

University of Applied Sciences



# Commercial chicken production in Bhutan: *Will social and religious sentiment allow the development?*



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*A Research project Submitted to Van Hall Larenstein University of Applied Sciences in Partial Fulfillment of the Requirements for the Degree of Master of Agriculture Production and Chain Management:*

**Specialization in Livestock Chain**

**T s h e w a n g T a s h i**

September 2009

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## ABSTRACT

This thesis aims in exploring the situation in which the broiler production is being carried out in Bhutan at present and find out the possibility of up-scaling domestic production. The study looks at two different components, the broiler chain, and the future consumer to understand the potential for market and explores for suitable intervention strategy toward establishment of domestic production which is based on Bhutanese context.

The study is guided by two main research questions focusing on what needs to be considered to develop domestic broiler production by looking at potential from consumer perspectives. It is non experimental research work, yet provides new knowledge and information for further development.

To accomplish the study objectives with high level of significance, the author has carried out intensive survey with larger samples and conducted case study with observation at the production sites, and with the broiler chain stakeholders at various level. To grasp the dynamics and effectiveness of the study, the author included all the stakeholders in the broiler chain development, totalling to approximately 345 people involved in the study. This diversity allowed in concluding the weaknesses and limitations of present broiler production and in giving a clear picture of the future domestic production.

Data used in this study were obtained through three different surveys on consumers and chain supporters, a cases study conducted with series of individual and group discussion, which involved stakeholders in Broiler chain development. The research conducted analysis on present situation and potential using, Value chain development, PESTE, Potters 5 forces, and economic analysis.

The result of study shows that the domestic broiler production has potential in Bhutan and it is economically feasible. It is seen that Bhutanese consumer care about quality and are willing to pay higher price for locally produced chicken. The perception of religious sentiment has no effect on consumer in general as well as the producer in the southern part of the country.

The conclusion in the study is summarized as a need to implement a set of recommendation of which a change in policy toward chicken development in Bhutan is highly emphasized; the future commercial production should aim for urban markets with strategies to improve quality and sustainable supply in the market. The findings strongly support the argument to accept the hypothesis of the study.

## DEDICATION

This thesis is dedicated to my father Mr. Pema Wangchuk and to my loving wife Kinley Chimi, sons, Jigme Nidup and Jigme Gaysel who always encouraged me in pursuing my studies and supported me morally to accomplish my works.

## ACKNOWLEDGMENT

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## LIST OF ABBREVIATIONS

1. AMS: Agriculture Marketing Section
2. BAFRA: Bhutan Agriculture Food Regulatory Authority
3. CP : Crude protein
4. DOL: Department of Livestock
5. DLO : District Livestock Officer
6. DOC : Day old chick
7. GDP : Gross Domestic Product
8. GNH: Gross National Happiness
9. IMS : Information management system
10. MT: Metric Ton
11. MOA: Ministry of Agriculture
12. ME : Metabolic energy
13. MSL: Meter above sea level
14. Nu : Ngultrum
15. NSB : National Statistic of Bhutan
16. PTC : Practical Training Centre
17. PHCB : Population and Housing Census Bhutan
18. PESTE: Political Economical Social Technology Environmental
19. RNR: Renewable Natural Resources
20. WTO : World Trade organization

## CHAPTER I: INTRODUCTION

### 1.1 INTRODUCTION TO THE STUDY

Broiler farming in Bhutan was introduced at farmer's level in Tsirang Dzongkhag<sup>1</sup> in 2004 and later in Samtse in 2006 by the author of this study. The production has not up-scaled due to various constraints in the broiler chain. There is a huge demand for chicken in Bhutan and chicken produced within Bhutan upholds higher preference in the market (Norbu & Wangdi, 2009).

One of most pertaining issue in domestic production is irregular supply of day old chick, heavily depended on import from India. There is a wide spread notion among policy makers, implementers and the general public that religious sentiment, and social stigma is the main constraint in up-scaling chicken production in Bhutan. The author argues that social sentiment prevails in Bhutan but it has little effect on chicken production if it is done in a right place with appropriate facilities. Chicken production is an important foundation to the livelihood of most households in developing countries. About 80% of the birds kept are indigenous while 20 % are commercial (Gueye E.F., 2002).

The definition of broiler production in this research includes the chicken which is reared in large number specifically for meat. The word domestic production is used to express chicken which is reared inside Bhutan not necessarily native chicken but it is more on exotic meat breeds mainly used for commercial purpose.

The term broiler chain refers to the entire gamut of commercial chicken raising, feed suppliers, day old chick and other support services.

The study is divided into eight chapters, with more emphasis on analysis and the recommendation. The conclusion of the study reflects the core analysis for the domestic broiler production and gives a clear picture of the future prospects by answering the question in the research objective.

### 1.2 JUSTIFICATION OF THE STUDY

Bhutanese consume meat widely and it is a staple diet for most families. The change in income level and living standard is bringing in new food habit, which demands more meat items in the diet. However, the country heavily depends upon meat import from India and other neighbouring countries due to limited domestic production.

In the event of chicken disease outbreak in India, Bhutanese consumers mainly in the urban areas has to remain without chicken or egg in their diet for many months this is because domestic chicken production is not up-scaled until now and there is not enough production inside the country.

