1	162
Total	**10**	**7**	**1**	**384**

Table 8.3. Bovine animals, by dzongkhag, and by type

Dzongkhag	Jersey pure	Jersey cross	Brown swiss pure	Brown swiss cross	Holstein-Fresian	Mithun pure	Jatsa-jatsam	Yanku-yankum	Doeb-doebum	Doethra-doethram	Nublang-thrabam	Jabas	Buffalo	Yak	Zo-Zom
	(Number)														
Bumthang	1	4,212	65	2,176	14	3	566	754	370	426	1,079	-	-	2,919	4
Chhukha	450	4,209	-	14	176	24	1,111	776	132	1,076	9,516	13	1	-	-
Dagana	245	4,172	10	-	-	45	538	900	293	7,096	2,298	166	9	-	13
Gasa	12	435	-	28	-	-	72	71	51	76	140	1	-	5,668	-
Haa	25	2,877	9	-	15	11	951	261	15	27	3,515	4	-	4,279	-
Lhuntse	23	2,396	3	148	14	7	1,775	2,386	868	555	2,686	180	-	217	71
Monggar	1,250	7,382	99	101	7	17	4,763	5,053	1,135	858	2,847	266	-	-	-
Paro	218	5,493	10	8	3	9	374	282	94	446	4,164	-	-	3,254	-
Pema Gatshel	148	5,596	7	12	51	1	447	441	60	125	541	242	-	-	-
Punakha	73	2,952	4	43	-	6	605	585	479	759	4,693	-	-	-	-
Samdrup Jongkhar	209	6,649	11	3	43	13	1,925	995	115	267	1,212	2,334	3	-	10
Samtse	441	6,028	13	35	107	57	492	218	861	124	22,235	3,158	306	-	-
Sarpang	319	7,751	22	17	24	241	716	478	749	995	6,140	1,715	29	-	-
Thimphu	101	1,782	2	-	5	1	79	42	22	53	917	-	-	10,368	-
Trashigang	214	7,601	12	23	142	21	4,301	3,149	537	975	4,683	700	-	5,001	6,869
Trashi Yangtse	54	3,202	3	15	37	8	840	755	172	1,168	1,867	189	-	100	11
Trongsa	79	2,854	121	134	1	1	890	731	150	170	3,366	-	-	150	-
Tsirang	120	6,561	11	85	10	6	63	227	36	365	4,011	10	116	-	-
Wangdue Phodrang	84	3,692	27	1,192	18	14	1,112	1,082	999	1,195	11,877	-	-	4,227	1
Zhemgang	135	2,127	-	8	1	15	2,019	2,428	946	788	912	39	-	-	-
Total	**4,201**	**87,971**	**429**	**4,042**	**668**	**500**	**23,639**	**21,614**	**8,084**	**17,544**	**88,699**	**9,017**	**464**	**36,183**	**6,979**

Table 8.4. Female Bovine animals, by dzongkhag, and by type

Dzongkhag	Jersey pure	Jersey cross	Brown swiss pure	Brown swiss cross	Holstein-Fresian	Mithun pure	Jatsa-jatsam	Yanku-yankum	Doeb-doebum	Doethra-doethram	Nublang-thrabam	Jabas	Buffalo	Yak	Zo-Zom
	(Number)														
Bumthang	1	3,078	56	1,569	11	2	518	493	249	267	796	-	-	1,778	-
Chhukha	359	2,974	-	10	142	12	766	530	67	548	5,243	7	-	-	-
Dagana	198	2,800	7	-	-	24	288	358	152	3,518	1,140	73	3	-	6
Gasa	12	351	-	22	-	-	44	59	39	47	91	1	-	2,887	-
Haa	24	2,330	6	-	12	8	677	163	8	15	2,538	3	-	2,610	-
Lhuntse	21	1,962	2	123	9	2	1,062	1,668	575	364	1,764	146	-	145	31
Monggar	1,088	6,026	84	83	7	6	3,179	3,477	713	599	1,801	204	-	-	-
Paro	195	4,108	7	7	2	5	215	187	69	262	2,424	-	-	2,042	-
Pema Gatshel	124	4,323	6	9	43	-	230	269	33	100	358	154	-	-	-
Punakha	58	2,162	4	26	-	3	330	354	294	499	2,647	-	-	-	-
Samdrup Jongkhar	161	5,024	8	2	32	10	1,214	664	65	142	788	1,343	2	-	8
Samtse	347	4,371	8	25	78	48	268	160	546	69	11,552	1,845	136	-	-
Sarpang	252	5,829	14	12	22	166	518	299	430	532	2,904	869	18	-	-
Thimphu	85	1,424	2	-	4	-	38	26	18	47	557	-	-	5,696	-
Trashigang	180	6,223	9	19	125	3	2,963	2,530	343	709	3,414	520	-	3,409	4,396
Trashi Yangtse	47	2,562	3	10	33	-	492	530	119	840	1,238	122	-	80	10
Trongsa	60	2,118	99	102	1	-	427	416	78	104	2,094	-	-	78	-
Tsirang	83	4,289	6	34	5	3	41	106	11	148	1,596	6	86	-	-
Wangdue Phodrang	70	2,821	20	901	17	3	752	737	644	775	7,815	-	-	2,613	-
Zhemgang	98	1,561	-	4	1	2	1,367	1,484	598	466	670	24	-	-	-
Total	**3,463**	**66,336**	**341**	**2,958**	**544**	**297**	**15,389**	**14,510**	**5,051**	**10,051**	**51,430**	**5,317**	**245**	**21,338**	**4,451**

8.4 Top three Bovine animals reared by the holdings in the country

Table 8.5 presents the top three bovine animals reared by holdings, by dzongkhag, and by type. The top three bovine animals are Jersey cross breed, Nublang (Thrabam) and Yak.

There are 27,771 holders rearing Jersey cross breed, of which Monggar (10.37 percent) and Trashigang (9.59 percent) have the highest holders rearing the Jersery cross breed. There are 19,894 holders rearing Nublang (Thrabam), of which Samtse (23.71 percent) and Chhukha (9.39 percent) have the highest holders rearing the same. There are 1,004 holders rearing Yak, of which Trashigang (28.78 percent) and Gasa (23.21 percent) have the maximum holders.

Table 8.5. Top three Bovine animals reared by holdings, by dzongkhag, and by type

Dzongkhag	Number of holdings rearing	Number of animals	Number of female animals	Number of holdings rearing	Number of animals	Number of female animals	Number of holdings rearing	Number of animals	Number of female animals
	(Jersey cross breed)			(Nublang-thrabam)			(Yak)		
Bumthang	666	4,212	3,078	234	1,079	796	60	2,919	1,778
Chhukha	1,234	4,209	2,974	1,868	9,516	5,243	-	-	-
Dagana	1,526	4,172	2,800	587	2,298	1,140	-	-	-
Gasa	123	435	351	42	140	91	233	5,668	2,887
Haa	624	2,877	2,330	531	3,515	2,538	79	4,279	2,610
Lhuntse	796	2,396	1,962	637	2,686	1,764	4	217	145
Monggar	2,880	7,382	6,026	1,068	2,847	1,801	-	-	-
Paro	1,399	5,493	4,108	927	4,164	2,424	50	3,254	2,042
Pema Gatshel	2,011	5,596	4,323	232	541	358	-	-	-
Punakha	985	2,952	2,162	1,038	4,693	2,647	-	-	-
Samdrup Jongkhar	2,056	6,649	5,024	437	1,212	788	-	-	-
Samtse	2,071	6,028	4,371	4,717	22,235	11,552	-	-	-
Sarpang	2,384	7,751	5,829	1,338	6,140	2,904	1	-	-
Thimphu	415	1,782	1,424	261	917	557	175	10,368	5,696
Trashigang	2,663	7,601	6,223	1,478	4,683	3,414	289	5,001	3,409
Trashi Yangtse	1,197	3,202	2,562	535	1,867	1,238	1	100	80
Trongsa	647	2,854	2,118	613	3,366	2,094	3	150	78
Tsirang	2,172	6,561	4,289	1,176	4,011	1,596	-	-	-
Wangdue Phodrang	1,143	3,692	2,821	1,861	11,877	7,815	109	4,227	2,613
Zhemgang	779	2,127	1,561	314	912	670	-	-	-
Total	**27,771**	**87,971**	**66,336**	**19,894**	**88,699**	**51,430**	**1,004**	**36,183**	**21,338**

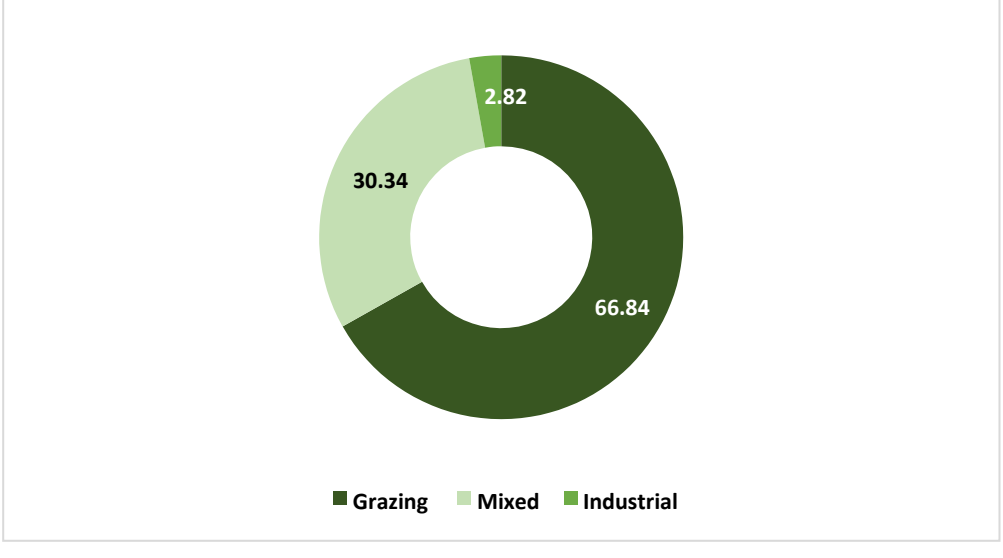
8.5 Rearing System

The livestock rearing system is the main practice of feeding the bovine animals reared by the holdings in the country. The bovine animals are either fed through grazing, industrial or mixed system. The definitions of each are as follows:

- *Grazing system* is a system where a farmer free roam their cattle to feed on the leaves and shoots of grass and other short plants.
- *Industrial system* refers to intensive livestock-rearing methods in which at least 90 percent of the dry matter of the animal feed is produced off-farm. E.g. Karma feed for cattle and piggery.
- *Mixed System* means a combination of grazing and industrial system.

Fig. 8.3 shows the livestock rearing system in the country. The rearing system is practised in the country by almost 66.84 percent of holdings, predominantly grazing system with 66.84 percent, mixed system with 30.34 percent and industrial system with 2.82 percent.

Figure 8.3. Percentage of holdings rearing livestock by rearing system



The detailed distribution of livestock system practiced by dzongkhag is provided in Table 8.6. From the total holdings rearing bovine animals, the grazing system is practised predominantly (more than 95 percent of the holdings) in dzongkhags like Lhuentse, Gasa and Zhemgang. While dzongkhags like Paro, Pema Gatshel and Haa have less than 35 percent of the holdings practising grazing system. Paro and Haa dzongkhags mostly practise industrial system with respectively 69.63 percent and 65.94 percent of holdings rearing bovine animals. Lhuentse dzongkhag has least practiced industrial system of livestock rearing.

Table 8.6. Agricultural holdings, by dzongkhag, and by type of livestock system practiced

Dzongkhag	Grazing system	Industrial system	Mixed system
	(Percentage)		
Bumthang	46.58	51.54	1.88
Chhukha	74.48	19.70	5.82
Dagana	74.86	23.72	1.42
Gasa	98.49	1.51	-
Haa	33.70	65.94	0.36
Lhuntse	99.40	0.36	0.24
Monggar	80.18	13.30	6.52
Paro	27.16	69.63	3.30
Pema Gatshel	29.19	65.61	5.20
Punakha	72.77	21.08	6.19
Samdrup Jongkhar	66.67	32.79	0.54
Samtse	63.94	32.05	4.01
Sarpang	61.33	37.17	1.51
Thimphu	41.90	56.94	1.16
Trashigang	71.50	25.64	2.86
Trashi Yangtse	79.40	20.35	0.25
Trongsa	77.32	22.59	0.09
Tsirang	64.77	35.00	0.23
Wangdue Phodrang	71.75	25.64	2.61
Zhemgang	95.49	4.51	-

The grazing system can be further classified into three types-nomadic or totally pastoral, semi-nomadic or semi-pastoral or transhumant and sedentary pastoral. The definition of each are as follows:

- *Nomadic or totally pastoral* refers to livestock reared, where the holder has no permanent place of residence and does not practice regular cultivation. Livestock moves from place to place with the holder and his/her household, depending on the season and the availability of feed or water.
- *Semi-nomadic, semi-pastoral or transhumant* refers to livestock reared by holders who live a semi-nomadic life. Typically, the holder has a permanent residence to which he/she returns for several months of the year according to seasonal factors. For semi-nomadic and semi-pastoral systems, the holder establishes a semi-permanent home for several months or years and may cultivate crops as a supplementary food source.
- *Sedentary pastoral* refers to livestock reared by holders who have a permanent residence.

- *Ranching* refers to large-scale livestock activities carried out on large areas of land set aside for extensive grazing, where livestock graze mainly on grasses and other plants.

Figure 8.4. Percentage of holdings rearing livestock by different grazing system

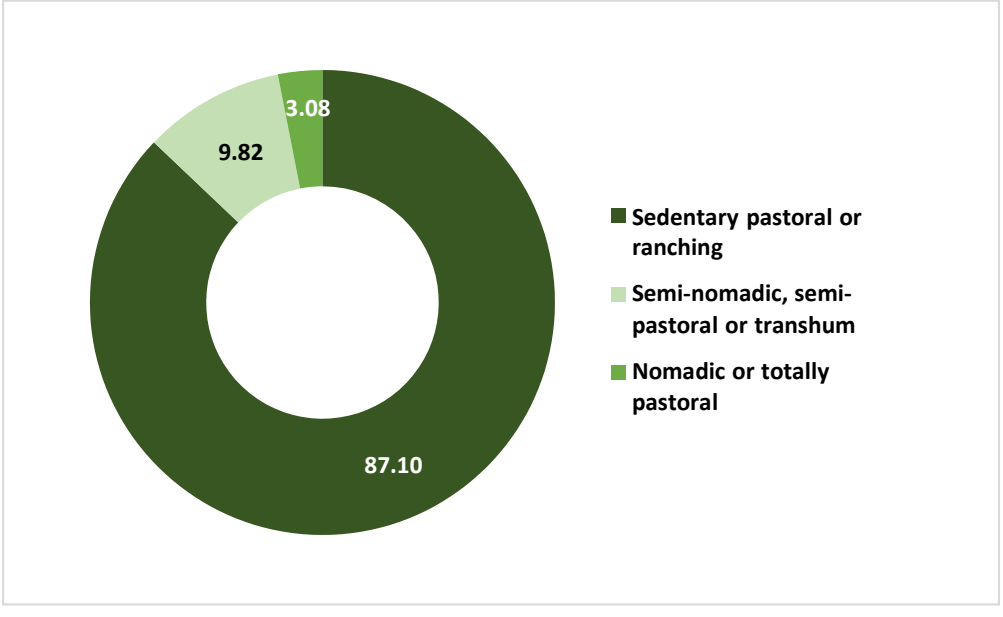


Figure 8.4 presents proportion of holdings rearing bovine animals and practising different kind of grazing system. From the total holdings practising grazing system, sedentary pastoral or ranching (87.10 percent) is mostly practised in the country, followed by semi-nomadic, semi-pastoral or transhumant (9.82 percent) and nomadic or totally pastoral (3.08 percent).

The sedentary pastoral or ranching is widely practised across all the dzongkhags except for Thimphu and Haa, while semi-nomadic or trans-humant is practised predominantly in Wangdue Phodrang dzongkhag. As for nomadic or pastoral grazing system, it is predominantly practiced in Gasa (60.61 percent), followed by Thimphu (41.72 percent). Table 8.7 presents distribution of holdings practising different kind of grazing system for their cattle by dzongkhag.

Table 8.7. Agricultural holdings, by dzongkhag, and by type of grazing system for their cattle

Dzongkhag	Sedentary Pastoral or ranching	Semi-nomadic or trans-humant	Nomadic or totally pastoral
	(Percentage)		
Bumthang	84.19	6.99	8.82
Chhukha	87.94	11.47	0.59
Dagana	71.33	14.99	13.67
Gasa	38.62	0.77	60.61
Haa	90.03	1.89	8.36
Lhuntse	86.19	13.38	0.43
Monggar	85.33	13.99	0.68
Paro	83.91	14.12	2.13
Pema Gatshel	93.49	6.08	0.42
Punakha	99.71	0.29	-
Samdrup Jongkhar	97.87	1.93	0.20
Samtse	86.95	11.73	1.32
Sarpang	89.85	8.01	2.14
Thimphu	46.63	11.66	41.72
Trashigang	88.71	9.91	1.38
Trashi Yangtse	85.31	14.63	0.06
Trongsa	93.00	6.89	0.11
Tsirang	94.80	4.37	0.82
Wangdue Phodrang	82.90	15.40	1.69
Zhemgang	97.88	1.98	0.14
Total	**87.11**	**9.82**	**3.08**

8.6 Other livestock

Table 8.10 shows the total number of holdings rearing other type of livestock and the number of holdings, total animals and total female animals. Among the other type of livestock, poultry-chicken (23,063 holdings) is the commonly reared livestock by the agricultural holdings, followed by utility dogs (about 17,153 holdings). The other livestock reared by the agricultural holdings include goat (9,650 holdings), horses or mules and hinnies and asses (4,966 holdings), pig (3,531 holdings), sheep (1,758 holdings) and poultry-others (289 holdings).

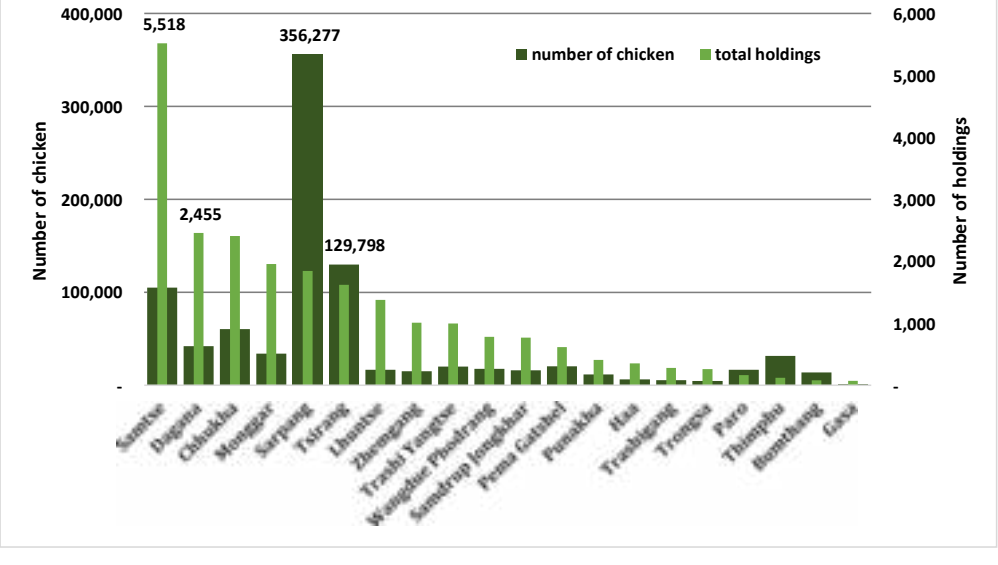
Table 8.8. Agricultural holdings rearing other livestock, by type

Livestock Type	Holdings	Animals	Female animals
	(Number)		
Horses/ mules & hinnies and asses	4,966	15,494	7,251
Sheep	1,758	11,756	7,278
Goat	9,650	50,266	25,588
Pig	3,531	11,263	5,103
Poultry (Chicken)	23,063	924,780	682,758
Poultry (Others)	289	2,394	1,398
Utility dog	17,153	30,206	12,983

8.7 Poultry

Figure 8.6 presents agricultural holdings rearing poultry and the number of poultry head count. Across the dzongkhag, Samtse (5,518 holdings) has the highest number of holdings rearing different kinds of poultry–layers, Chicken broilers and Chicken local. Gasa (72 holdings) and Bumthang (79 holdings) dzongkhags have the least holdings. In terms of the poultry head count, Sarpang (356,277 chicken) has the highest, followed by Tsirang (129,798 chicken). Gasa dzongkhag has the least number.

Figure 8.5. Number of holdings rearing poultry-chicken by dzongkhag



8.8 Bees

There are 7,339 holdings rearing bees, of which 96.03 percent are local type of bees while 2.97 percent are improved bees and 0.99 percent are both types of bees (Table 8.9). By dzongkhag, Samtse (35.13 percent) and Sarpang (17.36

percent) have the highest number of holdings rearing bees in the country. By the type of bees, improved bees are reared mostly in Samtse (29.36 percent) and Bumthang (36.70 percent), while the local bees are reared in Samtse (35.43 percent) and Sarpang (17.95 percent) dzongkhags.