This study, a first of its kind, will respond to the need for clear analysis on the potential and scope of domestic broiler industry development in future. The research will enhance the decision making ability of farmers, private entrepreneurs, policy makers, and other stakeholders to invest in up scaling domestic broiler production.

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<sup>1</sup> *Dzongkhag* is a district in English translation, *Tsirang and Samtse* are two districts in Bhutan

### 1.3 PROBLEM STATEMENT:

People are sceptical to invest in commercial chicken production due to lack of basic information on future potentials and prospects of domestic production. This situation is worsening by heavy dependency on irregular input supplies through import and weak broiler chain at present. Religious and social sentiment of the people is perceived as the main constraints in up scaling domestic production. However, it is not clearly understood whether religious sentiments and social stigma affect the consumer in chicken consumption and production.

### 1.4 OBJECTIVE OF THE STUDY:

To explore if domestic broiler production will be commercially feasible and sustainable in Bhutan.

Hypothesis:

*Religious sentiment and social stigma, is a not a hindrance for future commercial chicken production.*

The assumption in this research was that, weak strategies and low capacity of the chain supporters hinders up-scaling domestic chicken production in Bhutan.

### 1.5 RESEARCH QUESTION

**What feasibilities to be considered in supporting domestic broiler production in Bhutan?**

***Sub-questions:***

1. What is the state of present broiler production chain in Bhutan?
2. What is the situation of input supply and demand?
3. What are the constraints in the present broiler chain?
4. What is the present capacity of different actors and supporter in the broiler up scaling
5. What types of support and strategy will up scale production?
6. Is chicken production and consumption affected by religious sentiments?

**Main research question 2**

**What is the potential of domestic broiler production in line with the Bhutanese consumer?**

***Sub-questions:***

1. What is the market and demand for chicken in Bhutan?
2. What is the potential of chicken to substitute other meat in future?
3. What is the preference of Bhutanese consumer in chicken?
4. What factors will make Bhutanese consumer buy more chicken?
5. What type of chicken meat does the Bhutanese consumer want?
6. Will Bhutanese consumer be able to pay for higher quality chicken future?

## CHAPTER II: RESEARCH METHODOLOGY

*This chapter elaborates on the research method and instruments of data collection. Furthermore describes research site and sampling of respondents.*

### 2.1 RESEARCH DESIGN:

The research used both qualitative and quantitative analysis. Survey and case study were used in this study.

Two week desk research was done to collect relevant theories, concepts and information, to better understand the research context, and prepare for field works. Available relevant documents from the department of Livestock in Bhutan and other relevant sources were reviewed. The Information Management Section under the Department of livestock and Bhutan Agriculture Food Regulatory Authority was the main source of data on import, consumption and production of chicken in the country. Apart from this, the secondary data source from Agriculture marketing section, Bhutan Statistical Bureau, the district livestock offices in Samtse and Tsirang offered wide range of data and information.

#### 2.1.1 QUESTIONNAIRE DEVELOPMENT

The questionnaire development started with the focus on what actually the research wants to achieve. The variables in the survey questionnaire were developed according to the test which needs to be conducted to prove the hypothesis in the research and the assumptions made. Three different kinds of questionnaires were used to get different data.

**Table 1: Items in the survey questionnaire**

Consumer survey I	Consumer survey II	Extension agent survey
23 questions	15 questions	10 questions

#### 2.1.2 PRETESTING

The content of the survey questioner were pre-tested with expert view on the design and strength of questions. All items required ticking on the choice provided. A five point scale was used to get ranking response. Participant could provide additional information in an open section in each part.

A group comprising of a district livestock officer, district forest officer, assistant livestock officer and a general nurse (recently completed a research paper) working in Samtse, reviewed the questionnaire in Bhutan, to see the structure and different questions to be asked. The same questionnaire was reviewed by International master student in Van Hall Larenstien comprising of 2 students from international Agriculture, 2 from horticulture and 2 from Livestock chain. The panel recommended further items for inclusion and minor adjustment. For example, location in the survey from I, was often confused with place of birth of respondent.

The content validity of the survey was enhanced by developing items from the actual field situation and literature on similar cases. Criterion validity was not assessed because there was no established reliable instrument with which to compare the result. A pilot survey was conducted with 38 respondents in Tsirang, Samtse and Thimphu. The respondent reported that the survey was quick and interesting to answer and considered the tool as a suitable means to get information. Each interviewer took 7 minutes in average to complete one questionnaire.

## 2.2 SURVEY

Three different surveys were conducted to collect data, which was intended to answer the main research question on consumer behaviour and chain development from the consumer perspectives.

The three different surveys:

1. *Survey on Individual consumer( household level)*
2. *Survey on Institutional consumer(hotels, and restaurants)*
3. *Survey on capacity of Extension worker on rendering support on broiler production*

The data collection through survey was done strategically to get maximum data in shortest period. The author was supported by 12 interviewers, mainly the staffs working under ministry of agriculture to collect data using structured questionnaire. The interviewers were briefed about the research focus and how the survey should be conducted. The author also conducted surveys and carried out case studies simultaneously, as it requires understanding the real context and in-depth information about the topic. The field survey was conducted from 18<sup>th</sup> July to 4<sup>th</sup> August 2009 covering eight Districts in Bhutan.

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### 2.2.1 RESEARCH SITE AND SAMPLING

The research has significance for Bhutan as a whole due to its small population and land size. Therefore the study requires huge sample, which can represent the whole country. Selection of 8 districts for survey and two districts for case study was done using random sampling from 20 districts in Bhutan. The rationale behind selecting 8 districts is to cover diversity in ethnic, geographical, religion, and population density. Tsirang and Samtse districts were used as a pilot study site for conducting case study at the producers level. The selection is based on the chicken production data of the country ( DoL, MoA 2008). The data used from consumer survey is a representative figure for the entire county.

There were 250 individual household consumers, 30 institutional, 18 extension agent <sup>2</sup> to complete the survey. The other part of the study involved 17 (individual stakeholders in broiler production chain), 2 farmers group with 15 farmers in each group. (Refer annex 2. &2.1) A total of 345 people were directly involved in this study.

Author on personal request mobilized all these people and invited in the study.

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<sup>2</sup> Extension agent in this study is person dealing with livestock production

### 2.2.2 ANALYSIS OF SURVEY DATA

The surveys were used to answer the second main research question, which dealt with consumer behaviours on chicken consumption and the way they buy chicken.

The data collected from survey were coded and analyzed using statistical package for social sciences (SPSS) version 16. The study also used various graph, cross tabulation and frequency table to derive strong argument based on the research hypothesis.

All statistical tests were performed at  $P=0.05$ .

#### ***Different test used in data analysis***

##### 1. Mann-Whitney Test

Test was applied to see if the choice of meat is depending on the religion background.

##### 2. Nonparametric Correlations:

- a. To see if there is a significant correlation in education level and how strongly consumer opposes or support chicken production
- b. To find out if there is a correlation between Religion and meat consumption. It was tested on Buddhism and Hinduism as the main independent sample with different meat type.

##### 3. Cross tabulation

To see which section of people with different income level are affected due to ban on import of chicken in the country.

### 2.3 CASE STUDY:

Checklist on 4 category of pre-defined interviewee guided the Case study. The semi-structured interview question was used to collect data.

Interviews were conducted on four main categories:

1. *Individual interviews with Producers( 2 farmers group( 30 farmers in total)*
2. *Individual interviews with meat vendors (3 wholesaler, 2 meat vendors)*
3. *Individual interviews with chain supporters (7 individuals)*
4. *Individual interviews with Input Supplier (3 suppliers)*

The author used informal interviews with the targeted respondents, guided by check list. This method provided more fundamental information for in-depth analysis of broiler chain. On site observation at production level was done to get the real facts and experience the happenings. English was used as the medium; however, interview with non-literate respondents was mostly conducted in *Dzongkha*<sup>3</sup>.

The case interviews were conducted in three Districts, Samtse, Thimphu, and Tsirang. The author met most of the stakeholders personally and a few were interviewed through telephone. It took time to meet the required people who could provide actual facts about the on going broiler production and past experience. The case study started from Samtse on 14<sup>th</sup> July and ended on 4<sup>th</sup> August 2009. District livestock officers in Tsirang and Samtse assisted the author while meeting with farmers.

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<sup>3</sup> *Dzongkha* is the national language of Bhutan

### *Clusters in the research*

To compare the results, the study used two different types of clusters as mentioned below in both survey and case study. The clustering allowed the study to give judgement in building up strong recommendation for future development by looking from two different perspectives. It also helped in evaluating the research method by looking at what differences the research had in different clusters, and how it differed in the output.

#### 1. Cluster in Survey methods:

*Normal consumer (household level)*

*Institutional consumer (Restaurants, hotels, resorts)*

#### 2. Cluster in case study method:

*Broiler farmers in two different districts ( Tsirang and Samtse)*

**Table 2: Composition of Broiler farmers in Tsirang and Samtse**

	Gender		Religion				Average Starting stock	Present Stock
	Male	Female	Hindu	Christian	Muslim	Buddhist		
<i>Tsirang</i>	15	0	13	2	0	0	400	715
<i>Samtse</i>	12	3	11	1	2	0	433	0

### 2.3.1 ANALYSIS OF CASE STUDY DATA

The case study was used to answer the research question one, which dealt with feasibility of domestic chicken production in Bhutan.

Data from the case study took more time to analyze, the study used content analysis. As soon as the interview or discussions were conducted, information was written down and made category according to the question and importance for the study objective. Small conclusions were drawn on each question asked, and put together to get a clear picture of subject discussed. Analysis was based on actual findings and the conceptual frame work used in the study.

The research methods used in this study is supported by concepts and theory which are selected to help in defining the research outcome. The next chapter (III) will deal on conceptual frame work.

## CHAPTER III: CONCEPTUAL FRAMEWORK

*This chapter aims to elaborate principles and concepts, which is useful in understanding the problem in domestic broiler production in Bhutan. Few selected concept will be discussed for the purpose of this study.*

- Value chain development,
- The 5 Competitive forces model of Porter
- Marketing system
- Consumer behaviour

### 3.1 VALUE CHAIN:

A value chain is a sequence of production processes from the provision of specific inputs for a particular product to its primary production, transformation, marketing and distribution, and final consumption. It analyses the links and information flows within the chain and reveals the strengths and weaknesses in the process. It also analyses the boundaries between national and international chains, takes into consideration buyers' requirements and international standards (Richter 2005).