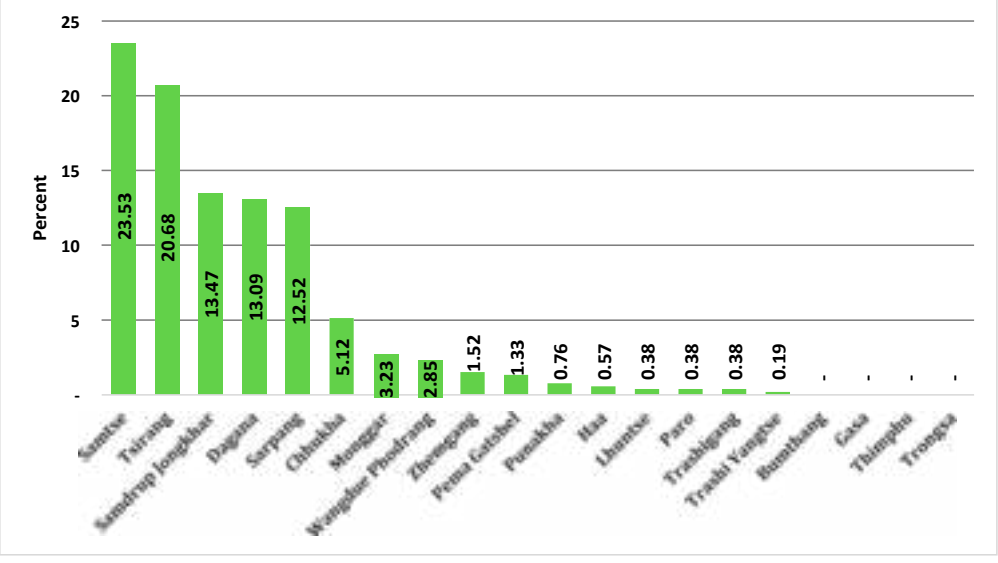
Table 8.9. Agricultural holdings rearing bees, by dzongkhag, and by type of bees

Dzongkhag	Holding	Improved	Local	Both	Beehives
	(Number)				
Bumthang	80	80	-	-	1,357
Chhukha	988	10	948	30	2,185
Dagana	983	5	976	2	2,109
Gasa	-	-	-	-	-
Haa	20	6	10	4	78
Lhuntse	-	-	-	-	-
Monggar	10	-	10	-	11
Paro	54	-	54	-	60
Pema Gatshel	26	1	25	-	33
Punakha	19	2	17	-	52
Samdrup Jongkhar	196	3	193	-	379
Samtse	2,578	64	2,497	17	4,695
Sarpang	1,274	8	1,265	1	3,082
Thimphu	32	17	14	1	63
Trashigang	16	2	14	-	18
Trashi Yangtse	-	-	-	-	-
Trongsa	13	2	11	-	16
Tsirang	985	5	962	18	2,169
Wangdue Phodrang	43	10	33	-	75
Zhemgang	21	3	18	-	26
Total	**7,338**	**218**	**7,047**	**73**	**16,408**

8.9 Aquaculture

Figure 8.6 presents the number of holdings rearing fish by dzongkhag. There are 527 holdings practising aquaculture, which accounts for 0.80 percent of the total holdings in the country. Across the dzongkhag, Samtse (23.53 percent) and Tsirang (20.68 percent) have the highest number of holdings rearing fish, followed by Samdrup Jongkhar (13.47 percent). Bumthang, Gasa, Thimphu and Trongsa have no holdings rearing fish.

Figure 8.6. Percentage of holdings rearing fish



9 WOOD AND NON-WOOD FOREST PRODUCTS

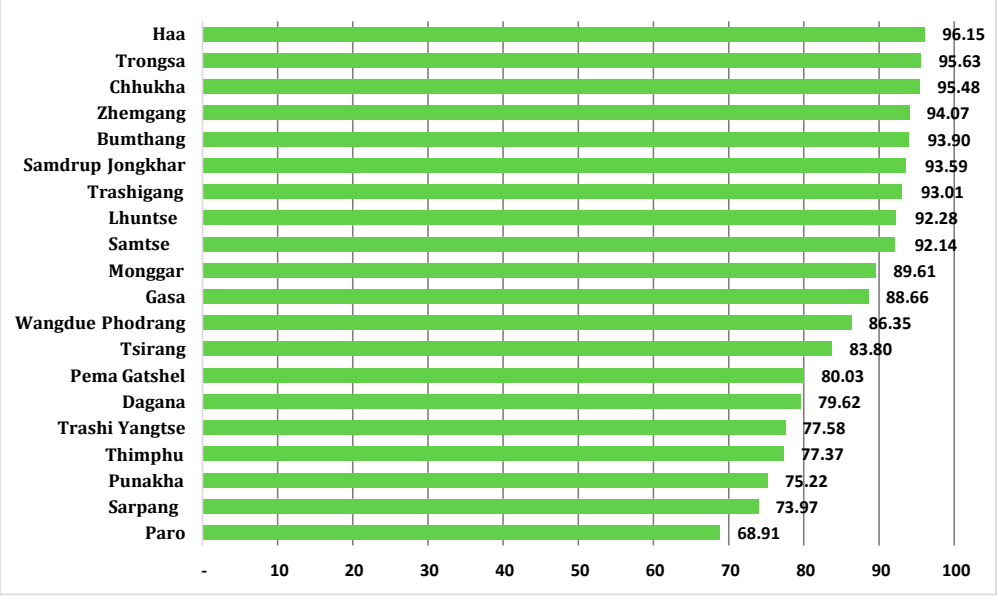
9.1 Introduction

Households are not only engaged in the cultivation of cereals and rearing of livestock for their livelihood. They are also engaged in the collection of Wood and Non-wood Forest Products for the purpose of own consumption or for sales. The NWFPs product mainly includes cane & bamboo, cordyceps, daphne, incense, medicinal and aromatic plants, medicinal fruits, mushrooms, spices, wild vegetables, etc.

Figure 9.1. Pictures of different kinds of NWFPs

Figure 9.1 presents visual representation of the different kinds of NWFPs collected by households. From the total of 66,587 households, about 86 percent (57,518 households) are involved in sustainable collection of Wood or Non-Wood Forest Products. Figure 9.2 presents the distribution of households engaged in the collection of Wood or Non-Wood Forest Products (NWFP) by dzongkhag. Across the dzongkhag, Haa (96.15 percent) has the highest proportion of households engaged in the collection of wood or non-wood forest products, followed by Trongsa (96.63 percent) and Chhukha (95.48 percent).

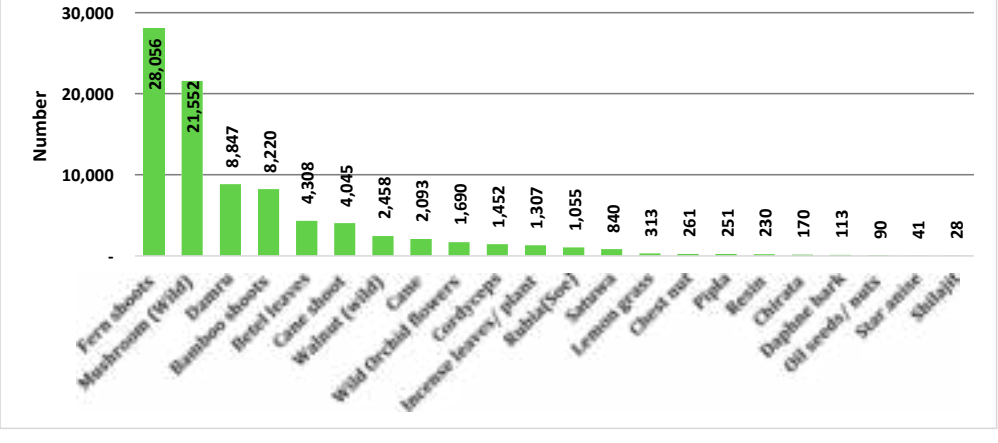
Figure 9.2. Percentage of households engaged in wood or non-wood forest products by dzongkhag



9.2 Households engaged in collection of NWFPs by type

Figure 9.3 presents the number of households that collected different types of NWFPs in 2018 across the country. The most dominant NWFPs collected by the farming households are the fern shoot/tops, followed by mushroom.

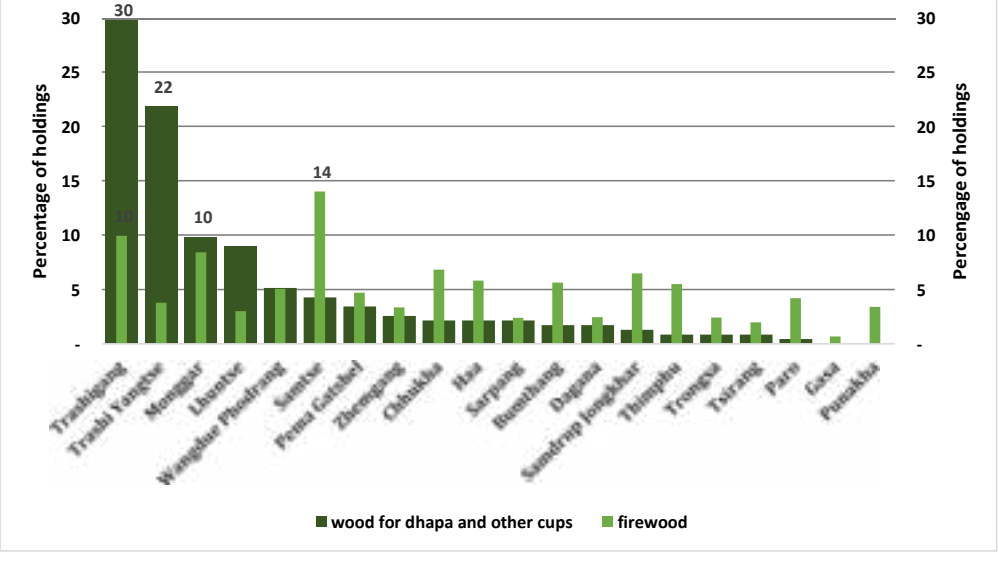
Figure 9.3. Households engaged in collection of NWFPs by types



9.3 Households engaged in collection of Wood products by type

There are 234 household engaged in the collection of wood for dhapa and other cups, of which, 30 percent are in Trashigang, followed by 22 percent in Trashi Yangtse and 10 percent in Monggar dzongkhag (Figure 9.4). From the total of 55,216 households engaged in the collection of firewood, about 14 percent are in Samtse, followed by 10 percent in Trashigang and 8 percent in Monggar dzongkhag. Whereas wood as raw material was collected only by few holdings in all the dzongkhag, while Gasa and Punakha dzongkhag did not have any households collecting wood for raw material purpose.

Figure 9.4. Percentage of holdings engaged in collection of wood products by dzongkhag



10 CONSTRAINTS

10.1 Introduction

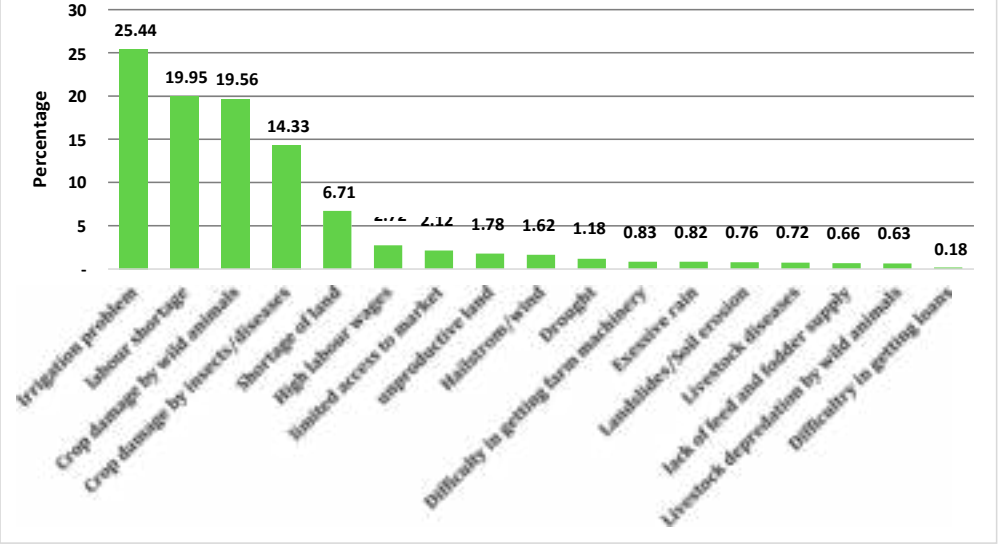
As the part of government's initiative to support RNR sector development and create an enabling environment for farming, several policy initiatives and programs have been undertaken. The census had questions on constraints and difficulties faced by the holdings. The primary goal of the module was to gauge different kinds of constraints and difficulties faced by the holdings to operate their farms or while carrying out agricultural activities in 2018. More than 88 percent of the holdings reported to have experienced constraints that affected their agricultural production or their assets.

Section 10.2 presents different kinds of constraints faced by the household sector by the type of constraints. The constraints differ significantly in nature and thus, section 10.3 presents the top three constraints faced by the holdings.

10.2 Types of constraints

Figure 10.1 presents percentage of holdings who faced different types of constraints in 2018. The top three constraints faced by holdings are irrigation problem (25.44 percent), followed by labour shortage (19.95 percent) and crop damage by wild animals (19.56 percent).

Figure 10.1. 1 Households who faced different types of constraints



10.3 The top three constraints by dzongkhag

When zooming in on top three constraints faced by households, by dzongkhag (Table 10.1), the percentage reported for irrigation problem is high in dzongkhags like Samtse (20.81 percent), followed by Dagana (10.43 percent) and Tsirang (10.39 percent). Across the dzongkhag for reported constraints for labour shortage, it is high in dzongkhags such as Trashi Yangtse (12.59 percent), followed by Samtse (9.50 percent) and Monggar (8.38 percent). On the other hand, Samtse (14.32 percent), Trashi Yangtse (10.01 percent) and Monggar (9.65 percent) faced the highest crop damage by wild animals.

Table 10.1. Top three constraints faced by the holdings and by dzongkhag.

Dzongkhag	Number of households who faced the constraints	Irrigation problem	Labour shortage	Crop damage by wild animals
		(Percentage)		
Bumthang	1,031	0.63	1.85	2.72
Chhukha	3,790	5.55	6.12	6.70
Dagana	3,882	10.43	4.31	4.42
Gasa	302	0.02	0.54	0.14
Haa	1,262	1.08	2.94	2.90
Lhuntse	1,643	1.31	4.61	3.66
Monggar	4,589	5.51	8.38	9.65
Paro	2,927	4.87	4.65	4.29
Pema Gatshel	3,243	4.21	7.96	5.38
Punakha	2,098	5.01	3.36	1.77
Samdrup Jongkhar	3,223	3.20	6.44	7.41
Samtse	8,639	20.81	9.50	14.32
Sarpang	4,094	8.68	4.44	7.05
Thimphu	894	1.30	1.83	0.96
Trashigang	2,345	2.41	5.14	5.20
Trashi Yangtse	5,296	4.99	12.59	10.01
Trongsa	1,299	1.84	2.65	1.98
Tsirang	3,382	10.39	3.23	3.99
Wangdue Phodrang	2,966	4.96	5.11	4.03
Zhemgang	1,964	2.79	4.35	3.43
Total (Number of households)	**58,869**	**22,326**	**17,503**	**17,161**

11 APPENDICES

Appendix I: Statistical Tables

Table A4. 1 Total dryland owned, leased-in, leased-out, fallow and operational, by dzongkhag

Dzongkhag	Total own	Leased-in	Leased-out	Fallow	Operational
	(Acre)				
Bumthang	9,612	917	307	3,707	6,515
Chhukha	14,985	774	761	2,829	12,168
Dagana	11,641	944	478	1,861	10,246
Gasa	646	1	1	108	539
Haa	4,362	162	108	798	3,617
Lhuntse	4,688	84	149	1,405	3,218
Monggar	17,525	509	258	5,579	12,198
Paro	5,426	169	110	869	4,616
Pema Gatshel	16,409	363	320	8,396	8,056
Punakha	1,653	87	38	500	1,203
Samdrup Jongkhar	16,023	422	445	4,440	11,561
Samtse	20,726	1,446	1,271	2,506	18,396
Sarpang	10,398	915	495	1,438	9,382
Thimphu	1,692	269	66	263	1,665
Trashigang	15,372	395	413	8,286	7,069
Trashi Yangtse	4,948	153	91	2,478	2,532
Trongsa	4,849	117	112	2,218	2,637
Tsirang	8,029	538	307	1,014	7,246
Wangdue Phodrang	4,564	557	288	975	3,859
Zhemgang	11,985	273	275	4,944	7,041
Total	**185,533**	**9,095**	**6,293**	**54,614**	**133,764**

Table A4. 2 Total wetland owned, leased-in, leased-out, fallow and operational, by dzongkhag

Dzongkhag	Total own	Leased-in	Leased-out	Fallow	Operational
	(Acre)				
Bumthang	3.30	0.75	1.80	1.00	1.25
Chhukha	1,934.85	127.00	144.32	203.41	1,714.12
Dagana	3,745.84	535.52	329.31	648.58	3,303.47
Gasa	197.71	16.00	18.43	59.93	135.35
Haa	171.72	2.50	5.05	29.11	140.06
Lhuntse	1,781.44	240.00	170.60	432.80	1,418.04
Monggar	1,330.56	99.00	116.92	489.83	822.81

Dzongkhag	Total own	Leased-in	Leased-out	Fallow	Operational
	(Acre)				
Paro	2,911.89	655.45	460.43	54.38	3,052.53
Pema Gatshel	348.24	9.00	19.15	207.95	130.14
Punakha	6,488.36	1,736.46	761.79	597.44	6,865.59
Samdrup Jongkhar	1,779.53	490.00	182.71	156.42	1,930.40
Samtse	6,666.93	1,449.01	1,460.01	1,261.95	5,393.98
Sarpang	4,512.94	1,031.43	691.07	981.35	3,871.95
Thimphu	421.18	76.75	38.91	31.28	427.74
Trashigang	2,217.14	339.00	252.24	556.16	1,747.74
Trashi Yangtse	1,500.56	169.71	126.39	586.48	957.40
Trongsa	1,718.04	301.00	222.53	541.42	1,255.09
Tsirang	3,851.58	558.80	382.27	679.70	3,348.41
Wangdue Phodrang	4,218.30	744.67	516.36	888.57	3,558.04
Zhemgang	1,595.48	91.00	64.62	550.11	1,071.75
Total	**47,395.59**	**8,673.05**	**5,964.91**	**8,957.87**	**41,145.86**

Table A4. 3 Total Khimsa owned, leased-in, leased-out, fallow and operational, by dzongkhag

Dzongkhag	Total own	Leased-in	Leased-out	Fallow	Operational
	(Acre)				
Bumthang	93.70	-	-	5.00	89.70
Chhukha	428.11	2.00	1.38	6.85	421.88
Dagana	722.94	12.00	2.68	8.89	723.37
Gasa	32.18	-	-	-	31.18
Haa	219.51	1.20	-	27.63	193.08
Lhuntse	206.26	1.00	-	1.00	206.26
Monggar	630.05	1.00	1.00	3.94	625.11
Paro	334.41	0.52	0.08	3.72	330.21
Pema Gatshel	522.23	6.00	6.24	12.00	510.99
Punakha	333.17	6.32	1.00	5.65	332.84
Samdrup Jongkhar	477.72	9.00	2.24	3.00	481.48
Samtse	674.37	19.10	5.32	7.60	680.55
Sarpang	637.31	3.00	6.25	8.33	625.98
Thimphu	131.78	2.00	2.13	18.16	112.49
Trashigang	776.83	8.00	3.39	46.63	733.81
Trashi Yangtse	285.83	1.00	2.30	4.18	281.35
Trongsa	198.46	1.00	-	2.00	196.46
Tsirang	602.03	8.00	4.13	11.53	594.37
Wangdue Phodrang	378.28	4.00	1.31	11.71	369.45
Zhemgang	353.45	-	0.26	10.50	341.69
Total	**8,038.62**	**85.14**	**39.71**	**198.32**	**7,882.25**

Table A4. 4 Total orchard land owned, leased-in, leased-out, fallow and operational, by dzongkhag

Dzongkhag	Total own	Leased-in	Leased-out	Fallow	Operational
	(Acre)				
Bumthang	3.00	-	-	-	3.00
Chhukha	734.19	13.00	16.84	163.40	566.95
Dagana	627.39	11.00	7.47	115.09	514.83
Gasa	-	-	-	-	-
Haa	280.06	7.50	-	23.00	264.56
Lhuntse	31.00	1.00	-	-	32.00
Monggar	27.00	-	-	-	27.00
Paro	296.50	0.67	1.00	3.00	294.17
Pema Gatshel	1,086.68	1.75	10.00	229.35	849.08
Punakha	28.00	11.00	-	8.00	30.00
Samdrup Jongkhar	430.90	1.00	1.00	-	430.90
Samtse	2,193.26	119.53	149.65	695.16	1,466.98
Sarpang	2,156.85	90.00	105.46	924.37	1,217.02
Thimphu	102.30	3.50	-	7.00	98.80
Trashigang	36.00	2.00	-	-	37.00
Trashi Yangtse	32.35	-	-	1.00	31.35
Trongsa	64.00	1.00	2.00	10.00	53.00
Tsirang	805.14	18.00	18.00	154.78	650.36
Wangdue Phodrang	13.00	-	-	4.00	9.00
Zhemgang	144.20	1.00	2.00	12.00	131.20
Total	**9,091.82**	**281.95**	**313.42**	**2,350.15**	**6,707.20**

Table A5. 1 Agricultural holdings, by dzongkhag, and by different sources of power to till their land

Dzongkhag	Total number of households	Animal power	Machine power	Manual power
		(Percentage)		
Bumthang	1,476	9.01	67.41	12.40
Chhukha	4,155	63.95	10.47	17.55
Dagana	4,235	70.37	13.79	9.14
Gasa	573	56.02	35.43	6.28
Haa	1,375	35.64	26.91	33.45
Lhuntse	2,008	47.86	27.89	19.97
Monggar	5,159	76.22	13.06	9.91
Paro	3,281	23.04	56.54	15.33
Pema Gatshel	3,456	36.57	14.32	44.39

Dzongkhag	Total number of households	Animal power	Machine power	Manual power
		(Percentage)		
Punakha	2,599	10.73	81.57	5.19
Samdrup Jongkhar	3,933	56.27	14.09	25.55
Samtse	8,997	67.79	4.68	19.91
Sarpang	4,875	46.32	27.73	16.98
Thimphu	1,432	6.77	41.27	34.85
Trashigang	5,994	58.59	23.04	12.16
Trashi Yangtse	2,475	47.52	21.21	28.69
Trongsa	1,466	51.98	30.83	12.21
Tsirang	3,654	80.46	5.53	9.85
Wangdue Phodrang	3,369	15.52	71.30	10.12
Zhemgang	2,075	70.41	14.41	11.66
Total	**66,587**	**52.28**	**24.73**	**17.37**

Table A5. 2 Agricultural holdings, by dzongkhag, and by different sources of credit availed