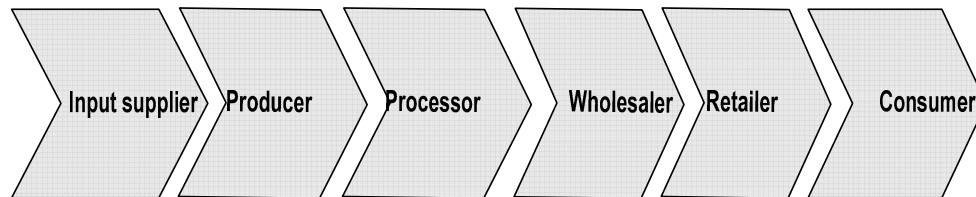


Figure 1: A simple Value Chain Model (Source VPC, APCM 2008)

The value chain approach addresses factors that determine if a product meets market requirements with regard to quality, price, dependability, volume, design and speed of delivery. In a value chain, producers, processors, distributors, brokers, wholesalers, meat vendors and consumers are the main actors.

Further, Kaplinsky, 2000 as cited in Asian Development Bank 2004, *defines a chain as the full range of activities which are required to bring a product or service from conception, through the intermediary of production, delivery to final consumers, and final disposal after use.* In operationalizing the concept of value chain analysis the indicators which can be distinguished are: (1) value chain mapping, (2) quantifying and describing the chain in detail and (3) economic analysis and benchmarking. The core and most essential indicator being mapping of the value chain (GTZ, 2007)

For the purpose of this research, the chain analysis will be limited to mapping, describing and identifying the constraints in the chain.



### 3.2 THE 5 COMPETITIVE FORCES MODEL OF PORTER

Besides analyzing the competition among market forces, the model can also be used to predict the eventual attractiveness and profitability of an industry. The collective strength of the forces determines the ultimate profit potential of an industry, which is determined by the strongest competitive force (s) (Porter, 1979).

To analyze the profit potential and attractiveness of a sector it is important to analyze the chain. A chain can be analyzed by chain mapping in which stakeholders, activities and relations are described. Analyzing the constraints and opportunities, calculation of gross margins can also be among the activities. After the forces engaged in the sector are identified, they are analyzed to determine their strength, using the model and theory of Porter. The competitive forces model of Porter can be used for both analyzing the competition among market forces and to predict the eventual attractiveness and profitability of an industry

The Competitive Forces analysis is made by identification of 5 fundamental competitive forces: (1) Entry of competitors, (2) Threat of substitutes, (3) Bargaining power of the buyers, (4) Bargaining power of suppliers and (5) Rivalry among the existing players. Sometimes the Government is added as the sixth competitive force. The collective strength, determined by the strongest competitive force (s) determines the ultimate profit potential of an industry (Porter, 1979). In this research the model will be used to analyze market segmentation, competitive edge building from production to wholesale-level.

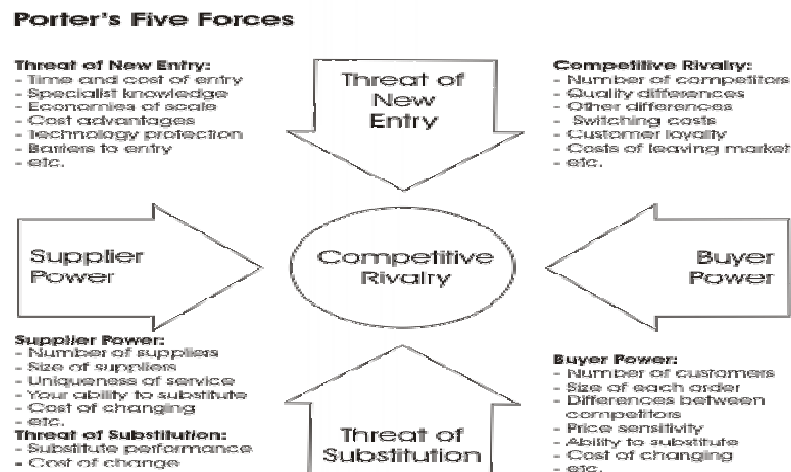


Figure 2: Porters' 5 forces model (Source: mindtools.com)

### 3.3 MARKETING SYSTEM

"Marketing system" is a primary mechanism for co-coordinating production, distribution and consumption activities in the food chain (Kaynak, 1999). In this context, marketing includes the exchange activities associated with the transfer of property rights to commodities, the physical handling of products and the institutional arrangements for facilitating these activities

From review of the literatures it can be concluded that marketing systems for meat are complex, and tend to vary across meat type species, location, end use (fresh or processed), and destination (local, town, big city, or export market).

In Bhutan marketing system is very simple yet more complex due to lack of required facilities. Farmers bring their produce to nearby markets and sell to meat vendors or directly to consumers. Small farmers, especially those on the periphery of big cities, practice this system. Producers have a direct link with consumers and can adjust their produce according to consumer preferences if it is a small production.

In this research these concepts of marketing chicken implies that marketing of products begins at the farm when the farmer plans his production to meet specific demands and market prospects. The broiler produced in the farm cannot usually go directly to the end consumer in large quantity. The production sites are far away from the place of end consumer. Thus the transportation is required to bring the product. Chicken production at present is irregular while consumption is regular and continuous throughout the year.

Thus, storage, supply of input and good marketing channel is required to adjust supply to demand. Similarly, a product is rarely in an acceptable form to consumers as the processing and marketing system is not developed. Farmers are not able to do process their product in various ways, and to be presented to the consumer in convenient quantities for sale. Moreover, the farmer expects payments when his produce leaves his possessions, but usually the buyers do not do payments on time.

### 3.4 CONSUMER BUYING BEHAVIOUR

Buying behaviour is the decision processes and act of people involved in buying and using product (Lecture Outline. *Consumer Markets and Consumer Buying Behaviour*, 2009) For the purpose of this research consumer behaviour is to understand what influences the consumer to buy more or less chicken.

Possibly the most challenging concept in marketing deals with understanding why buyers do what they do (or don't do). But such knowledge is critical for marketers since having a strong understanding of buyers behaviours will help light on what is important to the customers and also suggests the important influence on customer decision-making. Using this information, marketers can create marketing program that they believe will be of interest to customers. Buyer behaviour is deeply rooted in psychology with dashes of sociology thrown in just to make things more interesting. For different reasons people of different age groups purchase different food. (Lecture outline. *Consumer Markets and Consumer Buying Behaviour*, 2009)

Every person in the world is different, it is impossible to have simple rules that explains how buying decision are made. The study shows that the consumer buying behaviour is affected by three main factors: personal, psychological and social factors. At the personnel level, the buying behaviours can be unique to a particular person, demographic factors, sex, race, religion, age, etc. It can also depend upon the person who is responsible for decision making on food choices in the family.

In this research the concept of consumer behaviours is especially used to study how people choose between locally produced chicken and imported chicken. It is very important to understand the factors which determine the buying decision. This will allow the study to recommend a set of strategies, which can up hold competition over imported chicken in future.

## CHAPTER IV: MEAT PRODUCTION AND CONSUMPTION IN BHUTAN: AN OVERVIEW

*This chapter will discuss on the meat consumption and production in general with an insight into the religious and social stigma a perceived constraint in up-scaling domestic meat production in Bhutan. The chapter is more of literature review, which will try to give the overview of how meat production and consumption is taking place in Bhutan.*

### 4.1 BACKGROUND

Bhutan is an agricultural country with an area of 38,394 sq. km populated by 6,34,982 people, of which, 30.9% live in the urban area (PHCB, 2005). With an elevation ranging from 100 to 7500 MSL, there are six agro-ecological zones, from north to south. About 72.5% of the land area is under forest cover and is home of diverse flora and fauna. Only 7.7% is suitable for agriculture and human habitation. Agriculture is the single largest sector providing livelihood to 66% of the population in the country (NSB, 2008). Due to scattered population and low density (16 person per square kilometre) (PHCB, 2005), the consumer-base is small for large production of any goods for domestic market, moreover there is high competition from neighbouring countries.



Figure 3: Geographical position of Bhutan

There are 20 Districts in Bhutan; Thimphu is the capital city the most populated urban centre. The country established democratic constitutional monarchy in 2008, which made Bhutan the newest democratic country in the world. Buddhism is the state religion which majority of the people follow. The other religions practised are Hinduism, and small % of Christianity and Muslim.

#### *Bhutan's development Philosophy*

*Gross National Happiness is the development philosophy widely practiced at various level of development programs in Bhutan. Recognizing the wide ranges of factors that constitute to human well-being and happiness, four major areas are identified as the pillars of Gross National Happiness. These are economic growth and development, preservation and promotion of culture heritage, promotion of sustainable use of the environment and good governance. The global recognition can be witness as far as, the highly developed countries like Netherlands are trying to adopt the concept of GNH philosophy.*

*Bhutan is reported as the 8th happiest countries in the world (Business Week, London, 2008). The country has a per-capita GDP of 2082 USD, ranking the country on 17th position among 33 countries in Asia. (Global Property Guide, 2009)*

In Bhutan development is looked towards equitable share of resources and balance development. It is not the material wealth but social well-being and spiritual healthiness which are priorities. Mass production by few beneficiaries is not a priority in Bhutan, while production by mass is considered as a strategy to make small farmers get opportunity to earn income by participating in the larger market.

## 4.2 FARMING SYSTEM

Land is fairly distributed with at least 56 % of the households with land holding between 0.5 and 2.02 hectares each. Absolute landless is not very significant in Bhutan (Tobgay, 2006). This small piece of land is normally fragmented. The steep slopes, poor soil, abundant pests, and limited market access compels the households into more self-reliant subsistence farming strategy. The farming is characterized by rearing of livestock and crops together among which the chicken keeping is an integral part.

The relation between the different components in the system is very strong and it has greater symbiotic relation. An old cow may not produce milk, yet it is a vital component in the Bhutanese farming system due to use of cow dung as important farm manure. The farming system in Bhutan is determined by ethnic, religion and location of the farm household. For example goat rearing is a part of farm component in southern Bhutan while it is rarely reared in the West and central part of the country (DoL, MoA, 2008). In western, central and eastern part of the country, farm family gets more attached with their livestock and leads to non culling after the productive age (DoL, MoA 2004). Bhutanese strongly believes in sin. To kill animal or eat meat is considered a sinful act, however most Bhutanese eat meat.

In this research understanding the farming system is important to make recommendation towards up-scaling broiler production, and building up strategies.