Dzongkhag	Total number of households who availed credit	Commercial bank	BDBL	Cooperative credit society	Money lender	Input supplier	Self-help group	Family or friends	Government	REDCL	NGO (e.g. Tarayana)
		(Percentage)									
Bumthang	1,476	2	373	-	-	-	33	-	-	6	1
Chhukha	4,155	6	428	3	2	-	-	2	5	29	1
Dagana	4,235	49	472	10	3	-	8	32	15	55	17
Gasa	573	-	16	-	-	-	1	-	-	3	-
Haa	1,375	4	405	1	-	-	-	-	-	36	-
Lhuntse	2,008	8	106	-	-	-	-	1	-	8	-
Monggar	5,159	9	799	-	1	-	7	3	1	29	-
Paro	3,281	23	213	2	1	-	12	10	10	83	-
Pema Gatshel	3,456	9	255	1	-	-	2	1	-	32	-
Punakha	2,599	1	263	2	-	-	4	6	1	43	13
Samdrup Jongkhar	3,933	6	281	-	-	-	-	14	5	15	-
Samtse	8,997	62	926	5	10	-	5	3	4	26	12
Sarpang	4,875	19	263	1	-	-	1	7	4	18	-
Thimphu	1,432	10	85	-	-	-	-	1	1	48	-
Trashigang	5,994	12	297	16	21	1	9	13	2	21	3
Trashi Yangtse	2,475	-	58	-	-	-	-	-	1	21	-
Trongsa	1,466	3	78	2	-	-	-	-	1	37	1
Tsirang	3,654	21	156	4	10	-	4	26	2	17	5
Wangdue Phodrang	3,369	14	945	-	-	-	1	3	1	55	16
Zhemgang	2,075	2	290	-	-	-	-	-	-	12	-
Total	**66,587**	**260**	**6,709**	**47**	**48**	**1**	**87**	**122**	**53**	**594**	**69**

Table A6. 1 Harvest area (Acre), by dzongkhag, and by different types of cereals

Dzongkhag	Irrigated Paddy	Unland Paddy	Maize	Wheat	Barley	Millet	Buckwheat	Amaranthus	Quinoa
Bumthang	102.78	-	0.25	312.66	320.38	0.50	681.92	-	0.34
Chhukha	1,293.44	27.34	2,067.71	79.36	32.55	337.39	396.74	10.29	10.86
Dagana	2,473.50	4.51	4,041.46	49.99	33.74	231.48	276.11	-	22.35
Gasa	135.96	-	5.73	126.45	170.73	0.10	2.95	-	-
Haa	153.27	-	242.72	377.36	30.53	53.67	434.87	1.52	4.19
Lhuntse	1,315.94	80.24	1,635.93	14.37	0.25	45.88	2.38	4.52	7.25
Monggar	700.44	25.42	7,128.99	135.27	429.46	55.01	175.88	4.24	24.84
Paro	3,064.01	-	20.49	327.67	57.35	4.36	72.66	-	0.50
Pema Gatshel	27.13	11.43	2,787.51	47.85	34.66	104.43	176.64	5.59	2.44
Punakha	6,926.85	13.47	141.69	244.37	18.81	0.18	87.01	2.11	-
Samdrup Jongkhar	1,864.71	37.56	2,883.52	17.17	45.23	138.92	562.42	3.53	8.06
Samtse	4,393.82	69.81	3,857.72	103.03	20.76	668.22	199.91	0.54	11.68
Sarpang	3,170.81	17.83	2,224.84	5.77	-	410.55	70.97	0.42	3.41
Thimphu	391.75	-	20.16	81.77	16.77	0.20	5.09	-	-
Trashigang	1,467.11	70.23	3,796.97	35.07	66.99	103.98	243.84	2.93	8.84
Trashi Yangtse	838.67	129.79	1,179.11	3.36	3.46	168.03	5.06	0.25	0.99
Trongsa	1,216.61	5.41	423.53	231.16	245.12	33.14	371.08	1.68	1.25
Tsirang	2,798.16	4.63	3,406.36	26.98	4.96	221.43	120.21	-	4.88
Wangdue Phodrang	3,515.43	13.13	221.42	563.91	135.99	18.96	426.70	1.38	0.55
Zhemgang	819.82	86.85	2,649.50	35.21	47.06	163.30	334.12	21.83	1.71
Total	**36,670.21**	**597.65**	**38,735.61**	**2,818.78**	**1,714.80**	**2,759.73**	**4,646.56**	**60.83**	**114.14**

Table A6. 2 Production, by dzongkhag, and by different types of cereals

Dzongkhag	Irrigated Paddy	Unland Paddy	Maize	Wheat	Barley	Millet	Buckwheat	Amaranthus	Quinoa
Bumthang	164.56	-	0.38	190.83	201.18	0.20	416.00	-	0.07
Chhukha	1,852.52	20.27	2,500.62	30.24	19.33	114.54	195.93	0.80	1.51
Dagana	2,313.27	2.33	4,894.27	15.80	4.94	81.78	52.20	-	0.42
Gasa	183.24	-	8.76	81.61	112.27	0.02	1.41	-	-
Haa	232.08	-	260.25	149.59	11.35	26.48	162.07	0.23	1.62
Lhuntse	2,565.83	95.07	2,886.60	8.62	0.05	44.89	1.78	3.79	1.86
Monggar	810.99	12.16	9,770.95	66.19	183.41	15.60	52.17	0.66	5.08
Paro	7,038.39	-	31.10	148.33	24.55	4.82	29.54	-	0.02
Pema Gatshel	31.74	5.27	4,554.87	30.54	12.31	45.51	76.78	1.61	1.55
Punakha	16,389.69	15.34	255.02	123.78	12.92	0.06	57.97	0.49	-
Samdrup Jongkhar	3,131.63	23.71	3,706.65	14.17	31.75	30.39	297.93	2.09	0.55
Samtse	6,056.99	44.61	4,982.60	26.28	5.30	179.32	58.05	0.14	2.40
Sarpang	4,343.45	10.75	3,165.90	3.28	-	170.30	16.79	0.06	1.85
Thimphu	994.03	-	30.60	63.68	12.44	0.15	1.45	-	-
Trashigang	3,079.78	52.06	8,276.68	21.48	34.19	16.85	79.78	0.58	1.72
Trashi Yangtse	1,382.85	122.70	2,127.72	1.76	1.61	197.79	3.17	0.13	0.08
Trongsa	1,732.00	3.50	761.02	111.74	155.82	9.04	137.54	0.06	0.28
Tsirang	3,344.14	2.75	3,640.95	12.26	2.05	72.74	33.27	-	1.05
Wangdue Phodrang	6,684.25	11.82	375.00	330.87	72.54	8.28	205.90	0.54	0.26
Zhemgang	1,073.50	62.55	3,029.07	14.14	30.82	52.05	110.83	8.89	0.19
Total	**63,404.93**	**484.89**	**55,259.01**	**1,445.19**	**928.83**	**1,070.81**	**1,990.56**	**20.07**	**20.51**

Table A6. 3 Holdings growing cereal crops, by dzongkhag, and by different types of cereals

Dzongkhag	Total cereal grower	Irrigated Paddy	Unland Paddy	Maize	Wheat	Barley	Millet	Buckwheat	Amaranthus	Quinoa
	(Number)									
Bumthang	987	134	-	2	427	510	1	905	-	4
Chhukha	3,264	1,118	44	2,844	174	71	974	952	27	78
Dagana	3,617	1,840	7	3,295	114	39	661	495	-	8
Gasa	511	120	-	30	247	282	1	14	-	-
Haa	1,095	102	-	375	627	70	153	770	6	38
Lhuntse	1,807	1,257	174	1,642	28	1	185	11	38	41
Monggar	5,006	1,200	111	4,931	281	694	145	446	20	109
Paro	2,343	1,961	-	69	529	152	18	179	-	4
Pema Gatshel	3,123	39	22	3,044	65	122	337	597	38	12
Punakha	2,428	2,407	14	370	570	76	2	248	10	-
Samdrup Jongkhar	3,599	1,095	117	3,089	39	98	270	1,058	14	8
Samtse	7,231	3,166	95	6,303	342	85	1,939	962	8	94
Sarpang	3,661	1,873	33	3,106	21	1	1,101	330	3	17
Thimphu	478	291	-	103	137	51	2	24	-	-
Trashigang	5,264	1,841	267	5,099	116	249	400	770	63	54
Trashi Yangtse	2,323	1,248	325	2,099	14	18	492	29	3	3
Trongsa	1,266	1,052	13	784	461	471	111	620	9	7
Tsirang	3,296	1,467	8	3,073	58	19	733	507	-	37
Wangdue Phodrang	2,374	2,048	15	422	1,120	416	76	932	16	26
Zhemgang	1,891	825	117	1,703	45	99	425	466	73	7
Total	**55,564**	**25,084**	**1,362**	**42,383**	**5,415**	**3,524**	**8,026**	**10,315**	**328**	**547**

Table A6.4- 1 Harvest area and production, by dzongkhag, and by type of cereal crops

Dzongkhag	Number of growers	Area (acre)	Production (MT)	Number of growers	Area (acre)	Production (MT)	Number of growers	Area (acre)	Production (MT)
	(Wheat)			(Barley)			(Millet)		
Bumthang	427	313	190.83	510	320	201.18	1	1	0.20
Chhukha	174	79	30.24	71	33	19.33	974	337	114.54
Dagana	114	50	15.80	39	34	4.94	661	231	81.78
Gasa	247	126	81.61	282	171	112.27	1	-	0.02
Haa	627	377	149.59	70	31	11.35	153	54	26.48
Lhuntse	28	14	8.62	1	-	0.05	185	46	44.89
Monggar	281	135	66.19	694	429	183.41	145	55	15.60
Paro	529	328	148.33	152	57	24.55	18	4	4.82
Pema Gatshel	65	48	30.54	122	35	12.31	337	104	45.51
Punakha	570	244	123.78	76	19	12.92	2	-	0.06
Samdrup Jongkhar	39	17	14.17	98	45	31.75	270	139	30.39
Samtse	342	103	26.28	85	21	5.30	1,939	668	179.32
Sarpang	21	6	3.28	1	-	-	1,101	411	170.30
Thimphu	137	82	63.68	51	17	12.44	2	-	0.15
Trashigang	116	35	21.48	249	67	34.19	400	104	16.85
Trashi Yangtse	14	3	1.76	18	3	1.61	492	168	197.79
Trongsa	461	231	111.74	471	245	155.82	111	33	9.04
Tsirang	58	27	12.26	19	5	2.05	733	221	72.74
Wangdue Phodrang	1,120	564	330.87	416	136	72.54	76	19	8.28
Zhemgang	45	35	14.14	99	47	30.82	425	163	52.05
Total	**5,415**	**2,817**	**1,445.19**	**3,524**	**1,715**	**928.83**	**8,026**	**2,758**	**1,070.81**

Table A6.4- 2 Harvest area and production, by dzongkhag, and by type of cereal crops

Dzongkhag	Number of growers	Area (acre)	Production (MT)	Number of growers	Area (acre)	Production (MT)	Number of growers	Area (acre)	Production (MT)	Number of growers	Area (acre)	Production (MT)
	(Sweet buckwheat)			(Bitter buckwheat)			(Amaranthus)			(Quinoa)		
Bumthang	433	322	178.67	472	360	237.33	-	-	-	4	0.34	0.07
Chhukha	553	219	79.52	399	177	116.41	27	10.29	0.80	78	10.86	1.51
Dagana	357	194	37.06	138	83	15.15	-	-	-	8	22.35	0.42
Gasa	7	2	0.86	7	1	0.55	-	-	-	-	-	-
Haa	403	240	81.23	367	195	80.84	6	1.52	0.23	38	4.19	1.62
Lhuntse	6	1	0.70	5	1	1.08	38	4.52	3.79	41	7.25	1.86
Monggar	253	87	29.33	193	89	22.83	20	4.24	0.66	109	24.84	5.08
Paro	69	26	8.05	110	47	21.49	-	-	-	4	0.50	0.02
Pema Gatshel	357	104	29.65	240	72	47.13	38	5.59	1.61	12	2.44	1.55
Punakha	29	8	4.31	219	79	53.66	10	2.11	0.49	-	-	-
Samdrup Jongkhar	1,006	545	289.82	52	17	8.12	14	3.53	2.09	8	8.06	0.55
Samtse	598	123	33.83	364	77	24.22	8	0.54	0.14	94	11.68	2.40
Sarpang	256	55	13.04	74	16	3.75	3	0.42	0.06	17	3.41	1.85
Thimphu	15	4	0.86	9	1	0.59	-	-	-	-	-	-
Trashigang	557	204	64.59	213	40	15.20	63	2.93	0.58	54	8.84	1.72
Trashi Yangtse	10	2	1.47	19	3	1.70	3	0.25	0.13	3	0.99	0.08
Trongsa	145	78	34.65	475	293	102.89	9	1.68	0.06	7	1.25	0.28
Tsirang	431	101	26.39	76	19	6.89	-	-	-	37	4.88	1.05
Wangdue Phodrang	257	99	56.48	675	328	149.42	16	1.38	0.54	26	0.55	0.26
Zhemgang	164	153	38.04	302	181	72.79	73	21.83	8.89	7	1.71	0.19
Total	**5,906**	**2,567**	**1,008.55**	**4,409**	**2,079**	**982.04**	**328.00**	**60.83**	**20.06**	**547**	**114.14**	**20.51**

Table A6.5- 1 Harvest area, by dzongkhag, and by different types of oil seeds and legumes

Dzongkhag	Mustard	Sunflower	Soyabean	Sesame	Groundnut	Chickpeas	Cowpeas	Lentil	Lupins
	(acre)								
Bumthang	31.67	2.37	-	-	-	-	-	-	-
Chhukha	102.95	-	19.59	0.06	0.06	1.40	0.09	132.90	0.64
Dagana	114.84	3.28	13.16	1.16	9.33	0.20	24.16	97.91	8.90
Gasa	4.56	-	-	-	-	-	-	-	-
Haa	14.65	0.05	-	-	-	-	0.07	-	-
Lhuntse	6.26	0.15	14.47	-	1.20	0.01	-	1.34	-
Monggar	52.91	-	42.54	-	13.43	0.51	11.69	0.56	-
Paro	76.85	-	0.30	-	0.02	0.02	0.05	-	-
Pema Gatshel	32.63	-	106.44	0.89	47.61	3.05	5.16	39.77	0.04
Punakha	32.96	-	1.75	-	5.81	-	0.06	7.07	-
Samdrup Jongkhar	62.22	0.10	34.84	0.35	3.50	0.01	-	70.14	0.22
Samtse	173.12	0.42	17.10	0.35	0.23	11.15	9.10	109.67	4.16
Sarpang	118.56	0.35	5.27	0.08	0.89	0.25	0.45	48.13	1.15
Thimphu	4.23	0.10	-	-	0.08	-	-	-	-
Trashigang	34.19	0.71	66.42	-	96.92	0.02	0.13	5.70	-
Trashi Yangtse	0.51	-	20.54	-	62.33	-	-	0.37	-
Trongsa	17.55	-	8.93	-	0.05	-	-	-	-
Tsirang	81.23	-	14.41	0.14	23.41	-	0.10	102.26	38.76
Wangdue Phodrang	70.47	-	2.72	-	0.58	-	-	0.04	-
Zhemgang	70.69	0.03	8.33	0.15	1.78	0.06	-	0.97	-
Total	**1,103.05**	**7.56**	**376.81**	**3.18**	**267.23**	**16.68**	**51.06**	**616.83**	**53.87**

Table A6.5- 2 Production (MT unless specified otherwise), by dzongkhag, and by different types of oilseeds and legumes

Dzongkhag	Mustard	Sunflower (kg)	Soyabean	Sesame (kg)	Groundnut	Chickpeas (kg)	Cowpeas (kg)	Lentil	Lupins
Bumthang	8.97	793.00	-	-	-	-	-	-	-
Chhukha	28.92	-	3.81	22.00	0.03	3,020.00	80.00	15.94	0.10
Dagana	23.25	295.00	2.24	160.00	3.09	7.00	1,848.00	44.30	4.58
Gasa	1.63	-	-	-	-	-	-	-	-
Haa	4.08	45.00	-	-	-	-	60.00	-	-
Lhuntse	3.45	12.00	5.47	-	0.21	10.00	-	0.70	-
Monggar	14.02	-	6.11	-	9.39	47.00	2,349.00	0.41	-
Paro	15.66	-	0.05	-	0.03	15.00	75.00	-	-
Pema Gatshel	5.12	-	26.94	208.00	31.22	993.00	2,596.00	10.75	0.07
Punakha	10.20	-	2.30	-	7.11	-	30.00	2.00	-
Samdrup Jongkhar	18.36	25.00	18.82	40.00	2.53	5.00	-	18.95	0.17
Samtse	25.42	66.00	2.43	123.00	0.11	736.00	1,625.00	17.38	0.32
Sarpang	19.16	132.00	2.39	35.00	0.38	50.00	518.00	7.65	0.10
Thimphu	4.06	15.00	-	-	0.11	-	-	-	-
Trashigang	9.91	212.00	20.92	-	91.79	15.00	130.00	1.44	-
Trashi Yangtse	0.12	-	5.99	-	46.55	-	-	0.17	-
Trongsa	3.02	-	1.60	-	0.01	-	-	-	-
Tsirang	12.30	-	3.24	70.00	3.17	-	20.00	18.50	6.72
Wangdue Phodrang	19.20	-	2.09	-	0.45	-	-	0.12	-
Zhemgang	17.65	2.00	3.05	20.00	0.69	10.00	-	0.12	-
Total	**244.50**	**1,597.00**	**107.45**	**678.00**	**196.87**	**4,908.00**	**9,331.00**	**138.43**	**12.06**

Table A6.6- 1 Harvest area, by dzongkhag, and by different types of vegetables

Dzongkhag	Asparagus	Brocolli	Cabbage	Cauliflower	Chilli	Spinach and sag	Onion (inc. shallot)	Ginger	Tumeric	Garlic	Beans
	(acre)										
Bumthang	0.75	2.78	6.19	2.79	39.19	3.21	0.01	0.01	-	5.46	0.81
Chhukha	1.47	34.44	74.17	33.18	166.82	131.61	13.32	481.91	1.26	7.73	152.21
Dagana	7.91	47.38	89.75	48.88	150.72	168.17	32.74	51.63	0.86	49.18	340.34
Gasa	0.74	3.52	3.51	2.04	8.01	5.61	0.93	0.17	-	8.49	2.14
Haa	0.92	6.11	45.42	7.79	16.94	22.34	1.38	5.48	-	8.40	13.37
Lhuntse	5.53	36.97	71.72	74.22	248.08	40.43	11.52	17.48	0.57	83.56	110.89
Monggar	2.91	109.56	198.11	116.34	543.14	192.28	60.36	59.20	0.52	131.41	782.72
Paro	83.15	21.04	430.75	60.43	587.45	23.09	2.41	0.01	-	2.32	144.85
Pema Gatshel	8.96	12.10	71.52	19.60	151.20	79.98	18.21	160.36	15.29	50.91	251.34
Punakha	4.31	42.00	24.32	27.31	259.91	48.34	40.67	1.33	-	24.85	135.54
Samdrup Jongkhar	0.49	63.08	78.06	62.51	117.19	170.48	22.13	577.73	0.43	43.97	267.41
Samtse	0.52	81.62	199.86	110.48	163.29	272.29	23.40	431.34	16.72	11.49	179.01
Sarpang	1.48	39.19	60.69	42.96	102.58	114.30	12.12	120.86	2.15	6.83	157.51
Thimphu	15.77	70.35	44.36	69.47	159.24	43.04	6.09	0.05	-	10.88	16.07
Trashigang	8.04	38.70	89.86	79.24	363.26	155.07	47.93	17.35	1.50	279.00	401.56
Trashi Yangtse	3.42	26.14	43.62	44.25	191.58	28.16	12.82	6.97	0.18	30.62	45.45
Trongsa	3.13	16.03	30.12	19.19	122.38	23.07	6.50	5.35	-	11.11	21.83
Tsirang	0.15	82.89	100.55	114.09	147.99	136.74	29.14	124.31	5.22	20.85	290.72
Wangdue Phodrang	4.01	28.52	76.44	53.58	386.88	79.52	46.87	3.82	0.07	77.15	68.17
Zhemgang	0.27	18.25	53.02	12.73	104.82	42.13	5.37	90.17	4.26	9.82	41.21
Total	**153.93**	**780.67**	**1,792.04**	**1,001.08**	**4,030.67**	**1,779.86**	**393.92**	**2,155.53**	**49.03**	**874.03**	**3,423.15**

Table A6.6- 2 Production (MT unless specified otherwise), by dzongkhag, and by different types of vegetables

Dzongkhag	Asparagus	Brocolli	Cabbage	Cauliflower	Chilli	Spinach and sag	Onion (inc. shallot)	Ginger	Tumeric	Garlic	Beans
Bumthang	0.48	8.65	43.12	8.40	155.05	12.44	0.02	0.02	-	12.89	1.76
Chhukha	0.20	25.30	149.54	40.68	312.10	231.50	2.69	1,202.57	0.99	8.56	152.32
Dagana	2.80	30.97	50.79	45.69	82.04	77.25	18.09	58.66	1.10	9.56	73.41
Gasa	0.46	5.31	9.51	4.16	19.98	10.71	0.75	0.23	-	12.60	7.84
Haa	0.08	6.99	158.06	12.06	21.13	33.16	1.31	2.53	-	7.46	12.48
Lhuntse	1.61	36.66	77.78	42.31	412.96	44.85	8.09	6.77	0.23	49.76	75.70
Monggar	0.62	110.21	217.05	103.30	606.88	87.86	19.61	19.18	0.18	40.51	371.72
Paro	129.63	15.62	1,834.41	113.71	1,439.27	33.86	1.74	0.01	-	1.32	162.86
Pema Gatshel	2.42	14.61	110.88	28.41	128.49	84.69	20.87	296.90	19.40	26.22	108.24
Punakha	1.11	54.43	32.09	29.99	779.32	67.03	30.09	1.19	-	14.44	272.51
Samdrup Jongkhar	0.33	52.45	91.07	44.50	141.91	114.11	12.66	1,470.24	0.26	27.85	246.52
Samtse	0.06	34.84	88.30	65.86	101.86	352.83	11.47	557.37	3.28	6.91	86.17
Sarpang	0.24	44.20	105.96	69.01	68.87	141.35	9.03	193.84	1.89	2.93	139.58
Thimphu	10.86	131.62	207.53	177.73	477.77	146.83	11.92	0.20	-	10.38	42.64
Trashigang	3.46	32.97	135.08	48.47	623.54	107.25	31.39	14.47	2.25	141.45	135.91
Trashi Yangtse	1.22	53.93	123.77	52.48	313.33	48.91	20.80	9.19	0.06	29.61	49.65
Trongsa	1.17	23.16	73.74	31.98	224.57	38.80	5.19	8.57	-	12.86	35.13
Tsirang	0.06	78.88	134.90	146.84	149.41	207.84	22.26	227.39	2.91	10.55	166.14
Wangdue Phodrang	3.18	75.04	355.64	115.13	989.55	173.71	74.28	6.53	0.03	120.03	99.67
Zhemgang	0.09	10.33	35.87	8.92	85.01	33.64	2.88	183.73	6.78	4.21	33.91
Total	**160.08**	**846.17**	**4,035.09**	**1,189.63**	**7,133.04**	**2,048.62**	**305.14**	**4,259.59**	**39.36**	**550.10**	**2,274.16**

Table A6.7- 1 Harvest area, by dzongkhag, and by different types of vegetables

Dzongkhag	Coriander	Eggplant	Okra	Tomato	Cucumber	Pumpkins, squash and gourds	Carrot	Radish	Turnip	Watermelon	Broadbean	Peas
Bumthang	0.79	0.01	-	0.33	0.02	0.02	2.11	5.21	35.76	-	0	1.32
Chhukha	5.72	5.90	0.38	14.41	49.90	80.69	119.02	68.53	33.26	0.02	13.32	44.05
Dagana	14.95	7.45	0.53	27.63	65.10	83.62	2.69	99.47	6.34	0.22	11.79	14.15
Gasa	1.09	0.61	-	0.20	1.16	0.95	13.77	11.28	9.37	-	0	0.66
Haa	3.71	0.87	-	3.75	6.92	11.60	26.72	36.72	200.27	0.03	0	52.57
Lhuntse	9.08	26.28	35.05	10.30	46.73	32.97	6.74	40.04	5.33	0.50	0.03	6.35
Monggar	65.95	38.28	0.14	24.08	55.42	114.24	35.98	269.53	7.93	4.28	1.58	76.64
Paro	6.82	13.75	0.01	9.14	25.14	5.84	67.10	48.48	40.88	0.60	0.3	135.04
Pema Gatshel	13.70	7.03	0.63	6.93	47.61	140.43	5.47	87.86	3.47	2.46	13.68	26.63
Punakha	21.96	11.71	0.18	10.45	63.46	16.29	1.99	26.80	6.37	1.62	0.2	40.97
Samdrup Jongkhar	7.56	7.64	0.27	58.23	21.62	46.31	6.11	69.93	0.97	3.03	3.58	45.22
Samtse	25.75	21.86	12.09	63.57	38.66	193.57	6.04	138.30	2.67	0.06	24.89	9.67
Sarpang	6.19	7.97	27.71	49.80	16.13	52.28	5.73	54.16	0.59	0.95	24.94	6.47
Thimphu	15.30	1.42	0.04	2.78	3.92	5.56	29.52	63.05	54.24	0.02	1.9	46.2
Trashigang	19.83	28.17	-	5.95	24.55	35.14	41.65	150.73	12.06	0.60	56.15	51.13
Trashi Yangtse	13.71	16.96	-	4.53	9.90	9.11	10.39	36.47	2.41	0.62	0.95	9.22
Trongsa	5.40	3.78	0.01	0.57	6.34	7.67	8.02	77.70	22.43	0.07	0.03	9.95
Tsirang	13.63	9.03	0.90	26.51	40.98	89.30	3.87	142.34	3.52	0.61	10.35	47.09
Wangdue Phodrang	23.60	12.34	0.39	8.05	24.22	23.42	20.19	179.33	982.18	0.29	0.76	18.44
Zhemgang	2.21	20.83	0.24	2.10	13.24	37.90	1.66	38.22	3.34	0.18	1.54	0.51
Total	**276.95**	**241.89**	**78.57**	**329.31**	**561.02**	**986.91**	**414.77**	**1,644.15**	**1,433.39**	**16.16**	**165.99**	**642.28**

Table A6.7- 2 Production (MT unless specified otherwise), by dzongkhag, and by different types of vegetables

Dzongkhag	Coriander	Eggplant	Okra (kg)	Tomato	Cucumber	Pumpkins, squash and gourds	Carrot	Radish	Turnip	Watermelon	Broadbean	Peas
Bumthang	1.27	0.05	-	0.99	0.09	0.15	8.34	40.41	414.29	-	-	1.59
Chhukha	5.22	6.00	222.00	10.61	105.63	484.19	201.44	141.45	292.88	0.06	1.04	29.46
Dagana	2.97	4.72	322.00	13.52	58.17	200.22	2.58	65.96	4.91	0.20	3.23	3.63
Gasa	0.86	2.71	-	0.52	7.10	4.02	8.89	37.13	33.92	-	-	1.81
Haa	2.97	1.35	-	11.79	17.87	35.67	63.74	83.10	1,034.63	0.03	-	53.50
Lhuntse	4.88	30.83	8.00	5.18	74.36	86.09	10.05	77.77	18.20	0.50	0.02	7.34
Monggar	12.08	3.78	100.00	9.34	77.44	250.81	32.64	334.61	5.68	3.12	0.47	33.69
Paro	3.52	37.42	3.00	20.56	26.55	16.90	186.84	160.54	157.83	0.50	1.20	132.47
Pema Gatshel	6.02	7.13	318.00	6.40	169.30	359.08	5.06	206.44	4.83	5.52	7.61	17.51
Punakha	22.01	36.45	295.00	28.63	280.32	66.31	3.65	71.37	14.50	2.94	0.21	69.47
Samdrup Jongkhar	4.13	7.41	244.00	13.70	88.03	172.98	7.19	186.49	0.91	4.16	0.57	44.14
Samtse	4.56	9.52	2,072.00	26.23	82.12	657.82	4.04	86.55	2.52	0.20	5.80	5.16
Sarpang	2.86	11.36	2,757.00	35.67	58.04	185.95	9.04	88.44	0.92	1.80	12.65	7.60
Thimphu	18.91	2.98	100.00	7.15	11.18	28.91	143.64	299.36	290.32	0.01	6.38	59.34
Trashigang	5.26	13.58	-	3.03	66.34	117.05	11.25	212.59	5.01	5.15	27.92	27.57
Trashi Yangtse	6.51	25.34	-	6.51	75.45	117.52	12.43	144.58	5.62	6.59	2.79	5.16
Trongsa	5.58	5.69	2.00	0.74	34.17	45.97	13.16	272.23	160.69	0.13	0.05	13.70
Tsirang	7.96	8.69	576.00	32.53	191.72	745.12	3.41	153.80	10.77	2.46	13.53	36.42
Wangdue Phodrang	27.85	19.13	1,692.00	24.94	93.99	172.29	53.49	932.48	6,629.96	0.17	8.55	17.53
Zhemgang	0.91	10.93	318.00	3.05	23.25	123.10	1.44	53.26	8.76	0.18	1.62	0.32
Total	**146.33**	**245.07**	**9,029.00**	**261.09**	**1,541.12**	**3,870.15**	**782.32**	**3,648.56**	**9,097.15**	**33.72**	**93.64**	**567.41**

Table A6.8- 1 Harvest area (Acre), by dzongkhag, and by types of roots and tubers

Dzongkhag	Potato	Sweet potato	Cassava	Yams	Taro
Bumthang	798.53	-	-	-	-
Chhukha	576.18	1.52	121.61	13.85	49.78
Dagana	201.47	2.87	48.05	4.42	1.55
Gasa	36.98	-	-	-	-
Haa	360.68	0.04	0.94	-	-
Lhuntse	356.02	0.14	-	-	0.08
Monggar	1,580.44	3.46	3.51	0.05	3.91
Paro	1,033.19	-	0.45	-	-
Pema Gatshel	385.08	5.49	29.33	3.62	5.43
Punakha	48.36	0.02	0.10	-	-
Samdrup Jongkhar	350.01	1.83	6.08	3.49	0.14
Samtse	418.56	35.85	120.03	56.44	42.33
Sarpang	153.00	1.83	23.18	2.57	1.40
Thimphu	387.37	-	-	-	-
Trashigang	1,339.38	1.76	0.66	0.04	0.23
Trashi Yangtse	480.85	0.10	0.24	0.20	0.70
Trongsa	125.28	0.27	0.09	-	-
Tsirang	251.68	3.35	28.95	22.45	11.08
Wangdue Phodrang	2,134.47	2.65	0.29	0.02	0.03
Zhemgang	113.17	2.39	5.89	1.06	23.48
Total	**11,130.70**	**63.57**	**389.40**	**108.21**	**140.14**

Table A6.8- 2 Production (MT unless specified otherwise), by dzongkhag, and by types of roots and tubers

Dzongkhag	Potato	Sweet potato	Cassava	Yams	Taro
Bumthang	3,926.07	-	-	-	-
Chhukha	2,515.55	1.38	128.44	17.67	20.84
Dagana	140.96	1.44	72.27	10.07	1.42
Gasa	118.58	-	-	-	-
Haa	2,267.68	0.03	0.44	-	-
Lhuntse	711.47	0.08	-	-	0.15
Monggar	3,235.33	4.16	3.51	0.01	8.55
Paro	4,661.30	-	0.15	-	-
Pema Gatshel	1,236.13	8.02	57.18	6.81	13.29
Punakha	154.93	0.04	0.15	-	-
Samdrup Jongkhar	536.11	2.10	12.21	4.60	0.82
Samtse	226.12	2.65	90.85	15.46	19.54
Sarpang	197.10	3.21	24.49	3.43	2.57
Thimphu	1,820.06	-	-	-	-
Trashigang	4,400.06	3.50	0.54	0.05	0.09
Trashi Yangtse	1,697.88	0.08	0.20	0.30	0.43
Trongsa	448.72	0.13	0.06	-	-
Tsirang	219.87	2.53	38.58	4.58	12.38
Wangdue Phodrang	15,661.85	0.60	0.24	0.02	0.02
Zhemgang	102.24	2.20	18.68	3.20	11.40
Total	**44,278.01**	**32.15**	**447.99**	**66.20**	**91.50**

Table A6.9- 1 Total number of trees, bearing trees and production, by dzongkhag, and by types of fruits

Dzongkhag	Number of growers	Number of trees	Number of bearing trees	Production (MT)	Number of growers	Number of trees	Number of bearing trees	Production (MT)	Number of growers	Number of trees	Number of bearing trees	Production (MT)
	(Pear)				(Peach)				(Plum)			
Bumthang	106	233	168	7.27	161	370	214	7.17	176	322	196	5.58
Chhukha	531	1,362	719	30.02	1,080	2,211	1,576	55.72	133	245	143	5.34
Dagana	880	1,939	1,257	147.95	1,179	2,443	1,802	65.95	756	1,536	1,009	39.34
Gasa	105	985	349	2.82	80	296	176	1.60	27	65	38	0.52
Haa	32	78	46	1.40	95	282	246	5.92	12	21	17	0.53
Lhuntse	734	3,512	1,253	54.43	835	3,176	1,728	82.26	616	1,643	749	41.56
Monggar	1,582	11,820	4,872	124.03	1,761	6,007	3,770	145.01	1,187	2,301	1,710	96.60
Paro	286	3,544	705	22.06	446	3,784	1,305	43.67	103	2,191	147	5.72
Pema Gatshel	607	3,331	1,160	27.61	1,364	4,167	2,775	76.22	700	1,379	828	41.33
Punakha	783	3,710	1,742	76.63	782	4,125	1,940	75.60	243	745	490	21.88
Samdrup Jongkhar	697	2,731	1,579	62.94	990	2,596	2,044	69.71	460	1,229	698	27.29
Samtse	672	1,294	755	122.66	1,211	2,106	1,684	37.48	371	599	451	12.02
Sarpang	278	680	488	34.08	481	809	595	20.75	268	505	386	10.56
Thimphu	223	813	427	13.23	300	1,130	764	22.34	112	301	224	9.53
Trashigang	1,536	7,874	3,739	161.29	1,457	3,569	2,728	109.26	937	1,622	1,113	49.51
Trashi Yangtse	674	3,721	1,456	35.89	819	2,167	1,688	78.27	492	852	550	31.99
Trongsa	275	944	325	10.13	424	1,295	779	17.40	212	450	289	10.19
Tsirang	1,180	2,761	1,884	355.00	1,397	3,382	2,338	129.30	910	1,801	1,401	99.12
Wangdue Phodrang	695	2,373	1,187	79.28	749	1,846	1,352	68.18	129	300	209	19.63
Zhemgang	98	355	166	3.55	504	1,380	952	23.40	88	203	136	3.45
Total	**11,974**	**54,060**	**24,277**	**1,372.27**	**16,115**	**47,141**	**30,456**	**1,135.21**	**7,932**	**18,310**	**10,784**	**531.69**

Table A6.9- 2 Total number of trees, bearing trees and production, by dzongkhag, and by types of fruits

Dzongkhag	Number of growers	Number of trees	Number of bearing tree	Production (kg)	Number of growers	Number of trees	Number of bearing tree	Production (MT)	Number of growers	Number of trees	Number of bearing tree	Production (kg)
	(Apricot)				(Persimmon)				(Date plum)			
Bumthang	4	7	3	11	-	-	-	-	-	-	-	-
Chhukha	5	82	68	162	27	99	13	0.51	8	12	6	71
Dagana	84	146	97	2,757	82	216	38	1.17	14	19	11	200
Gasa	1	6	-	-	26	83	65	0.68	29	68	66	669
Haa	4	12	11	270	11	536	224	3.88	1	5	5	10
Lhuntse	17	43	8	235	129	491	121	1.94	67	92	56	706
Monggar	46	88	27	813	360	1,392	473	9.42	91	248	164	3,050
Paro	51	2,109	80	2,471	203	2,313	181	13.26	91	115	93	1,404
Pema Gatshel	60	129	34	1,027	214	720	184	2.50	17	27	16	449
Punakha	23	123	32	901	521	1,619	1,162	64.94	136	202	150	1,846
Samdrup Jongkhar	-	-	-	-	35	153	58	1.14	3	10	4	70
Samtse	36	53	38	606	38	58	34	2.42	2	2	1	12
Sarpang	21	31	23	536	14	23	10	0.03	-	-	-	-
Thimphu	56	121	73	2,326	67	134	46	1.12	22	33	27	419
Trashigang	10	75	10	96	202	533	250	8.38	94	115	88	754
Trashi Yangtse	2	6	1	20	80	329	99	1.21	25	42	28	196
Trongsa	45	150	49	872	104	334	113	11.17	32	54	40	1,028
Tsirang	90	159	96	2,425	29	113	41	0.72	24	32	22	319
Wangdue Phodrang	23	74	29	735	431	2,659	867	82.28	76	119	106	2,627
Zhemgang	3	21	1	1	9	34	13	0.36	-	-	-	-
Total	**581**	**3,435**	**680**	**16,264**	**2,582**	**11,839**	**3,992**	**207.13**	**732**	**1,195**	**883**	**13,830**

Table A6.9- 3 Total number of trees, bearing trees and production, by dzongkhag, and by types of fruits

Dzongkhag	Number of growers	Number of trees	Number of bearing tree	Production (MT)	Number of growers	Number of trees	Number of bearing tree	Production (Kg)	Number of growers	Number of trees	Number of bearing tree	Production (kg)
	(Walnut)				(Hazelnut)				(Lemons and Lime)			
Bumthang	185	842	335	4.01	334	59,625	425	38.00	-	-	-	-
Chhukha	71	258	62	1.09	102	25,981	201	-	187	986	613	8.71
Dagana	206	1,074	276	4.12	129	38,338	202	-	582	1,687	878	10.74
Gasa	19	125	5	0.02	13	3,492	-	-	1	3	1	0.01
Haa	74	356	228	7.88	77	13,825	140	50.00	4	11	6	0.17
Lhuntse	380	2,499	364	15.42	252	69,809	536	355.00	38	73	54	0.77
Monggar	688	2,124	989	28.70	557	154,216	2,859	441.00	48	95	61	2.78
Paro	458	4,084	1,220	16.47	36	5,787	-	-	-	-	-	-
Pema Gatshel	398	1,828	380	8.73	320	110,944	569	82.00	291	1,411	466	10.99
Punakha	418	2,321	950	13.61	122	36,066	75	24.00	192	515	433	3.40
Samdrup Jongkhar	297	2,385	514	15.06	390	142,561	482	281.00	162	444	278	4.18
Samtse	78	803	388	30.40	-	-	-	-	573	2,824	1,136	20.87
Sarpang	63	351	77	0.73	-	-	-	-	360	2,360	1,527	10.13
Thimphu	232	1,645	1,242	11.45	37	7,018	6	50.00	-	-	-	-
Trashigang	903	3,422	1,250	27.74	660	211,701	2,921	656.00	65	136	92	2.30
Trashi Yangtse	406	1,208	550	13.03	266	47,890	1,502	150.00	7	10	9	0.16
Trongsa	243	1,377	323	7.62	147	31,621	502	-	15	77	27	1.15
Tsirang	215	795	109	1.12	140	36,631	206	4.00	405	1,119	552	6.70
Wangdue Phodrang	260	2,408	652	8.23	146	24,046	578	265.00	123	284	179	6.90
Zhemgang	169	768	333	7.65	100	37,374	1,110	-	34	84	36	0.78
Total	**5,763**	**30,673**	**10,247**	**223.08**	**3,828**	**1,056,925**	**12,314**	**2,396.00**	**3,087**	**12,119**	**6,348**	**90.74**

Table A6.9- 4 Total number of trees, bearing trees and production, by dzongkhag, and by types of fruits

Dzongkhag	Number of growers	Number of trees	Number of bearing tree	Production (MT)	Number of growers	Number of trees	Number of bearing tree	Production (MT)	Number of growers	Number of trees	Number of bearing tree	Production (kg)
	(Mango)				(Guava)				(Pomogranate)			
Bumthang	-	-	-	-	-	-	-	-	-	-	-	-
Chhukha	661	2,894	968	25.99	945	2,661	1,768	37.29	162	1,097	67	203
Dagana	1,388	10,568	3,608	108.57	1,463	6,660	4,800	82.97	729	2,597	985	10,592
Gasa	-	-	-	-	-	-	-	-	-	-	-	-
Haa	4	72	2	0.17	30	75	34	0.39	5	13	6	45
Lhuntse	42	1,130	702	29.16	167	368	314	9.84	106	176	127	2,464
Monggar	801	6,278	3,177	95.71	637	2,772	2,062	50.84	268	593	325	4,176
Paro	-	-	-	-	-	-	-	-	61	85	46	569
Pema Gatshel	1,699	20,433	6,003	79.66	1,153	6,135	4,206	73.44	496	1,894	345	4,223
Punakha	344	1,181	599	12.44	519	4,873	4,168	71.63	264	854	335	4,272
Samdrup Jongkhar	1,357	11,939	2,386	49.43	914	2,910	2,131	60.04	252	848	442	4,165
Samtse	1,621	4,830	1,295	47.32	2,127	4,373	3,185	81.56	348	819	204	1,217
Sarpang	2,067	38,279	2,685	102.86	1,612	7,854	3,008	49.68	172	5,469	126	716
Thimphu	-	-	-	-	-	-	-	-	3	6	2	150
Trashigang	599	3,853	988	33.99	455	1,339	1,042	29.13	206	372	263	3,520
Trashi Yangtse	227	1,169	355	5.49	169	490	423	10.43	88	154	107	1,326
Trongsa	119	747	141	4.55	254	1,740	1,460	30.29	68	141	61	888
Tsirang	1,405	9,186	3,156	138.88	1,776	9,147	6,715	201.60	850	2,989	1,217	13,569
Wangdue Phodrang	217	958	263	37.40	383	1,673	1,396	66.11	195	460	218	6,597
Zhemgang	784	8,949	3,186	76.74	611	3,115	2,139	39.85	23	50	19	296
Total	**13,335**	**122,466**	**29,514**	**848.36**	**13,215**	**56,185**	**38,851**	**895.09**	**4,296**	**18,617**	**4,895**	**58,988**

Table A6.9- 5 Total number of trees, bearing trees and production, by dzongkhag, and by types of fruits

Dzongkhag	Number of growers	Number of trees	Number of bearing tree	Production (MT)	Number of growers	Number of trees	Number of bearing tree	Production (MT)	Number of growers	Number of trees	Number of bearing tree	Production (MT)
	(Avacado)				(Litchi)				(Jackfruit)			
Bumthang	-	-	-	-	-	-	-	-	-	-	-	-
Chhukha	408	4,535	83	1.17	430	2,108	458	11.81	261	453	175	36.13
Dagana	747	8,189	183	1.32	706	5,049	1,074	24.04	525	1,386	374	55.06
Gasa	5	12	2	0.05	-	-	-	-	-	-	-	-
Haa	17	157	-	-	1	10	-	-	-	-	-	-
Lhuntse	88	667	53	3.20	-	-	-	-	-	-	-	-
Monggar	1,149	6,530	445	15.54	159	1,398	115	2.24	112	183	99	19.26
Paro	3	3	2	0.04	-	-	-	-	-	-	-	-
Pema Gatshel	779	6,544	253	3.50	1,067	8,206	646	10.60	695	2,159	648	148.48
Punakha	277	2,359	185	2.93	4	10	-	-	17	22	13	1.20
Samdrup Jongkhar	594	3,618	142	1.49	742	4,770	481	17.55	457	915	363	66.95
Samtse	474	1,820	221	4.45	1,557	4,634	1,819	70.63	716	4,134	708	72.74
Sarpang	566	59,586	171	1.66	2,351	55,581	6,767	156.16	597	3,501	505	69.48
Thimphu	-	-	-	-	-	-	-	-	-	-	-	-
Trashigang	206	985	55	6.91	13	40	2	0.01	19	91	11	1.29
Trashi Yangtse	47	105	10	0.71	17	35	1	-	5	6	4	0.41
Trongsa	130	734	32	0.44	4	7	4	0.22	26	38	18	2.47
Tsirang	1,057	7,016	235	6.22	524	2,825	414	4.96	237	642	116	23.09
Wangdue Phodrang	197	716	123	5.52	29	107	26	1.70	24	44	21	1.86
Zhemgang	573	5,054	271	2.95	355	3,944	335	2.70	294	556	316	67.11
Total	**7,317**	**108,630**	**2,466**	**58.10**	**7,959**	**88,724**	**12,142**	**302.62**	**3,985**	**14,130**	**3,371**	**565.53**

Table A6.9- 6 Total number of trees, bearing trees and production, by dzongkhag, and by types of fruits