## 4.3 MEAT PRODUCTION AND CONSUMPTION:

The meat production and consumption figure from 2006 to 2008 shows that country imported 29387.89 metric tons (MT) of meat, which accounts to 86 % of the total consumption. The domestic production was only 4900 MT. The chicken consumption was 4434 MT of which, 3554 MT was imported. The study conducted on social, religious & economic aspects in Bhutan shows meat consumption is increasing whereas, the domestic supply of meat against import is decreasing (DoL, MoA, 2008). Tobias & Morrison (2009), in their study on animal rights in Bhutan revealed a drastic change in a community in the eastern part of Bhutan; those lived their entire live on slaughter of cattle. The entire hamlet gave up slaughtering of animal in 2007 coinciding with the descending day of Lord Buddha. Such change in the livelihood leads to decrease in meat production inside the country, which directly increases the dependency on import.

In Bhutan, eating meat is not condemned; the act of killing animals for their meat is treated with utter disdain. Until 2004 Bhutan had only two registered slaughtered house, later it was shut down due to social pressure and conflict from the people living around (DoL, MoA, EU Livestock Project-SLS 2008).

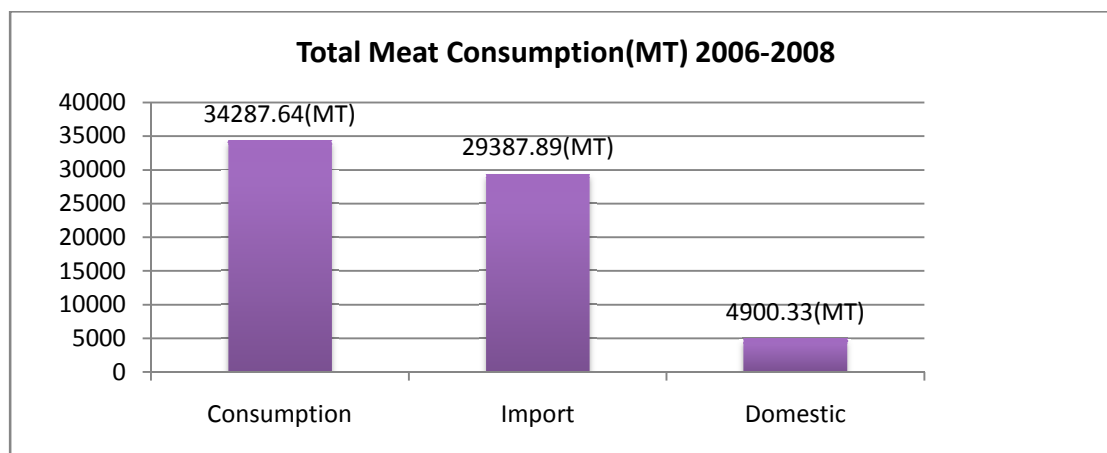


Figure 4: Meat consumption in Bhutan and sources (BAFRA, DoL, MOA 2008)

The available data on meat consumption clearly shows that there is a huge market for meat in the country. The per capita meat consumption in Bhutan is about 3 kilogram, while chicken consumption is about 2.3 kilogram (Tobias & Morrison, 2009).

The domestic production is very low vis a vis to the consumption (IMS, DoL, MoA, 2008). This information provides two conclusions; either Bhutanese can afford to import or internal production is not possible. The social stigma and influences from the religious bodies has lead to stop culling and slaughtering animal in many parts of the country (DoL, MoA, 2004).

In Bhutan Meat production is a complex issue, it requires proper strategies which can tackle both technical as well as social issues. This is explained in the study conducted by department of livestock that people are willing to take up livestock farming but are sentimental in culling the old stock especially in east, west and central part of the country (DoL, 2004). In Bhutan, people try to balance both economical gains and spiritual need at the same time. Technically, keeping animal after the productive age is not profitable.

In the southern part of the country, people are more sentimental about slaughtering cows. Pig, chicken and goat is preferred as a cash earning livestock with lesser sentiment and social stigma (DoL, MoA, 2004).

There is a contradiction on whether religious sentiment is a reality or myth. For instance, holy place like Bumthang in Bhutan has three meat shops, which directly means that people are still eating meat. As a Buddhist by religion people should be eating less meat but most families likes eating meat. From 2005-2006 the residents of Thimphu consumed 1,200 metric tons of imported beef. Phuntsholing, home to the country's largest slaughter house de-skinned 15,500 cows, while the same year Bhutan imported 1000 MT pork. During the auspicious months (Saga Daw<sup>4</sup>) the sale of all meat is banned, as per a decision taken by 79<sup>th</sup> National assembly in 2000. Yet this has also prompted a hoarding of meat products on eve of every Saga Daw.

However, eating meat is not really hindered by religious sentiment, except for few people. The practice of *Saga Daw* is traditional and politically debated. It has negative impact on the

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<sup>4</sup> Bhutanese auspicious month starting from 4<sup>th</sup> month of Bhutanese calendar (roughly July month) in which it is believed killing animal and eating meat is the biggest sin.

consumer as well as the producer at present. Meat sold in the restaurants and hotels in auspicious month are not fresh. The producers on other hand cannot sell their meat in those months even if it is ready for the market. This incurs extra cost on production and reduces profit margin. Although animal slaughtering is not taking place in the auspicious month, the number of animal killed on the eve of auspicious month is more than in normal months due to high demand for meat hording.