Dzongkhag	Number of growers	Number of trees	Number of bearing tree	Production (MT)	Number of growers	Number of trees	Number of bearing tree	Production (MT)	Number of growers	Number of trees	Number of bearing tree	Production (Kg)
	(Banana)				(Tomato)				(Dragon fruit)			
Bumthang	-	-	-	-	-	-	-	-	-	-	-	-
Chhukha	1,697	34,359	10,647	151.92	410	1,181	863	5.33	2	7	7	-
Dagana	2,085	50,470	17,149	275.67	882	2,729	1,982	11.31	5	6	-	-
Gasa	-	-	-	-	49	484	452	3.77	-	-	-	-
Haa	119	1,108	803	7.18	44	155	104	0.91	-	-	-	-
Lhuntse	274	2,526	927	14.49	620	1,723	1,572	23.89	1	2	-	-
Monggar	1,106	23,153	7,053	85.91	962	2,287	2,007	30.89	12	133	29	50
Paro	-	-	-	-	3	6	5	0.05	-	-	-	-
Pema Gatshel	1,639	48,000	14,324	216.85	834	1,932	1,534	10.52	17	177	1	-
Punakha	323	1,793	1,033	14.47	681	4,022	3,626	43.72	1	8	-	-
Samdrup Jongkhar	1,263	36,690	8,991	144.70	385	869	695	5.26	69	435	2	5
Samtse	3,581	61,963	24,599	353.61	650	1,520	1,030	5.36	1	1	-	-
Sarpang	2,996	102,727	39,072	502.72	360	2,441	2,175	13.43	2	540	-	-
Thimphu	-	-	-	-	-	-	-	-	-	-	-	-
Trashigang	685	14,083	4,032	37.10	661	1,264	1,043	12.79	8	34	-	-
Trashi Yangtse	243	3,985	1,501	16.75	303	525	463	5.19	1	10	-	-
Trongsa	216	3,800	1,771	15.74	308	1,196	993	9.40	-	-	-	-
Tsirang	2,350	104,675	39,494	692.12	1,389	7,504	5,930	32.56	8	53	-	-
Wangdue Phodrang	314	4,385	1,738	54.64	538	1,673	1,328	18.24	2	5	-	-
Zhemgang	1,003	32,390	13,302	178.35	224	805	618	6.49	1	1	1	50
Total	**19,894**	**526,107**	**186,436**	**2,762.22**	**9,303**	**32,316**	**26,420**	**239.11**	**130**	**1,412**	**40**	**105**

Table A6.9- 7 Total number of trees, bearing trees and production, by dzongkhag, and by types of fruits

Dzongkhag	Number of growers	Number of trees	Number of bearing tree	Production (Kg)	Number of growers	Number of trees	Number of bearing tree	Production (MT)
	(Kiwi)				(Papaya)			
Bumthang	-	-	-	-	-	-	-	-
Chhukha	45	1,700	491	917	53	99	49	0.56
Dagana	47	787	43	190	501	1,626	924	17.75
Gasa	-	-	-	-	-	-	-	-
Haa	-	-	-	-	-	-	-	-
Lhuntse	1	5	-	-	1	1	1	0.07
Monggar	3	21	1	1	176	600	469	6.96
Paro	20	2,090	9	121	-	-	-	-
Pema Gatshel	1	10	-	-	114	366	253	5.51
Punakha	15	405	24	58	42	87	74	1.35
Samdrup Jongkhar	11	102	23	100	317	855	660	21.24
Samtse	17	177	1	5	321	691	461	8.67
Sarpang	10	369	11	102	1,102	4,434	2,474	35.27
Thimphu	3	7	5	210	-	-	-	-
Trashigang	7	56	50	88	101	260	182	4.32
Trashi Yangtse	1	10	-	-	39	144	78	1.82
Trongsa	3	11	-	-	26	111	75	1.72
Tsirang	102	1,546	178	1,058	698	2,567	1,825	45.27
Wangdue Phodrang	8	130	-	-	45	149	117	8.96
Zhemgang	2	20	-	-	53	158	80	1.64
Total	**296**	**7,446**	**836**	**2,850**	**3,589**	**12,148**	**7,722**	**161.11**

Table A6.10- 1 Total number of trees, bearing trees and production of coffee and tea, by dzongkhag

Dzongkhag	Number of growers	Number of trees	Number of bearing tree	Production (Kg)	Number of growers	Number of trees	Number of bearing tree	Production (Kg)
	(Coffee)				(Tea)			
Bumthang	-	-	-	-	-	-	-	-
Chhukha	33	74	36	65	42	416	141	124
Dagana	173	1,696	166	156	71	548	456	202
Gasa	-	-	-	-	3	26	12	10
Haa	-	-	-	-	-	-	-	-
Lhuntse	-	-	-	-	-	-	-	-
Monggar	8	31	-	-	-	-	-	-
Paro	-	-	-	-	-	-	-	-
Pema Gatshel	310	6,026	111	46	1	1	1	2
Punakha	1	1	-	-	-	-	-	-
Samdrup Jongkhar	9	69	15	28	2	4	1	2
Samtse	444	53,393	2,221	4,754	109	6,973	853	1,064
Sarpang	405	17,797	945	708	11	209	175	92
Thimphu	-	-	-	-	-	-	-	-
Trashigang	-	-	-	-	1	3	1	1
Trashi Yangtse	-	-	-	-	-	-	-	-
Trongsa	-	-	-	-	57	56,846	50,255	383
Tsirang	36	71	26	41	17	29	14	83
Wangdue Phodrang	-	-	-	-	-	-	-	-
Zhemgang	30	1,269	30	35	-	-	-	-
Total	**1,449**	**80,427**	**3,550**	**5,833**	**314**	**65,055**	**51,909**	**1,963**

Table A7.1- 1 Farm machinaries and equipment used, by dzongkhag, and by types of machinery and equipment

Dzongkhag	Total holdings	Power tiller	Milling machine	Chainsaw	Manually operated thresher	Tractor	Cornflake (tengma) machine	Manually operated sprayer	Power thresher	Brush cutter	Power cream separator	Chaff cutter
	(Number)											
Bumthang	1,476	388	21	816	4	660	-	167	144	18	53	24
Chhukha	4,155	481	471	620	62	4	-	178	24	57	17	28
Dagana	4,235	489	459	409	343	100	10	156	55	97	37	32
Gasa	573	143	26	38	244	1	-	8	2	2	2	-
Haa	1,375	398	52	142	92	3	22	115	42	23	27	17
Lhuntse	2,008	599	668	866	118	8	505	2	95	9	1	7
Monggar	5,159	480	1,193	936	258	9	522	10	28	71	3	63
Paro	3,281	1,691	413	451	559	23	5	67	463	82	53	9
Pema Gatshel	3,456	212	817	358	163	3	137	146	3	27	2	55
Punakha	2,599	1,774	1,283	915	749	4	-	20	43	18	-	14
Samdrup Jongkhar	3,933	552	723	358	170	86	18	19	5	11	7	112
Samtse	8,997	282	372	358	426	9	-	41	15	58	6	70
Sarpang	4,875	568	531	281	72	753	2	138	70	198	23	59
Thimphu	1,432	560	22	97	209	13	-	74	11	37	5	1
Trashigang	5,994	1,252	1,688	1,167	381	8	525	9	175	39	370	176
Trashi Yangtse	2,475	715	902	595	224	1	71	5	49	2	1	5
Trongsa	1,466	312	515	613	8	5	43	4	15	85	3	3
Tsirang	3,654	173	256	328	168	4	8	18	17	193	9	133
Wangdue Phodrang	3,369	1,712	959	1,380	848	551	3	428	63	20	312	85
Zhemgang	2,075	251	210	415	40	4	61	9	38	68	1	14
Total	**66,587**	**13,032**	**11,581**	**11,143**	**5,138**	**2,249**	**1,932**	**1,614**	**1,357**	**1,115**	**932**	**907**

Table A7.1- 2 Farm machinaries and equipment used, by dzongkhag, and by types of machinery and equipment

Dzongkhag	Total holdings	Power sprayer	Maize sheller	Milking machine	Power reaper	Vegetable/ fruit drier	Water pump	Combine harvester	Transplanter	Potato harvester	Rotary paddy weeder	Sorter and graders
	(Number)											
Bumthang	1,476	-	-	2	1	31	1	-	-	-	-	-
Chhukha	4,155	35	4	5	3	4	6	-	-	4	-	5
Dagana	4,235	16	20	17	5	1	7	4	-	-	5	-
Gasa	573	-	-	44	-	21	-	1	1	-	-	-
Haa	1,375	4	-	29	2	-	2	-	-	53	-	-
Lhuntse	2,008	-	55	30	1	42	-	-	-	-	1	1
Monggar	5,159	7	304	42	1	11	3	1	-	-	4	1
Paro	3,281	95	-	62	268	17	144	172	176	5	4	1
Pema Gatshel	3,456	3	24	41	5	8	15	1	-	-	1	-
Punakha	2,599	1	-	86	7	4	13	4	1	-	11	-
Samdrup Jongkhar	3,933	1	71	26	2	4	12	2	1	-	1	6
Samtse	8,997	4	2	9	1	1	19	1	-	1	-	-
Sarpang	4,875	27	27	45	15	5	19	5	4	-	2	1
Thimphu	1,432	25	-	6	1	27	6	-	1	10	-	-
Trashigang	5,994	5	144	33	1	19	-	-	1	1	9	1
Trashi Yangtse	2,475	1	19	23	1	12	1	-	-	-	-	-
Trongsa	1,466	13	3	32	2	80	3	-	-	-	-	-
Tsirang	3,654	12	22	23	2	9	7	-	-	-	2	1
Wangdue Phodrang	3,369	481	-	73	6	6	4	4	2	38	6	1
Zhemgang	2,075	5	30	13	3	14	1	2	-	-	1	-
Total	**66,587**	**735**	**725**	**641**	**327**	**316**	**263**	**197**	**187**	**112**	**47**	**18**

Table A7.2- 1 Farm machinaries and equipment owned, by dzongkhag, and by types of machinery and equipment

Dzongkhag	Holdings using Machine	Manually operated thresher	Power thresher	Manually operated sprayer	Power sprayer	Transplanter	Tractor	Power tiller	Power reaper	Brush cutter	Combine harvester
	(Number)										
Bumthang	4	4	11	58	-	-	110	240	-	11	-
Chhukha	62	20	-	125	28	-	-	131	3	-	-
Dagana	343	243	53	101	12	-	2	195	3	53	-
Gasa	244	128	2	7	-	-	-	53	-	2	1
Haa	92	77	3	96	3	-	1	76	-	3	-
Lhuntse	118	115	94	1	-	-	3	149	-	94	-
Monggar	258	257	26	12	2	-	2	152	-	26	1
Paro	559	396	280	63	87	74	11	898	81	280	10
Pema Gatshel	163	162	2	144	3	-	-	32	5	2	1
Punakha	749	626	37	13	1	1	2	702	2	37	3
Samdrup Jongkhar	170	79	4	17	-	1	4	40	-	4	2
Samtse	426	132	11	40	4	-	6	48	1	11	-
Sarpang	72	57	5	81	14	4	35	106	3	5	-
Thimphu	209	168	3	54	22	1	3	198	1	3	-
Trashigang	381	366	77	6	2	-	1	276	1	77	-
Trashi Yangtse	224	7	14	5	-	-	-	108	1	14	-
Trongsa	8	7	14	4	12	-	5	200	2	14	-
Tsirang	168	156	16	16	11	-	3	129	1	16	-
Wangdue Phodrang	848	708	48	327	372	-	114	836	4	48	3
Zhemgang	40	40	33	9	4	-	1	71	2	33	1
Total	**5,138**	**3,748**	**733**	**1,179**	**577**	**81**	**303**	**4,640**	**110**	**733**	**22**

Table A7.2- 2 Farm machinaries and equipment owned, by dzongkhag, and by types of machinery and equipment

Dzongkhag	Rotary paddy weeder	Potato harvester	Sorter and graders	Maize sheller	Cornflake (tengma) machine	Vegetable/ fruit drier	Chainsaw	Milking machine	Power cream separator	Water pump	Milling machine	Chaff cutter
	(Number)											
Bumthang	-	-	-	-	-	30	679	2	52	1	20	24
Chhukha	-	2	5	2	-	2	302	2	15	4	44	26
Dagana	4	-	-	20	6	1	256	16	37	3	194	32
Gasa	-	-	-	-	-	21	38	44	2	-	27	-
Haa	-	11	-	-	-	-	119	28	27	2	21	16
Lhuntse	-	-	1	28	23	32	599	27	1	-	385	7
Monggar	22	-	1	215	191	7	698	38	3	2	979	60
Paro	3	1	1	-	5	17	384	46	52	107	255	9
Pema Gatshel	1	-	-	22	19	3	275	29	2	11	311	46
Punakha	11	-	-	-	-	4	625	76	-	11	758	13
Samdrup Jongkhar	1	-	5	48	1	-	304	8	7	11	220	87
Samtse	-	-	-	2	-	1	274	4	2	18	66	68
Sarpang	2	-	-	22	1	4	184	39	23	18	269	54
Thimphu	-	9	-	-	-	27	95	3	3	5	21	-
Trashigang	1	1	-	76	35	11	692	20	312	-	795	160
Trashi Yangtse	-	-	-	12	8	7	350	9	1	-	361	4
Trongsa	-	-	-	3	32	77	524	31	3	3	342	2
Tsirang	2	-	1	19	4	7	299	24	9	7	225	133
Wangdue Phodrang	5	26	1	-	3	4	1,218	62	310	3	643	80
Zhemgang	1	-	-	27	15	13	401	13	1	1	186	11
Total	**53**	**50**	**15**	**496**	**343**	**268**	**8,316**	**521**	**862**	**207**	**6,122**	**832**

Table A7.3- 1 Farm machinery and equipment hired from FMCL, by dzongkhag, and by types of machinery and equipment

Dzongkhag	Holdings using Machine	Manually operated thresher	Power thresher	Manually operated sprayer	Power sprayer	Transplanter	Tractor	Power tiller	Power reaper	Brush cutter	Combine harvester	Rotary paddy weeder
	(Number)											
Bumthang	4	-	-	-	-	-	2	8	-	-	-	-
Chhukha	62	1	-	-	-	-	1	55	-	-	-	-
Dagana	343	1	-	1	-	-	87	20	1	-	1	-
Gasa	244	-	-	-	-	-	1	8	-	-	-	-
Haa	92	3	7	4	-	-	1	251	1	-	-	-
Lhuntse	118	-	-	-	-	-	4	170	1	-	-	1
Monggar	258	1	1	-	-	-	-	92	-	-	-	-
Paro	559	13	129	1	7	95	10	545	157	2	154	-
Pema Gatshel	163	1	-	-	-	-	-	86	-	-	-	-
Punakha	749	13	4	-	-	-	1	276	5	-	1	-
Samdrup Jongkhar	170	-	-	-	-	-	8	46	-	-	-	-
Samtse	426	43	1	-	-	-	1	121	-	-	-	-
Sarpang	72	1	19	2	1	-	378	188	8	-	4	-
Thimphu	209	3	3	1	-	-	1	161	-	-	-	-
Trashigang	381	7	-	-	-	1	-	138	-	-	-	7
Trashi Yangtse	224	-	-	-	-	-	-	123	-	-	-	-
Trongsa	8	-	-	-	-	-	-	41	-	-	-	-
Tsirang	168	6	-	-	-	-	-	27	1	-	-	-
Wangdue Phodrang	848	1	-	1	1	-	1	149	-	-	-	-
Zhemgang	40	-	1	-	-	-	-	128	-	-	-	-
Total	**5,138**	**94**	**165**	**10**	**9**	**96**	**496**	**2,633**	**174**	**2**	**160**	**8**

Table A7.3- 2 Farm machinery and equipment hired from FMCL, by dzongkhag, and by types of machinery and equipment

Dzongkhag	Holdings using Machine	Potato harvester	Sorter and graders	Maize sheller	Cornflake (tengma) machine	Vegetable/ fruit drier	Chainsaw	Milking machine	Power cream separator	Water pump	Milling machine	Chaff cutter
	(Number)											
Bumthang	4	-	-	-	-	-	-	-	-	-	-	-
Chhukha	62	-	-	-	-	-	2	-	-	-	9	-
Dagana	343	-	-	-	-	-	-	-	-	-	-	-
Gasa	244	-	-	-	-	-	-	-	-	-	-	-
Haa	92	20	-	-	10	-	-	-	-	-	-	1
Lhuntse	118	-	-	1	2	-	1	-	-	-	1	-
Monggar	258	-	-	1	-	-	-	-	-	-	1	-
Paro	559	3	-	-	-	-	6	4	-	6	5	-
Pema Gatshel	163	-	-	-	-	-	-	-	-	-	-	-
Punakha	749	-	-	-	-	-	3	-	-	1	4	-
Samdrup Jongkhar	170	-	-	-	-	-	-	-	-	-	2	-
Samtse	426	-	-	-	-	-	-	-	1	-	2	-
Sarpang	72	-	-	-	-	-	-	-	-	-	2	-
Thimphu	209	-	-	-	-	-	-	-	-	-	-	-
Trashigang	381	-	-	-	1	-	2	1	-	-	5	-
Trashi Yangtse	224	-	-	-	1	-	1	-	-	-	1	-
Trongsa	8	-	-	-	-	-	3	-	-	-	6	-
Tsirang	168	-	-	-	-	-	1	-	-	-	2	-
Wangdue Phodrang	848	-	-	-	-	-	1	1	-	-	2	-
Zhemgang	40	-	-	1	-	-	-	-	-	-	-	-
Total	**5,138**	**23**	**-**	**3**	**14**	**-**	**20**	**6**	**1**	**7**	**42**	**1**

Table A7.4- 1 Farm machinery and equipment hired from others, by dzongkhag, and by types of machinery and equipment

Dzongkhag	Holdings using Machine	Manually operated thresher	Power thresher	Manually operated sprayer	Power sprayer	Transplanter	Tractor	Power tiller	Power reaper	Brush cutter	Combine harvester	Rotary paddy weeder
		(Number)										
Bumthang	4	-	58	59	-	-	279	50	-	-	-	-
Chhukha	62	8	-	2	-	-	2	193	-	10	-	-
Dagana	343	68	2	10	2	-	7	104	1	6	-	1
Gasa	244	-	-	-	-	-	1	33	-	-	-	-
Haa	92	2	2	6	1	-	-	11	1	-	-	-
Lhuntse	118	-	1	-	-	-	1	195	-	-	-	-
Monggar	258	1	-	-	-	-	4	68	-	-	-	-
Paro	559	15	9	2	-	1	1	124	12	2	1	-
Pema Gatshel	163	-	-	-	-	-	-	19	-	-	-	-
Punakha	749	7	4	3	-	-	-	397	1	-	-	-
Samdrup Jongkhar	170	-	1	-	-	-	15	44	-	-	-	-
Samtse	426	101	1	-	-	-	3	71	-	1	-	-
Sarpang	72	13	41	25	7	-	416	146	3	25	1	-
Thimphu	209	7	4	14	2	-	9	138	-	2	-	-
Trashigang	381	2	-	-	-	-	2	292	-	10	-	-
Trashi Yangtse	224	8	9	-	1	-	-	236	-	1	-	-
Trongsa	8	1	1	-	-	-	-	59	-	1	-	-
Tsirang	168	19	1	-	-	-	-	11	-	1	-	-
Wangdue Phodrang	848	95	13	51	105	2	393	542	2	-	-	-
Zhemgang	40	-	1	-	-	-	1	18	-	1	-	-
Total	**5,138**	**347**	**148**	**172**	**118**	**3**	**1,134**	**2,751**	**20**	**60**	**2**	**1**

Table A7.4- 2 Farm machinery and equipment hired from others, by dzongkhag, and by types of machinery and equipment

Dzongkhag	Holdings using Machine	Potato harvester	Sorter and graders	Maize sheller	Cornflake (tengma) machine	Vegetable/ fruit drier	Chainsaw	Milking machine	Power cream separator	Water pump	Milling machine	Chaff cutter
	(Number)											
Bumthang	4	-	-	-	-	-	42	-	-	-	-	-
Chhukha	62	-	-	1	-	2	303	2	-	-	233	-
Dagana	343	-	-	-	-	-	108	1	-	-	181	-
Gasa	244	-	-	-	-	-	-	-	-	-	-	-
Haa	92	2	-	-	11	-	21	-	-	-	11	-
Lhuntse	118	-	-	1	301	-	135	3	-	-	129	-
Monggar	258	-	-	2	6	-	129	-	-	-	1	-
Paro	559	-	-	-	-	-	25	1	-	1	13	-
Pema Gatshel	163	-	-	-	11	-	14	2	-	-	116	-
Punakha	749	-	-	-	-	-	136	3	-	-	238	1
Samdrup Jongkhar	170	-	-	1	-	-	2	-	-	-	7	-
Samtse	426	-	-	-	-	-	81	4	-	-	257	1
Sarpang	72	-	-	-	-	-	51	4	-	-	148	-
Thimphu	209	-	-	-	-	-	-	-	-	-	-	-
Trashigang	381	-	-	4	231	-	313	4	-	-	544	2
Trashi Yangtse	224	-	-	1	28	1	199	5	-	-	402	-
Trongsa	8	-	-	-	8	-	84	1	-	-	167	-
Tsirang	168	-	-	-	-	-	15	-	-	-	5	-
Wangdue Phodrang	848	12	-	-	-	-	121	3	-	-	206	-
Zhemgang	40	-	-	-	-	-	1	-	-	-	1	-
Total	**5,138**	**14**	**-**	**10**	**596**	**3**	**1,780**	**33**	**-**	**1**	**2,659**	**4**

Table A7.5- 1 Farm machinery and equipment hired from the government, by dzongkhag, and by types of machinery and equipment

Dzongkhag	Holdings using Machine	Manually operated thresher	Power thresher	Manually operated sprayer	Power sprayer	Transplanter	Tractor	Power tiller	Power reaper	Brush cutter	Combine harvester	Rotary paddy weeder
		(Number)										
Bumthang	4	-	-	1	-	-	-	-	-	-	-	-
Chhukha	62	13	16	3	1	-	-	78	-	3	-	-
Dagana	343	2	-	10	2	1	3	107	-	1	-	1
Gasa	244	-	-	-	-	-	-	55	-	-	-	-
Haa	92	1	-	4	-	-	-	10	-	-	-	-
Lhuntse	118	1	-	-	-	-	-	17	-	-	-	-
Monggar	258	-	-	-	3	-	-	169	-	-	-	-
Paro	559	-	5	-	-	2	1	118	1	-	3	-
Pema Gatshel	163	-	-	2	-	-	1	62	-	3	-	-
Punakha	749	1	-	4	-	-	-	187	-	-	-	-
Samdrup Jongkhar	170	1	-	-	-	-	22	377	1	-	-	-
Samtse	426	1	-	-	-	-	-	34	-	-	-	-
Sarpang	72	-	1	4	1	-	6	88	1	-	-	-
Thimphu	209	-	-	-	-	-	-	51	-	-	-	-
Trashigang	381	4	2	3	2	-	1	206	-	-	-	-
Trashi Yangtse	224	4	19	-	-	-	-	151	-	-	-	-
Trongsa	8	-	-	-	-	-	-	6	-	-	-	-
Tsirang	168	1	-	1	-	-	-	4	-	-	-	-
Wangdue Phodrang	848	5	-	-	1	-	-	166	-	-	-	-
Zhemgang	40	-	2	-	-	-	1	10	-	1	-	-
Total	**5,138**	**34**	**45**	**32**	**10**	**3**	**35**	**1,896**	**3**	**8**	**3**	**1**