The religious sentiment is more at the communal level, and it is sometimes a shared view in society. Study shows, people who are entrepreneurial and more inclined towards economic gains appreciate culling and slaughtering the animal (DoL, MoA, 2004).

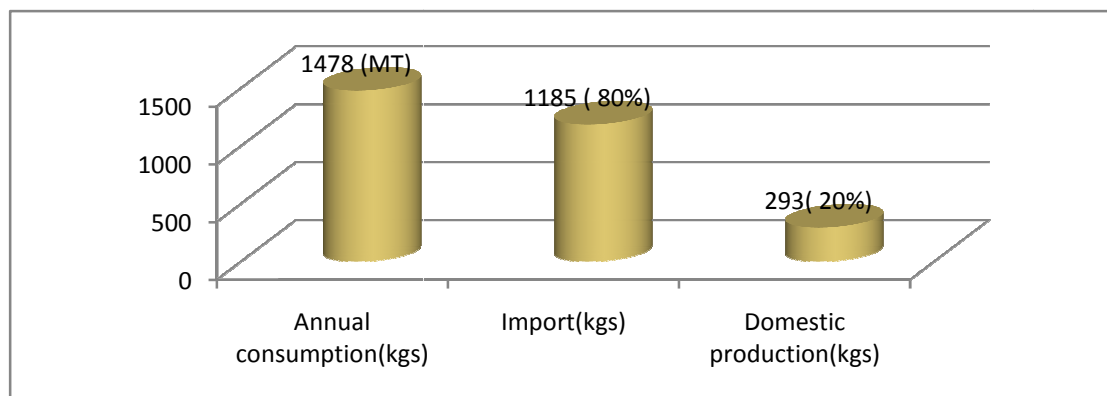


Figure 5: Chicken consumption in Bhutan and different sources (Source IMS, DoL, MoA 2008)

#### 4.4 CHICKEN PRODUCTION IN BHUTAN

Development in increasing chicken production started with the implementation of five year development plans in late 1970s in Bhutan. Breed improvement of native birds through cross breeding with exotic breeds was the main emphasis of the government with more focus at the subsistence level where farmers keep 10-20 birds for egg or meat. Though a small percentage of native birds has increased in production capacity, it is observed that chicken production has not developed from the subsistence level of production (Tashi, 2003). At present, there are only a few farms in the country which can be categorized into commercial level by production standards based on investment, infrastructures, and production.

##### *Constraints in Chicken development in Bhutan*

###### ***Non-availability of quality feed at reasonable price.***

One drawback in the poultry development is the non availability of input in the market readily.

###### ***Lack of people to invest in poultry infrastructures/equipment***

Many people feel that investment in poultry farming is a risk. This is due to less awareness and inadequate demonstration on the economical benefit practically.

###### ***Lack of parent stock farms for broiler***

There is no broiler parent stock farm in the country, due to this establishment of broiler farm should depend on Indian farms, which is assumed as a risk factor for such projects.

###### ***Lack of external donors for poultry development activities***

Development in the field Poultry is taking very slowly in the country. This is due to the fact that there are no enough resources to carry out different activities to enhance the overall development.

###### ***Lack of enough trained manpower (SMS) in the field of poultry***

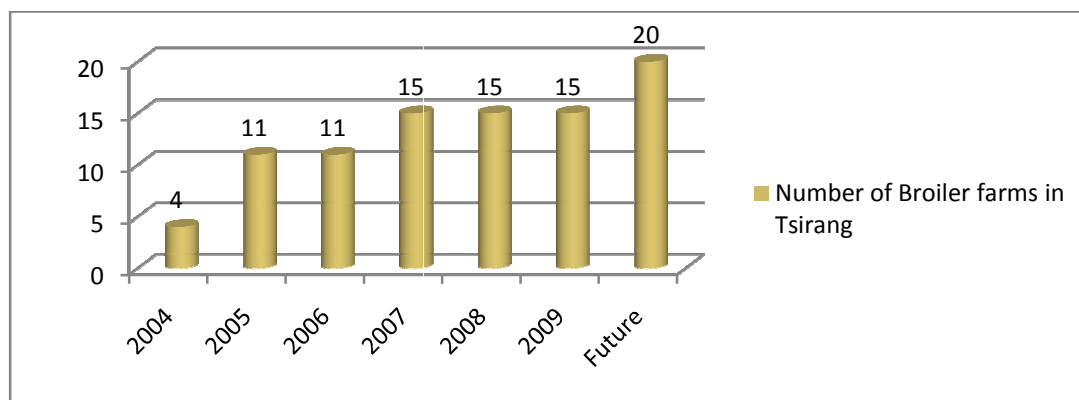
Due to few Skilled manpower and expertise in the field of poultry, it is very difficult to take up major activities or programs, which needs enough technical guidance.

Source: Chicken project up scaling semi -commercial farms (2003, Project report, DoL)



The above abstract of project discusses constraints which are obvious. There is a need to look for the real cause of the constraints which is affecting the development. If people are not investing in broiler production or infrastructure there must be a reason in it. Understanding the reason will allow further development in supporting the broiler chain.