Table A7.5- 2 Farm machinery and equipment hired from the government, by dzongkhag, and by types of machinery and equipment

Dzongkhag	Holdings using Machine	Potato harvester	Sorter and graders	Maize sheller	Cornflake (tengma) machine	Vegetable/ fruit drier	Chainsaw	Milking machine	Power cream separator	Water pump	Milling machine	Chaff cutter
	(Number)											
Bumthang	4	-	-	-	-	-	-	-	-	-	1	-
Chhukha	62	-	-	1	-	-	2	1	-	1	145	-
Dagana	343	-	-	-	1	-	-	-	-	1	3	-
Gasa	244	-	-	-	-	-	-	-	-	-	-	-
Haa	92	1	-	-	1	-	-	1	-	-	-	-
Lhuntse	118	-	-	-	10	6	-	-	-	-	1	-
Monggar	258	-	-	2	54	1	1	-	-	1	5	1
Paro	559	-	-	-	-	-	-	-	-	4	-	-
Pema Gatshel	163	-	-	1	10	4	1	8	-	2	46	7
Punakha	749	-	-	-	-	-	2	-	-	-	2	-
Samdrup Jongkhar	170	-	-	4	2	-	2	-	-	-	44	-
Samtse	426	-	-	-	-	-	-	-	2	-	38	-
Sarpang	72	-	-	-	-	-	2	-	-	-	-	-
Thimphu	209	-	-	-	-	-	-	-	-	-	-	1
Trashigang	381	-	1	21	6	7	-	-	-	-	14	14
Trashi Yangtse	224	-	-	6	4	5	4	-	-	-	32	-
Trongsa	8	-	-	-	-	-	-	-	-	-	-	1
Tsirang	168	-	-	-	1	-	-	-	-	-	-	-
Wangdue Phodrang	848	-	-	-	-	2	-	-	-	-	3	1
Zhemgang	40	-	-	2	2	1	-	-	-	-	1	3
Total	**5,138**	**1**	**1**	**37**	**91**	**26**	**14**	**10**	**2**	**9**	**335**	**28**

Table A7.6- 1 Credit availed by households, by dzongkhag, and by credit sources

Dzongkhag	Credit availed	Commercial bank	BDBL	Cooperative credit society	Money lender	Input supplier	Self-help group	Family or friends	Government	REDCL	NGO (e.g. Tarayana)
	(Number)										
Bumthang	414	2	373	-	-	-	33	-	-	6	1
Chhukha	545	6	428	3	2	-	-	2	5	29	1
Dagana	647	49	472	10	3	-	8	32	15	55	17
Gasa	20	-	16	-	-	-	1	-	-	3	-
Haa	439	4	405	1	-	-	-	-	-	36	-
Lhuntse	123	8	106	-	-	-	-	1	-	8	-
Monggar	850	9	799	-	1	-	7	3	1	29	-
Paro	355	23	213	2	1	-	12	10	10	83	-
Pema Gatshel	294	9	255	1	-	-	2	1	-	32	-
Punakha	329	1	263	2	-	-	4	6	1	43	13
Samdrup Jongkhar	328	6	281	-	-	-	-	14	5	15	-
Samtse	1,047	62	926	5	10	-	5	3	4	26	12
Sarpang	311	19	263	1	-	-	1	7	4	18	-
Thimphu	141	10	85	-	-	-	-	1	1	48	-
Trashigang	395	12	297	16	21	1	9	13	2	21	3
Trashi Yangtse	82	-	58	-	-	-	-	-	1	21	-
Trongsa	122	3	78	2	-	-	-	-	1	37	1
Tsirang	242	21	156	4	10	-	4	26	2	17	5
Wangdue Phodrang	1,026	14	945	-	-	-	1	3	1	55	16
Zhemgang	304	2	290	-	-	-	-	-	-	12	-
Total	**8,014**	**260**	**6,709**	**47**	**48**	**1**	**87**	**122**	**53**	**594**	**69**

Table A8. 1 Agricultural holdings rearing livestock, by dzongkhag, and by types of livestock

Dzongkhag	Bovine Holders	Jersey Pure Breed	Jersey Cross Breed	Brown Swiss Pure	Brown Swiss Cross	Holstein-Fresian	Mithun Pure	Jatsa-Jatsam	Yanku-Yankum	Doeb-Doebum	Doethra-Doethram	Nublang-Thrabam	Jaba	Buffalo	Yak	Zo-Zom
	(Number)															
Bumthang	1,168	1	666	15	360	6	3	78	96	56	73	234	-	-	60	2
Chhukha	2,939	152	1,234	-	2	42	13	229	181	39	191	1,868	1	1	-	1
Dagana	3,234	131	1,526	6	2	-	13	184	212	80	1,477	587	40	3	-	1
Gasa	397	4	123	-	13	-	-	35	40	25	18	42	1	-	233	-
Haa	1,101	15	624	3	-	3	2	86	29	4	6	531	1	-	79	-
Lhuntse	1,654	14	796	2	68	6	8	687	726	272	172	637	36	1	4	8
Monggar	4,617	474	2,880	29	49	6	9	1,741	1,831	525	344	1,068	103	-	-	1
Paro	2,242	80	1,399	2	3	1	4	107	76	23	111	927	-	-	50	-
Pema Gatshel	2,422	65	2,011	2	6	25	1	262	223	30	49	232	102	-	-	-
Punakha	1,921	27	985	2	12	-	4	279	212	125	161	1,038	-	-	-	-
Samdrup Jongkhar	2,955	106	2,056	2	2	13	8	667	388	48	53	437	718	2	-	1
Samtse	6,758	155	2,071	4	10	15	19	149	62	198	28	4,717	693	83	-	-
Sarpang	3,584	143	2,384	8	13	8	67	183	106	198	236	1,338	417	8	1	1
Thimphu	778	24	415	2	-	4	1	20	18	7	14	261	-	-	175	-
Trashigang	4,968	81	2,663	7	13	51	22	1,458	885	185	333	1,478	262	-	289	424
Trashi Yangtse	2,015	29	1,197	3	9	20	8	424	313	67	307	535	63	-	1	1
Trongsa	1,164	20	647	19	35	1	1	286	216	53	37	613	-	-	3	-
Tsirang	3,000	66	2,172	6	51	9	5	23	68	14	116	1,176	3	43	-	-
Wangdue Phodrang	2,796	41	1,143	11	230	3	13	510	453	262	241	1,861	-	-	109	1
Zhemgang	1,531	45	779	-	3	1	14	635	688	289	229	314	18	-	-	-
Total	**51,244**	**1,673**	**27,771**	**123**	**881**	**214**	**215**	**8,043**	**6,823**	**2,500**	**4,196**	**19,894**	**2,458**	**141**	**1,004**	**441**

Table A8. 2 Agricultural holdings rearing livestock, by dzongkhag, and by types of livestock

Dzongkhag	Number of holders	Number of animals	Number of female animals	Number of holders	Number of animals	Number of female animals
	(Jersey pure breed)			(Jersey cross breed)		
Bumthang	1	1	1	666	4,212	3,078
Chhukha	152	450	359	1,234	4,209	2,974
Dagana	131	245	198	1,526	4,172	2,800
Gasa	4	12	12	123	435	351
Haa	15	25	24	624	2,877	2,330
Lhuntse	14	23	21	796	2,396	1,962
Monggar	474	1,250	1,088	2,880	7,382	6,026
Paro	80	218	195	1,399	5,493	4,108
Pema Gatshel	65	148	124	2,011	5,596	4,323
Punakha	27	73	58	985	2,952	2,162
Samdrup Jongkhar	106	209	161	2,056	6,649	5,024
Samtse	155	441	347	2,071	6,028	4,371
Sarpang	143	319	252	2,384	7,751	5,829
Thimphu	24	101	85	415	1,782	1,424
Trashigang	81	214	180	2,663	7,601	6,223
Trashi Yangtse	29	54	47	1,197	3,202	2,562
Trongsa	20	79	60	647	2,854	2,118
Tsirang	66	120	83	2,172	6,561	4,289
Wangdue Phodrang	41	84	70	1,143	3,692	2,821
Zhemgang	45	135	98	779	2,127	1,561
Total	**1,673**	**4,201**	**3,463**	**27,771**	**87,971**	**66,336**

Table A8. 3 Agricultural holdings rearing livestock, by dzongkhag, and by types of livestock

Dzongkhag	Number of holders	Number of animals	Number of female animals	Number of holders	Number of animals	Number of female animals
	(Brown swiss pure)			(Brown swiss cross)		
Bumthang	15	65	56	360	2,176	1,569
Chhukha	-	-	-	2	14	10
Dagana	6	10	7	2	-	-
Gasa	-	-	-	13	28	22
Haa	3	9	6	-	-	-
Lhuntse	2	3	2	68	148	123
Monggar	29	99	84	49	101	83
Paro	2	10	7	3	8	7
Pema Gatshel	2	7	6	6	12	9
Punakha	2	4	4	12	43	26
Samdrup Jongkhar	2	11	8	2	3	2
Samtse	4	13	8	10	35	25
Sarpang	8	22	14	13	17	12
Thimphu	2	2	2	-	-	-
Trashigang	7	12	9	13	23	19
Trashi Yangtse	3	3	3	9	15	10
Trongsa	19	121	99	35	134	102
Tsirang	6	11	6	51	85	34
Wangdue Phodrang	11	27	20	230	1,192	901
Zhemgang	-	-	-	3	8	4
Total	123	429	341	881	4,042	2,958

Table A8. 4 Agricultural holdings rearing livestock, by dzongkhag, and by types of livestock

Dzongkhag	Number of holders	Number of animals	Number of female animals	Number of holders	Number of animals	Number of female animals	Number of holders	Number of animals	Number of female animals
	(Holstein Fresian)			(Mithun pure)			(Jatsa-Jatsam)		
Bumthang	6	14	11	3	3	2	78	566	518
Chhukha	42	176	142	13	24	12	229	1,111	766
Dagana	-	-	-	13	45	24	184	538	288
Gasa	-	-	-	-	-	-	35	72	44
Haa	3	15	12	2	11	8	86	951	677
Lhuntse	6	14	9	8	7	2	687	1,775	1,062
Monggar	6	7	7	9	17	6	1,741	4,763	3,179
Paro	1	3	2	4	9	5	107	374	215
Pema Gatshel	25	51	43	1	1	-	262	447	230
Punakha	-	-	-	4	6	3	279	605	330
Samdrup Jongkhar	13	43	32	8	13	10	667	1,925	1,214
Samtse	15	107	78	19	57	48	149	492	268
Sarpang	8	24	22	67	241	166	183	716	518
Thimphu	4	5	4	1	1	-	20	79	38
Trashigang	51	142	125	22	21	3	1,458	4,301	2,963
Trashi Yangtse	20	37	33	8	8	-	424	840	492
Trongsa	1	1	1	1	1	-	286	890	427
Tsirang	9	10	5	5	6	3	23	63	41
Wangdue Phodrang	3	18	17	13	14	3	510	1,112	752
Zhemgang	1	1	1	14	15	2	635	2,019	1,367
Total	**214**	**668**	**544**	**215**	**500**	**297**	**8,043**	**23,639**	**15,389**

Table A8. 5 Agricultural holdings rearing livestock, by dzongkhag, and by type of livestock

Dzongkhag	Number of holders	Number of animals	Number of female animals	Number of holders	Number of animals	Number of female animals	Number of holders	Number of animals	Number of female animals
	(Yangku-Yangkum)			(Doeb-Doebum)			(Doethra-Doethram)		
Bumthang	96	754	493	56	370	249	73	426	267
Chhukha	181	776	530	39	132	67	191	1,076	548
Dagana	212	900	358	80	293	152	1,477	7,096	3,518
Gasa	40	71	59	25	51	39	18	76	47
Haa	29	261	163	4	15	8	6	27	15
Lhuntse	726	2,386	1,668	272	868	575	172	555	364
Monggar	1,831	5,053	3,477	525	1,135	713	344	858	599
Paro	76	282	187	23	94	69	111	446	262
Pema Gatshel	223	441	269	30	60	33	49	125	100
Punakha	212	585	354	125	479	294	161	759	499
Samdrup Jongkhar	388	995	664	48	115	65	53	267	142
Samtse	62	218	160	198	861	546	28	124	69
Sarpang	106	478	299	198	749	430	236	995	532
Thimphu	18	42	26	7	22	18	14	53	47
Trashigang	885	3,149	2,530	185	537	343	333	975	709
Trashi Yangtse	313	755	530	67	172	119	307	1,168	840
Trongsa	216	731	416	53	150	78	37	170	104
Tsirang	68	227	106	14	36	11	116	365	148
Wangdue Phodrang	453	1,082	737	262	999	644	241	1,195	775
Zhemgang	688	2,428	1,484	289	946	598	229	788	466
Total	**6,823**	**21,614**	**14,510**	**2,500**	**8,084**	**5,051**	**4,196**	**17,544**	**10,051**

Table A8. 6 Agricultural holdings rearing livestock, by dzongkhag, and by type of livestock

Dzongkhag	Number of holders	Number of animals	Number of female animals	Number of holders	Number of animals	Number of female animals	Number of holders	Number of animals	Number of female animals
	(Nublang-thrabam)			(Jabas)			(Buffalo)		
Bumthang	234	1,079	796	-	-	-	-	-	-
Chhukha	1,868	9,516	5,243	1	13	7	1	1	-
Dagana	587	2,298	1,140	40	166	73	3	9	3
Gasa	42	140	91	1	1	1	-	-	-
Haa	531	3,515	2,538	1	4	3	-	-	-
Lhuntse	637	2,686	1,764	36	180	146	1	-	-
Monggar	1,068	2,847	1,801	103	266	204	-	-	-
Paro	927	4,164	2,424	-	-	-	-	-	-
Pema Gatshel	232	541	358	102	242	154	-	-	-
Punakha	1,038	4,693	2,647	-	-	-	-	-	-
Samdrup Jongkhar	437	1,212	788	718	2,334	1,343	2	3	2
Samtse	4,717	22,235	11,552	693	3,158	1,845	83	306	136
Sarpang	1,338	6,140	2,904	417	1,715	869	8	29	18
Thimphu	261	917	557	-	-	-	-	-	-
Trashigang	1,478	4,683	3,414	262	700	520	-	-	-
Trashi Yangtse	535	1,867	1,238	63	189	122	-	-	-
Trongsa	613	3,366	2,094	-	-	-	-	-	-
Tsirang	1,176	4,011	1,596	3	10	6	43	116	86
Wangdue Phodrang	1,861	11,877	7,815	-	-	-	-	-	-
Zhemgang	314	912	670	18	39	24	-	-	-
Total	**19,894**	**88,699**	**51,430**	**2,458**	**9,017**	**5,317**	**141**	**464**	**245**

Table A8. 7 Agricultural holdings rearing livestock, by dzongkhag, and by type of livestock

Dzongkhag	Number of holders	Number of animals	Number of female animals	Number of holders	Number of animals	Number of female animals
	(Yak)			(Zo-Zom)		
Bumthang	60	2,919	1,778	2	4	-
Chhukha	-	-	-	1	-	-
Dagana	-	-	-	1	13	6
Gasa	233	5,668	2,887	-	-	-
Haa	79	4,279	2,610	-	-	-
Lhuntse	4	217	145	8	71	31
Monggar	-	-	-	1	-	-
Paro	50	3,254	2,042	-	-	-
Pema Gatshel	-	-	-	-	-	-
Punakha	-	-	-	-	-	-
Samdrup Jongkhar	-	-	-	1	10	8
Samtse	-	-	-	-	-	-
Sarpang	1	-	-	1	-	-
Thimphu	175	10,368	5,696	-	-	-
Trashigang	289	5,001	3,409	424	6,869	4,396
Trashi Yangtse	1	100	80	1	11	10
Trongsa	3	150	78	-	-	-
Tsirang	-	-	-	-	-	-
Wangdue Phodrang	109	4,227	2,613	1	1	-
Zhemgang	-	-	-	-	-	-
Total	**1,004**	**36,183**	**21,338**	**441**	**6,979**	**4,451**

Table A8. 8 Agricultural holdings rearing other livestock, by type of other livestock

Type of other livestock	Number of holders	Number of animals	Number of female animals
Local hen	18,136	140,357	74,706
Utility dog	17,173	30,423	13,102
Goat	9,655	50,373	25,660
Layer	6,262	619,835	582,945
Horse	4,716	12,525	5,775
Pig	3,653	11,344	5,143
Sheep	1,758	11,756	7,278
Broiler	381	221,499	82,018
Duck	217	525	300
Ass	70	113	55
Turkey	59	1,668	996
Guinea fowl	13	188	93
Goose	6	13	9

Table A8. 9 Agricultural holdings rearing other livestock, by dzongkhag, and by type of other livestock

Dzongkhag	Number of holders	Number of animals	Number of female animals	Number of holders	Number of animals	Number of female animals	Number of holders	Number of animals	Number of female animals
	(Horse)			(Ass)			(Mules and Hinnies)		
Bumthang	219	1,011	457	-	-	-	27	88	38
Chhukha	93	200	101	1	1	-	38	53	27
Dagana	94	162	80	7	10	6	3	3	2
Gasa	333	1,391	506	2	2	2	175	985	521
Haa	183	752	303	-	-	-	72	197	112
Lhuntse	477	937	579	10	13	7	35	128	65
Monggar	363	583	373	5	6	4	20	21	9
Paro	252	1,374	515	11	32	11	85	403	205
Pema Gatshel	139	152	101	7	8	4	19	19	9
Punakha	141	323	165	1	3	1	2	3	2
Samdrup Jongkhar	205	261	138	10	10	5	34	40	18
Samtse	115	160	70	4	4	3	12	14	3
Sarpang	202	316	137	2	2	-	3	8	6
Thimphu	224	1,188	470	1	1	-	150	685	314
Trashigang	546	1,553	641	2	4	2	57	73	37
Trashi Yangtse	430	849	451	2	4	3	42	76	35
Trongsa	33	85	38	-	-	-	5	6	2
Tsirang	68	79	49	-	-	-	1	2	-
Wangdue Phodrang	192	426	189	1	1	-	20	29	16
Zhemgang	405	641	346	3	3	3	77	114	70
Total	**4,714**	**12,443**	**5,709**	**69**	**104**	**51**	**877**	**2,947**	**1,491**

Table A8. 10 Agricultural holdings rearing other livestock, by dzongkhag, and by type of other livestock

Dzongkhag	Number of holders	Number of animals	Number of female animals	Number of holders	Number of animals	Number of female animals
	(Sheep)			(Goat)		
Bumthang	12	608	388	12	36	23
Chhukha	125	712	383	960	6,044	2,934
Dagana	11	60	27	1,753	8,900	4,645
Gasa	-	-	-	-	-	-
Haa	-	-	-	9	16	9
Lhuntse	4	57	30	21	39	22
Monggar	1	1	1	51	56	33
Paro	4	6	1	39	89	22
Pema Gatshel	1	-	-	24	48	21
Punakha	1	15	11	35	142	78
Samdrup Jongkhar	10	38	19	288	1,173	596
Samtse	1,191	6,278	3,860	3,301	19,549	10,177
Sarpang	171	685	422	991	4,273	2,157
Thimphu	1	1	1	6	31	17
Trashigang	139	1,869	1,264	103	198	101
Trashi Yangtse	-	-	-	25	40	21
Trongsa	6	129	48	15	49	31
Tsirang	24	87	50	1,941	9,381	4,596
Wangdue Phodrang	57	1,210	773	59	166	82
Zhemgang	-	-	-	17	36	23
Total	**1,758**	**11,756**	**7,278**	**9,650**	**50,266**	**25,588**

Table A8. 11 Agricultural holdings rearing other livestock, by dzongkhag, and by type of other livestock

Dzongkhag	Number of holders	Number of animals	Number of female animals	Number of holders	Number of animals	Number of female animals
	(Local pig)			(Improved pig)		
Bumthang	-	-	-	1	9	3
Chhukha	266	438	164	144	793	380
Dagana	461	757	313	205	738	337
Gasa	-	-	-	-	-	-
Haa	34	61	32	-	-	-
Lhuntse	7	7	5	31	37	19
Monggar	5	5	4	74	125	80
Paro	15	59	41	18	146	90
Pema Gatshel	24	30	16	71	133	68
Punakha	20	21	12	19	57	26
Samdrup Jongkhar	42	98	39	17	116	46
Samtse	499	787	336	139	440	177
Sarpang	170	313	116	193	2,572	1,073
Thimphu	4	8	5	7	108	54
Trashigang	16	65	40	36	75	34
Trashi Yangtse	14	17	10	57	81	44
Trongsa	1	1	-	2	3	1
Tsirang	200	318	135	381	1,687	792
Wangdue Phodrang	97	229	122	142	645	327
Zhemgang	74	94	51	146	190	111
Total	**1,949**	**3,308**	**1,441**	**1,683**	**7,955**	**3,662**

Table A8. 12 Agricultural holdings rearing other livestock, by dzongkhag, and by type of other livestock

Dzongkhag	Number of holders	Number of animals	Number of female animals	Number of holders	Number of animals	Number of female animals	Number of holders	Number of animals	Number of female animals
	(Chicken-Layer)			(Chicken-Broiler)			(Chicken-Local)		
Bumthang	53	13,590	13,570	-	-	-	27	177	143
Chhukha	90	13,760	11,806	22	28,904	14,735	2,323	17,681	8,398
Dagana	150	12,893	11,962	25	7,653	3,975	2,313	21,514	9,805
Gasa	56	1,051	1,049	2	9	9	29	75	70
Haa	34	4,165	4,158	3	435	432	317	1,707	1,323
Lhuntse	1,254	14,027	12,215	7	32	31	653	2,615	1,859
Monggar	1,354	28,887	23,573	86	1,168	1,019	771	3,950	3,009
Paro	136	16,584	14,563	4	23	23	26	117	86
Pema Gatshel	450	16,689	15,870	28	2,355	1,837	202	1,284	972
Punakha	174	10,432	9,136	3	3	-	285	1,299	940
Samdrup Jongkhar	91	9,894	9,020	9	1,082	476	683	5,172	3,523
Samtse	113	23,021	21,692	71	34,801	15,928	5,421	47,091	22,791
Sarpang	254	224,907	212,664	40	115,937	28,284	1,598	15,433	7,720
Thimphu	83	31,272	31,258	-	-	-	45	296	231
Trashigang	427	16,430	12,762	20	1,205	797	613	2,414	1,943
Trashi Yangtse	266	5,267	4,092	3	201	198	13	44	31
Trongsa	90	3,746	3,188	-	-	-	188	837	600
Tsirang	136	95,982	93,355	39	21,717	8,301	1,497	12,099	6,763
Wangdue Phodrang	349	8,370	8,328	17	5,968	5,967	542	3,403	2,219
Zhemgang	673	11,957	11,773	2	6	6	590	3,149	2,280
Total	**6,233**	**562,924**	**526,034**	**381**	**221,499**	**82,018**	**18,136**	**140,357**	**74,706**

Table A8. 13 Agricultural holdings rearing other livestock, by dzongkhag, and by type of other livestock

Dzongkhag	Number of holders	Number of animals	Number of female animals	Number of holders	Number of animals	Number of female animals	Number of holders	Number of animals	Number of female animals
	(Turkey)			(Goose)			(Duck)		
Bumthang	-	-	-	-	-	-	-	-	-
Chhukha	7	20	10	2	4	2	17	29	14
Dagana	4	8	4	-	-	-	24	59	31
Gasa	-	-	-	-	-	-	-	-	-
Haa	-	-	-	-	-	-	-	-	-
Lhuntse	-	-	-	-	-	-	-	-	-
Monggar	-	-	-	-	-	-	1	-	-
Paro	-	-	-	-	-	-	-	-	-
Pema Gatshel	-	-	-	1	1	1	2	4	2
Punakha	-	-	-	-	-	-	1	2	1
Samdrup Jongkhar	4	34	27	-	-	-	11	41	29
Samtse	21	49	27	3	8	6	133	296	171
Sarpang	14	1,527	912	-	-	-	19	65	32
Thimphu	1	2	2	-	-	-	-	-	-
Trashigang	-	-	-	-	-	-	-	-	-
Trashi Yangtse	-	-	-	-	-	-	-	-	-
Trongsa	-	-	-	-	-	-	-	-	-
Tsirang	8	28	14	-	-	-	8	27	18
Wangdue Phodrang	-	-	-	-	-	-	1	2	2
Zhemgang	-	-	-	-	-	-	-	-	-
Total	**59**	**1,668**	**996**	**6**	**13**	**9**	**217**	**525**	**300**

Table A8. 14 Agricultural holdings rearing other livestock, by dzongkhag, and by type of other livestock

Dzongkhag	Number of holders	Number of animals	Number of female animals	Number of holders	Number of animals	Number of female animals
	(Guinea Fowls)			(Utility Dog)		
Bumthang	-	-	-	444	802	319
Chhukha	1	-	-	1,189	2,042	829
Dagana	2	2	1	1,766	2,879	1,211
Gasa	-	-	-	64	107	41
Haa	-	-	-	679	1,317	598
Lhuntse	-	-	-	279	466	184
Monggar	2	2	2	708	1,073	422
Paro	-	-	-	1,393	3,356	1,506
Pema Gatshel	-	-	-	383	652	267
Punakha	1	2	1	804	1,697	766
Samdrup Jongkhar	-	-	-	678	1,059	519
Samtse	-	-	-	2,262	3,534	1,503
Sarpang	1	177	88	1,007	1,539	680
Thimphu	-	-	-	635	1,441	628
Trashigang	-	-	-	1,238	2,057	862
Trashi Yangtse	-	-	-	569	1,106	459
Trongsa	-	-	-	286	464	169
Tsirang	6	5	1	1,713	2,719	1,135
Wangdue Phodrang	-	-	-	777	1,482	683
Zhemgang	-	-	-	279	414	202
Total	**13**	**188**	**93**	**17,153**	**30,206**	**12,983**

Table A9.1- 1 Households collecting different kinds of wood and non-wood forest products, by dzongkhag, and by type of wood and non-wood forest products

Dzongkhag	Number of households who collected Wood and NWFPs	Firewood	Wood as a raw material	Mushroom (Wild)	Wild Orchid flowers	Star anise	Walnut (wild)	Hazel nut / Chest nut	Rubia (Soe)	Chirata	Pipla	Resin	Lemon grass
	(Number)												
Bumthang	1,386	1,355	4	692	-	-	-	-	-	-	-	-	-
Chhukha	3,967	3,760	5	1,683	21	1	155	24	30	1	14	8	1
Dagana	3,372	3,113	4	1,617	71	-	241	1	1	1	15	13	1
Gasa	508	374	-	34	2	-	20	1	-	-	1	1	-
Haa	1,322	1,327	5	390	-	1	48	-	3	1	-	1	-
Lhuntse	1,853	1,659	21	773	66	3	466	3	81	-	1	81	126
Monggar	4,623	4,646	23	1,708	47	1	160	3	63	-	-	1	108
Paro	2,261	2,315	1	411	-	-	1	-	-	-	-	4	-
Pema Gatshel	2,766	2,598	8	1,172	180	14	154	46	328	13	79	44	6
Punakha	1,955	1,874	-	761	50	-	96	2	-	-	3	3	-
Samdrup Jongkhar	3,681	3,573	3	1,814	101	2	116	13	125	67	2	2	-
Samtse	8,290	7,735	10	3,394	413	8	43	18	16	70	26	2	8
Sarpang	3,606	3,205	5	1,527	57	1	31	72	121	2	20	1	4
Thimphu	1,108	1,091	2	335	1	-	4	2	2	-	-	-	-
Trashigang	5,575	5,494	70	1,428	278	2	402	17	282	2	3	10	50
Trashi Yangtse	1,920	2,087	51	469	73	3	68	7	1	1	1	-	4
Trongsa	1,402	1,333	2	410	54	3	129	3	-	1	4	9	-
Tsirang	3,062	3,030	2	691	28	1	11	24	1	9	-	47	2
Wangdue Phodrang	2,909	2,793	12	1,093	86	-	219	1	1	1	1	1	1
Zhemgang	1,952	1,854	6	1,150	162	1	94	24	-	1	81	2	2
Total	**57,518**	**55,216**	**234**	**21,552**	**1,690**	**41**	**2,458**	**261**	**1,055**	**170**	**251**	**230**	**313**

Table A9.1- 2 Households collecting different kinds of wood and non-wood forest products, by dzongkhag, and by type of wood and non-wood forest products

Dzongkhag	Number of households who collected Wood and NWFPs	Cane	Cane shoot	Bamboo shoots	Fern shoots	Damru	Paris polliphyla	Betel leaves	Incense leaves/ plant	Oil seeds/ nuts	Daphne bark	Shilajit	Cordyceps
	(Number)												
Bumthang	1,386	-	1	-	-	-	228	-	17	1	-	-	330
Chhukha	3,967	76	314	777	2,411	639	27	636	64	1	9	1	-
Dagana	3,372	157	268	683	2,659	742	5	416	6	-	1	-	-
Gasa	508	-	-	-	79	-	15	-	163	-	-	1	391
Haa	1,322	57	77	66	211	107	2	116	9	-	-	-	7
Lhuntse	1,853	14	100	26	1,242	865	187	61	8	-	1	-	9
Monggar	4,623	84	121	96	1,579	703	1	11	18	1	-	-	-
Paro	2,261	-	-	-	-	-	2	-	42	-	-	-	52
Pema Gatshel	2,766	68	133	244	989	523	10	176	71	1	2	-	-
Punakha	1,955	2	60	46	756	207	1	42	-	59	1	-	-
Samdrup Jongkhar	3,681	84	175	519	1,985	932	7	548	193	4	-	-	-
Samtse	8,290	584	744	2,817	5,918	561	83	952	19	4	43	24	-
Sarpang	3,606	419	841	1,253	3,002	373	2	384	21	4	-	2	-
Thimphu	1,108	-	-	-	-	-	-	1	40	-	-	-	173
Trashigang	5,575	109	32	28	1,796	1,004	177	52	265	-	-	-	-
Trashi Yangtse	1,920	10	8	13	798	532	-	16	29	2	56	-	53
Trongsa	1,402	44	129	40	695	362	19	145	15	1	-	-	-
Tsirang	3,062	50	185	513	1,586	89	-	134	26	2	-	-	-
Wangdue Phodrang	2,909	86	211	84	898	258	68	145	192	7	-	-	437
Zhemgang	1,952	249	646	1,015	1,452	950	6	473	109	3	-	-	-
Total	**57,518**	**2,093**	**4,045**	**8,220**	**28,056**	**8,847**	**840**	**4,308**	**1,307**	**90**	**113**	**28**	**1,452**

Table A10.1- 1 Number of households, by dzongkhag, and by types of constraints faced

Dzongkhag	Number of households who faced constraints	Irrigation problem	Unproductive land	Labour shortage	High labour wages	Crop damage by wild animals	Crop damage by insects / diseases	Drought	Excessive rain	Hailstorm / wind
Bumthang	1,031	140	7	324	10	466	126	-	19	34
Chhukha	3,790	1,239	108	1,071	83	1,149	735	74	205	262
Dagana	3,882	2,329	189	754	197	758	1,104	161	22	106
Gasa	302	5	16	95	2	24	16	1	1	-
Haa	1,262	242	20	515	179	498	226	5	1	3
Lhuntse	1,643	292	22	807	37	628	571	15	41	34
Monggar	4,589	1,230	42	1,466	71	1,656	951	91	22	287
Paro	2,927	1,088	48	814	291	737	563	343	23	20
Pema Gatshel	3,243	940	23	1,394	141	924	578	11	39	129
Punakha	2,098	1,118	12	588	242	304	312	6	10	2
Samdrup Jongkhar	3,223	714	107	1,127	68	1,271	502	5	13	17
Samtse	8,639	4,647	661	1,663	173	2,458	1,869	37	68	94
Sarpang	4,094	1,939	75	777	51	1,209	628	37	78	70
Thimphu	894	290	20	321	85	165	196	27	8	7
Trashigang	5,296	1,114	22	2,204	265	1,717	1,527	53	37	118
Trashi Yangtse	2,345	537	20	900	64	893	806	86	33	174
Trongsa	1,299	411	3	463	111	339	200	2	5	4
Tsirang	3,382	2,319	125	565	187	685	642	57	3	9
Wangdue Phodrang	2,966	1,108	21	894	62	692	667	26	74	17
Zhemgang	1,964	624	20	761	71	588	359	1	17	33
Total	**58,869**	**22,326**	**1,561**	**17,503**	**2,390**	**17,161**	**12,578**	**1,038**	**719**	**1,420**

Table A10.1- 2 Number of households, by dzongkhag, and by types of constraints faced

Dzongkhag	Number of households who faced constraints	Landslides / soil erosion	Livestock depredation by wild animals	Livestock diseases	Lack of feed and fodder supply	Shortage of land	Limited access to market	Difficulty in getting loans	Difficulty in getting farm machinery
Bumthang	1,031	2	27	80	69	157	9	6	45
Chhukha	3,790	73	11	20	29	331	183	6	9
Dagana	3,882	43	11	51	23	371	204	9	12
Gasa	302	-	41	12	97	81	1	-	34
Haa	1,262	8	27	12	36	137	52	7	42
Lhuntse	1,643	14	8	8	9	81	73	3	113
Monggar	4,589	52	38	159	56	208	43	22	23
Paro	2,927	1	42	37	16	193	25	23	83
Pema Gatshel	3,243	12	10	12	21	163	78	5	10
Punakha	2,098	20	10	10	8	222	32	-	84
Samdrup Jongkhar	3,223	11	5	12	9	297	162	6	11
Samtse	8,639	191	10	38	44	1,855	307	18	11
Sarpang	4,094	67	10	58	18	597	314	9	49
Thimphu	894	-	32	4	3	104	7	1	2
Trashigang	5,296	93	29	17	45	220	179	6	20
Trashi Yangtse	2,345	29	8	7	2	60	24	1	19
Trongsa	1,299	7	105	5	8	60	22	2	39
Tsirang	3,382	17	5	26	32	350	42	4	4
Wangdue Phodrang	2,966	12	114	15	48	324	41	13	99
Zhemgang	1,964	17	7	53	5	76	58	13	15
Total	**58,869**	**669**	**550**	**636**	**578**	**5,887**	**1,856**	**154**	**724**

Appendix II: Concepts and definitions

For the purpose of RNR Census 2019, the concepts and definitions shall be as follows:

Census Date and reference period. The census reference year is a period of twelve months, i.e. the RNR census refers to calendar year of 2018. The census reference day is a point in time used for livestock numbers and other inventory items i.e. the day the enumeration is done for that particular holding. The RNR census was conducted from 1st March 2019 to 15th April 2019. The census has two main reference periods –the *census reference* year and the *census reference day.*

Population. In this census the population targets are those that are engaged in agriculture, livestock and forestry activities.

Statistical units. The basic statistical unit for the RNR census is agricultural holdings engaged in RNR production activities e.g. households, institutions, corporative entities, etc.

Agricultural holding. An economic unit under single management comprising all livestock kept and all land used wholly or partly for agriculture production purposes, regardless of the ownership. Single management may be exercised by an individual or household, jointly by two or more individuals or households, by a clan or tribe, or by a juridical person such as a corporation, cooperative or government agency e.g Bhutan Livestock Development Corporation Limited.

Holdings in the **household sector** – that is, those operated by household members.

Holdings in the **non-household sector** - Corporations and government institutions such as the following:

- A *private limited company* or large commercial farms such as Samden coffee plantation, Druk Horticulture Farm, etc.;
- *Agriculture groups or cooperatives* that are run by a group of farmers who leases land either from government or community, share labour and market the produce for joint profit;
- *Monasteries* that often lease out land to others but sometimes may employ a caretaker/ manager to run the farm or sometimes the monks/ students of a shedra may grow vegetables for their own consumption; and
- The '*others*' category includes those holdings other than those categorized above such as labour camp holdings, kukhor-owned holdings that are usually managed by a caretaker and armed force premises holdings who also rears some chickens or goats, etc.

Household. The concept of household is based on the arrangements made by persons, individually or in groups, for providing themselves with food or other essentials for living. A household may be either

- a one-person household, that is to say, a person who makes provision for his or her own food or other esentials for living without combining with any other person to form part of a multi-person household, or
- a multi-person household, that is to say, a grou pf two or more persons living together who make common contribution in the production of food or other essentials for living. The person in the group may pool their resoruces and may have a common budget; they may e related or unrelated persons, or constitute a comnination of persons both related and unrealted.

Respondent. The person from whom data are collected about the statistical unit. This item can be used for quality assessments and checks. The respondent should be someone sufficiently knowledgeable to answer the census questions accurately, using this is the holder or hired manager.

The main RNR activity. Activities like agriculture, livestock and forestry activities and it pertains to the total value of the farms' production in 2018. The following are the main RNR activity:

- *Livestock production*-when majority of the total value of the holdings' production in the household comes from livestock production.
- *Crop and livestock*-when crop and livestock production in the household has equal value to the holdings' production.
- *Forestry and logging*-when majority of the total value of the holdings' production in the household comes from engaging in forestry and logging.
- *Fishery and aquaculture*-when majority of the total value of the holdings' production in the household comes from engaging in fishery and aquaculture activities.

Holder. A person, group of people or juridical person who makes the major decisions regarding the resources used and exercises management control over the holdings' operation. The holder has technical and economic responsibility for the holding and may undertake all responsibilities directly, or delegate responsibilities related to day to day work management to a hired manger.

Only for own consumption*.* If the purpose of the holdings' production is for self-consumption and not for sale or if all of the holdings' production is for self-consumption and not for commercial purpose.

Mainly for own consumption with some sales. If the larger portion of the holdings' production is for self-consumption and lesser portion for sale of the production for cash or in exchange for other produce or products.

Mainly for sale with some own consumption. If the larger portion of the holdings' production is for sale of the produces for cash or in exchange for other produce or products and lesser portion for self-consumption.

Only for sale. If all of the holdings' production is for commercial purpose and not of consumption.

Other economic activities. This related to other business/enterprise activities run by the household, not about household members earning income from employment elsewhere.

Educational attainment. The highest grade of formal education completed or attended by a household or by a household member.

Chhuzhing. An area, which has access to naturally or artificially provided irrigation to grow crops. These are rain fed wetlands too but terraced.

Kamzhing. Agricultural land where crops are grown without irrigation.

Khimsa. A piece of plot on which a mixed variety of crops are grown around the house mostly for self-consumption.

Ngulthodumra. A land on which fruits are grown in compact plantation. The compact plantation includes plants, trees and shrubs planted in a regular and systematic manner, such as an orchard. Fruit trees planted here and there in scattered manner, or on land predominantly used for temporary crops, should not be considered as orchard.

Operational land. The total land area owned and leased in minus the total land area leased out and left fallow.

Arable land. land that is used in most years for growing temporary crops, temporary meadows and pastures as well as land that is lying fallow but which could easily be brought back under cultivation. It does not include land under permanent crops/ orchards;

Cropland. Is the total of arable land and land under permanent crops;

Agricultural land. Is the total of cropland and permanent meadows and pastures;

Land used for agriculture. Is the total of "agricultural land" and "land under farm buildings and farmyards".

Single name, Individual ownership (Rang chang). Land owned by a sole person where only his name is recorded as the owner of the land.

Single name, Family ownership (Za tshang). Land owned by the family but is registered in the name of the household head.

Multiple names, Joint ownership (Chhi ruup). Land owned by multiple people where everyone's name is registered as the owner of the land.

Chemical fertilizer. Manufactured chemical compounds such as phosphate, potassium, nitrogen and other mixed and complex fertilizers applied to soil to enhance or improve the production.

Manure. Fertilizer prepared from organic material (e.g. animal excreta, vegetable wastes, etc.).

Pesticides. Materials intended to mitigate, control or eliminate pests in plants or animals, or to control the behavior or physiology of pests or crops during production or storage (e.g. butachlor, chlorpyrifos, mancozeb, etc.).

Tillage refers to the preparation of soil for the purpose of crop production by using methods such as digging, stirring and overturning of the soil. There are 3 types of power sources:

- **Animal power** refers to using oxen to till the land;
- **Machine power** refers to using farm machines such as power tiller to till the land; and
- **Manual power** refers to manually tilling the land using hoes, spades, etc.

Protective cover here refers to providing roof of glass, plastic or other material over a permanent structure, used for protecting crops against the weather, pests or diseases. Structures like farm buildings or yards are excluded as protective cover.

Irrigation. Refers to purposely providing land with water, other than rain, for improving pastures or crop production. The main methods used for irrigating the fields by the holders are:

- ***Surface Irrigation*** is where water is applied and distributed over and across the field/surface of the field by gravity;
- ***Sprinkler irrigation*** refers to pipe networks through which water moves under pressure before being delivered to the crop via sprinkler nozzles;
- ***Localized irrigation*** is a system whereby water is distributed under low pressure through a piped network, in a pre-determined pattern, and applied as a small discharge to each plant. E.g. drip and micro irrigation.

Surface water is water found on the earth's surface that is naturally open to the atmosphere, in streams, rivers, ponds, lakes, wetlands or oceans.

Groundwater is water stored underground in aquifers – i.e., water in soil in the saturated zone beneath the water table, where the soil voids are filled with water. It is usually pumped from wells.

Mixed Surface water and Ground water is irrigation water supplied both from the earth's surface and pumped from underground.

Municipal water supply is a source of water withdrawn from the public piped distribution network.

Permanent Crops. Crops with a more than one-year growing cycle (e.g. fruits, cardamom, etc.).

Temporary Crops. Crops with a less than one-year growing cycle (e.g. vegetables, tubers, etc.).

Compact Plantation. Plants, trees and shrubs planted in a regular and systematic manner, such as in an orchard.

Temporary meadows and pastures. Those that grow herbaceous forage crop, through cultivation or naturally grown which has been less than 5 years old after its establishment.

Permanent meadows and pastures. Those that grow herbaceous forage crop, through cultivation or naturally grown which has been more than 5 years old after its establishment.

Grazing system is a system where a farmer leaves their cattle to feed on the leaves and shoots of grass and other short plants.

Industrial system refers to intensive livestock-raising methods in which at least 90 percent of the dry matter of the animal feed is produced off-farm. E.g. Karma feed for cattle and piggery.

Mixed System means a combination of grazing and industrial system.

Nomadic or totally pastoral refers to livestock reared, where the holder has no permanent place of residence and does not practice regular cultivation. Livestock moves from place to place with the holder and his/her household, depending on the season and the availability of feed or water.

Semi-nomadic, semi-pastoral or transhumant refers to livestock reared by holders who live a semi-nomadic life. Typically, the holder has a permanent residence to which he/she returns for several months of the year according

to seasonal factors. For semi-nomadic and semi-pastoral systems, the holder establishes a semi-permanent home for several months or years and may cultivate crops as a supplementary food source.

Sedentary pastoral refers to livestock reared by holders who have a permanent residence.

Ranching refers to large-scale livestock activities carried out on large areas of land set aside for extensive grazing, where livestock graze mainly on grasses and other plants.

Credit for agricultural purposes refers to any type of credit availed for purposes related to the operations of the farming households. This includes credit for purchasing crop and livestock inputs, construction of farm buildings and purchasing farm machinery.

Commercial bank. E.g. Bank of Bhutan, etc.

Agricultural development bank. Financial institutions dedicated to help farmers avail credit serves at subsidized interest. E.g. Bhutan Development Bank Limited.

Co-operative credit society. A member owned financial group where it is controlled by the members of the group and operated for the purpose of providing financial services to its members.

Money lender. Credit availed from other people.

Self-help group. Family or friends.

REDCL (Rural Enterprise Development Corporation Limited). A state-owned enterprise which gives credit services to the rural population for the operation of agricultural purposes.

NGO (Non-profit Government Organization). To improve the livelihood of the rural population the non-profit government organization provide credit facility at a subsidized rate.

Man-days. A day regarded in terms of the amount of work that can be done by one person within the stipulated period.

Appendix III: Questionnaire

RENEWABLE NATURAL RESOURCES CENSUS 2019

RNR Statistics Division

Ministry of Agriculture and Forests

Royal Government of Bhutan

2. IDENTIFICATION

Identification and location of the holder E F

Dzongkhag	Gewog	Chiwog	Village	Household s.no	Respondent's Name	Contact No	Enumerator's Name

Note: **Village/ Town Area: If it's a holding in town area, please add the word 'town' after name, e.g. MONGGAR TOWN.

2.1 SECTION A: GENERAL CHARACTERISTICS

A1. What is the main RNR activity on the holding? (If in doubt, please refer your enumerator's manual for concepts and definitions of the following terms before making a selection.)

1-Crop production; 2- Livestock production; 3- Crop and livestock; 4- Forestry and logging; 5- Fishery and aquaculture

2.2 A2. What type of holding is this?

1- Household; 2- Private Ltd company; 3- Group/cooperative; 4- SOE; 5- Monastery;6- School; 7- Armed force premise; 8-Kukhor-owned;9- Others

A2.H. Name of holder.....If the holding in question A2 is 1-Household, please write the name of the head of household; else write the name of manager or caretaker.

2.3 If A2 is a holding other than the household type,

then else skip to section C, C1 A3. What is the main purpose of production? E F

1- Only for own consumption; 2- Mainly for own consumption with some sales; 3- Mainly for sale with some own consumption; 4- Only for sale

A4. What are other economic activities of this household? E F. (Select all that apply. If in doubt, please refer your enumerator's manual for concepts and definitions of the following terms before making a selection.)

	Tick Below
Forestry and logging	
Non-wood forest products collection	
Fishing and aquaculture	
Processing of agricultural products (Agro processing)	
Handicrafts	
Wholesale and retail trade	
Hotels and restaurants	
Agro-tourism (including homestay)	
Livestock production	
Crop production	
Other	

A4_0THER. If other, please specify……

A5. What percentage of the total household income comes from RNR production? (Only for household type holdings)
1- 0% - 25%; 2- 26% - 50%; 3- 51% - 75%; 4- 76% - 100%

3. SECTION B: HOUSEHOLD MEMBERS DEMOGRAPHY

Details of household members who are usually resident in the household, sharing meals together. Please start with the household head. This information will help understand the labour force situation in the farming sector. (Only for household type holdings)

B1. Name (Please type the name of the person, starting with the respondent.)	B2. What is the relation of (name) to household head?	B3. What is the sex of (name)? (Code) (1=Female; 2=Male)	B4. What is the age (in completed years) of (name)? Skip to next member if age<15	B5. What is the marital status of (name)? Only for ages 15 and above	B6. What is the highest education attained by (name)? Only for ages 15 and above	B7. What is the main occupation of (name)? Only for ages 15 and above

Relation to Head: 1-Head; 2-Spouse; 3- Father/Mother; 4-Brother/Sister; 5-Son/Daughter; 6-Neice/Nephew; 7-GrandFather/ Grand Mother; 8- Grand Son/Grand Daughter; 9-Son-in-law/Daughter-in-law 10. Father-in-law/Mother-in-law 11. Brother-in-law/Sister-in-law 12. Uncle/Aunt 13. Step father/Step mother 14. Adopted/Foster/Stepchild
15. Other Family Relatives 16. Live in Servant
Marital Status: 1-Never Married; 2. Living Together; 3. Married; 4. Divorced; 5. Separated; 6. Widow/Widower

Education: 00-PP; 01-Grade 1; 02-Grade 2; 03-Grade 3; 04-Grade 4; 05-Grade 5; 06-Grade 6; 07-Grade 7; 08-Grade 8; 09-Grade 9; 10-Grade 10; 11-Grade 11; 12-Grade
12; 13-Bachelor's degree; 14-Master's; 15- Ph.D/Doctorate; 16- Diploma; 17- VTI/TTI/RTI Certificate; 18-BLC(Zherim); 19-PLC (Khakong); 20- ECCD/Daycare; 21- No
Schooling; 22- Other

3.1 SECTION C: HOLDING AREA, LANDUSE AND IRRIGATION

C1. Does your holding have land, either owned or leased-in from others, in this Gewog where you reside? Yes/No

C2. If yes, please select the land types - by legal definition, and not to be confused with actual land use. (The below categories are land types by legal definition, and not to be confused with actual landuse. For e.g. Ngulthogdumra does not necessarily mean land having fruit trees, but simply how a land is registered in the thram.)

	C3. Yes/ No	C4. TOTAL AREA owned	C5. AREA leased-in	C6. Leased from?	C7. AREA leased-out	C8. AREA left fallow	C9. Reason fallow	C10. Op land (Total owned+ LI-LO-Fa)	C_FB. Farm building, farm yards	C11. Permanent crops	C12. Temporary meadows & pasture	C13. Permanent meadows & Pasture	C14. Forest-wooded
Chhuzhing													
Kamzhing													
Khimsa													
Ngulthodumra													

Codes for fallow reason: 1- As part of crop rotation practice; 2- Want to convert to other land type; 3- Irrigation problems; 4-Wildlife damage; 5- Labor shortage; 6- Low soil fertility; 7- Too far from home; 8- Other reasons

Note to follow for all Land holdings:

** **TOTAL AREA owned:** Area should be reported as per actual physical area on the ground, which can be more (or sometimes even less) than is registered in thram.

** **AREA leased-out:** Please note area leased out cannot exceed area owned. If no land is leased out, please write 0.

** **AREA left fallow:** Please note area left fallow cannot exceed area owned. If no land is left fallow, please write 0.

** **Op land (Total owned+ LI-LO-Fa):** Operational area = Total area of own land - area leased out from own land - area left fallow from own land + area leased-in. If the operational area figure seems unreasonable, please go back and recheck. Otherwise move on to next question

** **Farm building, farm yards:** If the holder's house, including the yard around it, is also on this land, it should be included here as part of the farm buildings, otherwise if it is somewhere separately from the holding, exclude.

** **Permanent crops:** Fruit trees planted here and there in scattered manner, or on land predominantly used for temporary crops, should not be considered as land under permanent crop. If none, write 0.

** **Temporary meadows & pasture:** Temporary meadows and pastures are those which are less than 5 years old after establishment. If none, write 0.

** **Permanent meadows & Pasture:** Permanent meadows and pastures are those which are more than 5 years old after establishment. If none, write 0.

** **Forest-wooded:** Trees found here and there in scattered manner on the holding should not be considered as forests/woods. If none, write 0. Also ensure that the farmer is not referring to fallow land overgrown with trees which he may have already mentioned before and was subtracted from own land to arrive at operational land, in which case it will be double counting.

C15. Does your holding have land, either owned or leased-in from others, in another Gewog? Yes- 1| No- 0 If No, skip to **RES_THRAM_YN C16.** If yes, which dzongkhag? ……..

C17. Which Gewog? ……..

C18. What type of land do you operate there? Tick the ones which apply: Chuzhing/ Kamzhing/ Khimsa/ Ngulthodumra

	C19. Yes/ No	C20. TOTAL AREA owned	C21. AREA leased-in	C22. Leased from?	C23. AREA leased-out	C24. AREA left fallow	C25. Reason fallow	C26. Op land (Total owned+ LI-LO-Fa)	C_FB_2. Farm building, farm yards	C27. Permanent crops	C28. Temporary meadows & pasture	C29. Permanent meadows & Pasture	C30. Forest-wooded
Chhuzhing													
Kamzhing													
Khimsa													
Ngulthodumra													

C31. Does your holding have land, either owned or leased-in from others, in yet another Gewog? Yes- 1| No- 0 If No, skip to **RES_THRAM_YN C32.** If yes, which dzongkhag? ……..

C33. Which Gewog? ……..

C34. What type of land do you operate? Tick the ones which apply: Chuzhing/ Kamzhing/ Khimsa/ Ngulthodumra

	C35. Yes/ No	C36. TOTAL AREA owned	C37. AREA leased-in	C38. Leased from?	C39. AREA leased-out	C40. AREA left fallow	C41. Reason fallow	C42. Op land (Total owned+ LI-LO-Fa)	C_FB_3. Farm building, farm yards	C43. Permanent crops	C44. Temporary meadows & pasture	C45. Permanent meadows & Pasture	C46. Forest-wooded
Chhuzhing													
Kamzhing													
Khimsa													
Ngulthodumra													

3.2 LAND OWNERSHIP & GENDER

If the total land holding from all the locations is greater than 0 i.e. sum of C4+C20+C36>0:

3.3 Asked To Respondent

RES_THRAM_YN: Is your name (respondent) listed as an owner on one or more Thrams? 1- Yes| 0- No| 2- Don't know
RES_THRAM_TYPW: If yes, what type of Thram is it? 1-Individual ownership 2-Joint ownership 3-Family ownership; 3-Family ownership 4-More than one of the above
RES_THRAM_FAM: If no, are you a family member for a Thram for a family ownership? 1- Yes| 0- No

3.4 Asked About randomly selected household member (RSHM) other than respondent:

RAND_THRAM_YN: Is X (RSHM) listed as an owner on one or more Thram? 1- Yes| 0- No (Please ask the following question to the randomly selected member of the household. If not present, the respondent may answer on his/her behalf.)
RAND_THRAM_TYPW: If yes, what type of Thram is it? 1-Individual ownership 2-Joint ownership 3-Family ownership; 3-Family ownership 4-More than one of the above
RAND_THRAM_FAM: If no, is X a family member for a Thram with family ownership? 1- Yes| 0- No
RAND_PRESENT: Was X present when C**2 questions were asked? 1- Yes| 0- No

C47. Did this holding irrigate any land in 2018? Yes-1; No-0 If Yes go to **C48,** If No skip to **D1 C48.** How many acres (in acres) were irrigated? ……..
C49. What was the main method of irrigation? (If in doubt, please refer your enumerator's manual for concepts and definitions of the following terms before making a selection.)
1- Surface Irrigation 2- Sprinkler irrigation; 3 Localized Irrigation (Drip irrigation, micro irrigation)
C50. Select the main source of irrigation water. (If in doubt, please refer your enumerator's manual for concepts and definitions of the following terms before making a selection.)
1. Surface water 2. Ground water 3. Mixed Surface water and Ground water 4. Municipal water supply

3.5 SECTION D. CROPS

D1. Did the holding grow any CEREALS in 2018? Yes- 1| No- 0 (if No, skip to D2)
(No need to select a crop if the area grown was negligible, e.g. 1 decimal or less.)

D1_01. What cereals did you have in 2018?	D1_03. How many times grown in 2018?	D1_04. Area harvested (Acres)	D1_05. Production (Kg)	D1_06REV. Which of the following inputs were used? Please select all that apply. 1- chemical fertilizer; 2- manure/ compost; 3- chemical pesticide; 4- non-chemical pesticide
Paddy (Irrigated)				
Paddy (Upland)				
Maize				
Wheat				
Barley				
Millet				
Sweet Buckwheat				
Bitter Buckwheat				
Amaranthus				
Quinoa				

Note for all the crops:
** How many times grown in 2018? (This refers to whether the farm did double or triple cropping of this crop in 2018.)
** Area harvested (Acres) (If done double or triple cropping, then area from each harvest should be summed up to give total.)
** Production (Kg) (If harvested twice or thrice, then production from each harvest should be summed up to give total)

D2. Did the holding grow any OILDSEEDS/LEGUMES in 2018? Yes- 1| No- 0 (if no, skip to D3)
(No need to select a crop if the area grown was negligible, e.g. 1 decimal or less.)

D2_01. What oilseeds and leguminous crops did you grow in 2018?	D2_03. How many times grown in 2018?	D2_04. Area harvested (Acres)	D2_05. Production (Kg)	D2_06REV. Which of the following inputs were used? Please select all that apply. 1- chemical fertilizer; 2- manure/ compost; 3- chemical pesticide; 4- non-chemical pesticide
Mustard				
Sunflower				
Soya bean				
Sesame				
Groundnut				
Beans				
Broad beans				
Chickpeas				
Cowpeas				
Lentil				
Lupins				
Peas				

D3. Did the holding grow any VEGETABLES in 2018? Yes- 1| No- 0 ((if No, skip to D4)
(No need to select a crop if the area grown was negligible, e.g. 1 decimal or less.)

D3_01. What vegetable crops did you grow in 2018?	D3_03. How many times grown in 2018?	D3_04. Area harvested (Acres)	D3_05. Production (Kg)	D3_06REV. Which of the following inputs were used? Please select all that apply. 1- chemical fertilizer; 2- manure/ compost; 3- chemical pesticide; 4- non-chemical pesticide
Asparagus				
Broccoli				
Cabbages				
Cauliflower				
Chili				
Spinaches and sags				
Onion (inc. shallots)				
Ginger				
Turmeric				
Garlic				
Coriander				
Eggplant/ aubergine/ brinjal				
Okra/ ladies' finger				
Tomato				
Cucumber				
Pumpkins, squash and gourds				
Carrot				
Radish				
Turnip				
Watermelon				

D4. Did the holding grow any MUSHROOMS in 2018? Yes- 1| No- 0 If No, skip to **D5 D4_01.** If yes, what type of mushroom? A-Oyster: B-Shitake; C-Button; D-Others
D4_02. How much quantity (in KG) of mushroom was produced in 2018?.....
D5. Did the holding grow any ROOTS/TUBERS in 2018? Yes- 1| No- 0 If No, skip to **D6**

(No need to select a crop if the area grown was negligible, e.g. 1 decimal or less.)

D5_01. What roots/ tuber crops did you grow in 2018?	D5_03. How many times grown in 2018?	D5_04. Area harvested (Acres)	D5_05. Production (Kg)	D5_06REV. Which of the following inputs were used? Please select all that apply. 1- chemical fertilizer; 2- manure/ compost; 3- chemical pesticide; 4- non-chemical pesticide
Potato				
Sweet Potato				
Cassava				
Yams				
Taro				
Yautia				
Other roots and tubers n.e.c				

D6. Did you have any PERMANENT CROPS (fruit crops including coffee) in 2018? Yes- 1| No- 0 If No skip to **D7**
For each permanent crop grown, ask the total number of trees and bearing trees, and production.

D6_01. What permanent crops did you grow in 2018?	D6_03. Total tree number	D6_04. Of which how many are fruit bearing trees	D6_05. Production (Kg)	D6_06REV. Which of the following inputs were used? Please select all that apply. 1- chemical fertilizer; 2- manure/ compost; 3- chemical pesticide; 4- non-chemical pesticide
Apple				
Pear				
Peach				
Plum				
Apricot				
Persimmon				
Date-plum (gendum)				
Walnut				
Hazelnut				
Areca nut				
Mandarin				
Lemons and limes				
Mango				
Guava				
Pomegranate				
Avocado				
Litchi				
Jackfruit				

D6_01. What permanent crops did you grow in 2018?	D6_03. Total tree number	D6_04. Of which how many are fruit bearing trees	D6_05. Production (Kg)	D6_06REV. Which of the following inputs were used? Please select all that apply. 1- chemical fertilizer; 2- manure/ compost; 3- chemical pesticide; 4- non-chemical pesticide
Banana				
Tree tomato (Tamarillo)				
Dragon fruit				
Kiwi				
Papaya				
Coffee				
Tea				

….any other permanent crops, such as cardamom, pineapple and sugarcane? (No need to select a crop if the area grown was negligible, e.g. 1 decimal or less.)

	D_OPC1. Area under x (Acres)	D_OPC2. Production (Kg)	D_OPC3REV. Which of the following inputs were used? Please select all that apply. 1- chemical fertilizer; 2- manure/ compost; 3- chemical pesticide; 4- non-chemical pesticide
Cardamom			
Pineapple			
Sugarcane			

D7. Did you have some cropped land under protective cover (e.g. plastic or glass house) on your holding in 2018? Yes- 1 | No- 0
If No skip to **E1**
(Not to be confused with structures like farm buildings, store house etc.)

D8. If yes, what area of your land was under protective cover? ……

3.6 SECTION E: LIVESTOCK

E1. Do you have large bovine animals (e.g. cattle, buffaloes, yaks, zoms etc) **on this day?** Yes- 1 | No- 0 If No skip to **E8**
For the selected, details

E2. Tick the ones reared on this day.	E4. Total number of animals	E4_FA. Total female animals
Jersey pure breeds		
Jersey cross breeds		
Brown swiss pure breeds		
Brown swiss cross breeds		
Holstein-Fresian breeds		
Mithun pure breeds		
Jatsa-jatsams		
Yanku-yankums		
Doeb-doebums		
Doethra-doethrams		
Nublang-thrabams		
Jabas		
Buffaloes		
Yaks		
Zo-zoms		
Golengs		

E6. What feeding system do you practice with your cattle? (If in doubt, please refer your enumerator's manual for concepts and definitions of the following terms before making a selection.)

Grazing system; 2- Mixed system; 3- Industrial system

E7. If grazing system is practiced, what type? (If in doubt, please refer your enumerator's manual for concepts and definitions of the following terms before making a selection.)

Nomadic or totally pastoral; 2- Semi-nomadic, semi-pastoral or transhumant; 3- Sedentary pastoral or ranching

E8. Do you have any OTHER LIVESTOCK **on this day?** Yes- 1 | No- 0 If No skip to **E13**

For the selected ones, ask details for each.

E9. Tick the ones reared on this day.	E11. Total number of animals	E11_FA. Total female animals
Horses		
Asses		
Mules and hinnies		
Sheep		
Goats		
Local pigs		
Improved pigs		
Chickens – layers		
Chickens - broilers		
Chickens - local		
Turkeys		
Geese		
Ducks		
Guinea fowls		
Utility dogs		

E13. Do you have bee hives? Yes- 1| No- 0
E14. How many hives? …… If No skip to **E16 E15.** What type of bees are they? Local/Improved
E16. Do you rear fish in ponds? Yes- 1| No- 0

4. SECTION F: FARM MECHANISATION

F1. In 2018, what kind of equipment/ machinery was used on the holding? Select the ones that apply. Tick the ones that were used.

Type of Machinery & Equipment	Tick	F3. Source (Select from below) 1-Own, 2-Hired from FMCL; 3- Hired from others (Non-FMCL); 4- Hired from Government, 5-Other
Manually operated thresher		
Power thresher		
Manually operated sprayer		
Power sprayer		
Transplanter		
Tractor		
Power tiller		
Power reaper		
Brush cutter		
Combine harvester		
Rotary paddy weeder		

Type of Machinery & Equipment	Tick	F3. Source (Select from below) 1-Own, 2-Hired from FMCL; 3- Hired from others (Non-FMCL); 4- Hired from Government, 5-Other
Potato harvester		
Sorter and graders		
Maize sheller		
Cornflake(tengma) machine		
Vegetable/ fruit drier		
Chainsaw		
Milking machine		
Power cream separator		
Water pump		
Milling machine		
Chaff cutter		

F4. During 2018, what was the main source of power for land tillage on this holding? 1- Animal power; 2- Machine power; 3- Manual power

5. SECTION G: CREDIT (Only for household type holdings)

G1. In 2018, did you avail any credit for purposes related to the operation of the holding? Yes- 1| No- 0 If No skip to **H1**

G2. Select the source of credit.

Source of credit	G3. Availed from (Yes/No)
Commercial bank	
Agricultural development bank (e.g. BDBL)	
Cooperative credit society	
Money lender	
Input supplier	
Self-help group	
Family or friends	
Government	
REDCL	
NGO (e.g. Tarayana)	

6. SECTION H: WORK ON THE HOLDING

H1. Did the holding employ a hired manager to run the holding in 2018? (Institutional type holdings may usually employ hired manager/ caretaker, so if this is the case for this holding, 'Yes' should be selected.) Yes- 1| No- 0 If No skip to **H4**

H2. What is the sex of the hired manager (1- Male; 2- Female)

H3. What is the age of the hired manager?**.....**

H4. In 2018, did you hire workers on the holding, on casual basis (as and when required)? Yes- 1| No- 0 If No skip to **HFT H5.**

On how many occasions did you hire casual workers in 2018? **.....**

H6. In total how many man-days were worked? ..... (To calculate total man-days, let us illustrate by an example. Suppose a holding had hired workers on 3 occasions. In the 1st occasion 5 workers came to work for 2 days, in the 2nd occasion 3 workers came and worked for 3 days and in the 3rd occasion 10 workers came to work for 1 day. Therefore total man-days is calculated as: (5x2) + (3x3) +(10x1) = 29 man-days.)

H7. How many different individuals were involved for the said number of man-days?..... (For example, the 29 man-days were done by 10 different individuals, some coming once, some twice and some thrice but counted only once.)

H8. Of which how many were female workers?

H9. What was the main form of payment for casual workers?

1-Cash only; 2-Cash plus meals; 3-Farm produce; 4-Exchange of labour; 5-Other forms of in-kind payment

HFT. Did you employ any worker on long-term basis? (Example, a dairy farm may employ a worker on full-time basis, for a few months or all year round.)

Yes- 1| No- 0 If No skip to **MAINACT**

H_FT_NUM How many workers were employed on long-term basis? **.....**

H_FT_FEM Of which, how many were females? **.....**

WORK ON THE HOLDING BY FAMILY WORKERS (Only for household type holdings)

MAINACT. Is the work on the holding the main activity of [name]? Yes- 1| No- 0 If No skip to H10 Copy household member names from the demography table, only for those aged 15 and over.	HH_WORKTIME. For how long did [name] work on this holding in 2018? 1- 0 - 10 Man-Days; 2- 11 - 20 Man-Days; 3- 21 – 31 Man-Days; 4- 1 - 3 months; 5- 3 – 6 months; 6- 7 or more months

H10: Did you face any constraints/situation in 2018 that affected your RNR productions or assets? (Only for household type holdings) Yes- 1| No- 0 If No skip to **H12**

H11. If Yes, tick 3 most important constraints from below faced by your household/holding in 2018. (Only for household type holdings)

	Tick
Irrigation problem	
Unproductive land	
Labour shortage	
High labour wages	

	Tick
Crop damage by wild animals	
Crop damage by insects /diseases	
Drought	
Excessive rain	
Hailstorm / wind	
Landslides / soil erosion	
Livestock depredation by wild animals	
Livestock diseases	
Lack of feed and fodder supply	
Shortage of land	
Limited access to market	
Difficulty in getting loans	
Difficulty in getting farm machinery	

H12. Was your household able to meet all food requirement for all of 2018? (Only for household) Yes- 1| No- 0

7. SECTION I: FORESTRY

I1. Did your household collect Wood or Non-Wood Forest Products in 2018 for consumptions or sales? (Only for household type holdings) Yes- 1| No- 0 If No skip to **J1**
Tick the NWFP(s) collected in 2018 (Only for household type holdings)

	Tick		Tick
Wood for Dhapa and other cups		Cane (for making bang chu, baskets, ropes)	
Firewood		Cane shoot (patsa for curry)	
Mushroom (Wild)		Bamboo shoots (for curry)	
Wild Orchid flowers		Fern shoots (Naakey)	
Illicium fruits / Star anis		Damru	
Walnut (wild)		Satuwa *(Paris polliphyla)*	
Hazel nut / Chest nut		Paan/betel leaves	
Rubiacordifolia (Soe / Laneru / Majeto) Dyes		Incense leaves/ plant (sang-zey)	
Chirata		Oil seeds/nuts (e.g pangtse makhu)	
Pipla		Daphne bark	
Resin		Shilajit	
Lemon grass		Cordyceps	

7.1 J1. GPS READING OF THE HOLDING

To get GPS make sure the location function of your device is turned on. GPS location of the holdings will enable MoAF to understand the spatial distribution of the holdings across the country for better landuse planning. If you do not intend to capture GPS, you must note the reason (click on Note icon and type the reason) before selecting 'No need'.

If GPS coordinates could not be acquired upon clicking 'Get GPS' and waiting for 60 seconds, just type 0 (zero) in the LATITUDE AND LONGITUDE items to end the questionnaire.

1-Get GPS; 0-No need (coordinates will be captured in LATITUDE and LONGITUDE

THE END