Broiler farming was introduced on trail basis with 250 chicks in Tsirang. The trail was successful and triggered broiler farming as a fast income generating activity in southern part of the country. Farmers are interested due to cost effectiveness in terms of minimum land requirement and fast return from the investment. The climatic condition is suitable for broiler production in southern part of the country and rearing chicken for meat is accepted without social stigma.<sup>5</sup>



**Figure 6: Growing number of broiler farms in Tsirang**

*Interpretation: (Future in this graph mean any time if the input supply and other conditions are favourable which can support broiler production. The future projection is the result of the case study in which 15 farmers calculated their capacity to produce in future).*

Chicken subsector in the country can be divided into three main categories.

1. Table egg production and development
2. Native chicken improvement and conservation
3. Broiler production and development

The policy makers for livestock development have started appreciating the potential for broiler production to become an important meat sector in the country. It is gaining attention and moving steadily towards commercial production in the southern districts.

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<sup>5</sup> Social Stigma in this study refers to the pressure directly or indirectly a person feels from the society due to certain activities which is taken against the society's norms and believes.

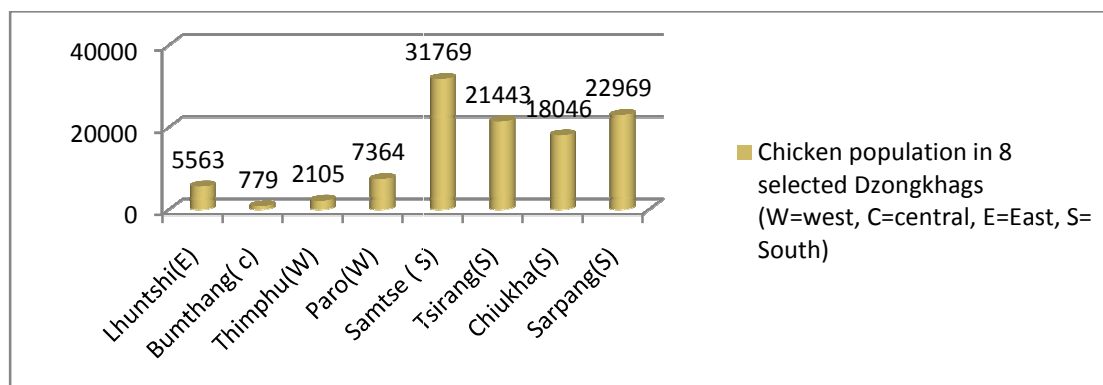


Figure 7: Chicken population of 8 selected districts in Bhutan

The above graph shows potential for chicken production in the southern districts of the country while other districts can be a potential domestic market.

The trend in native chicken growth in the country is taking place at fast rate. Swan (1999), states that “if the appropriate breed combination can be found for native chicken, which will produce increased number of eggs and meat while retaining scavenging ability and disease resistance when crossed, the new breed will contribute significantly to the income generation ability of the beneficiaries”. Besides commercial broiler production, there is a huge potential for up-scaling rural chicken production to contribute in rural household income generation and increased nutritional intake in the country. Rural chicken production, mainly used for consumption can help in reducing nutritional problems in the villages at the household level. Bhutan has high level of malnutrition and anaemia cases in children (MoH, 2009).

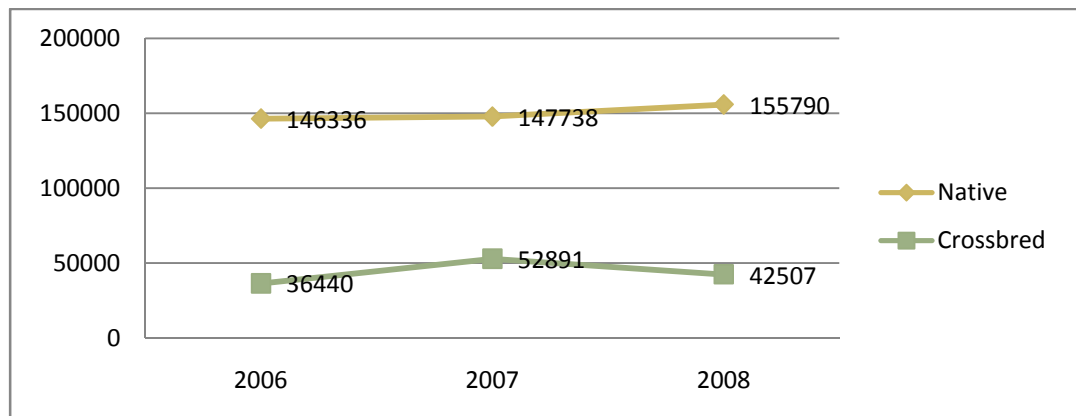


Figure 8: Chicken population growth in Bhutan

The figure 39 shows two different categories of chicken; native and cross bred with exotic breed. Native birds in this study means the chicken breed which is found in villages, and are local to the country. These native birds should not be disturbed in its breed composition. In general, people like domestic chicken due to attachment towards native birds and its meat taste. Crossbreds are generally used for commercial production. There is a potential to develop separate market channel for native chicken marketing. This area demands proper study and allocation of policy support for breed protection as well as economical gains for the rural farmers.



## CHAPTER V: DOMESTIC BROILER CHAIN DEVELOPMENT IN BHUTAN

*This chapter deals with the findings from case study. It answers to the questions in the research objective. It discusses more about the technical feasibility*

### 5.1 BROILER CHAIN IN TSIRANG

*For the purpose of the study, the commercial broiler chain analysis is done only for Tsirang District as a pilot study representing the whole country. The case study data from Samtse District is used for comparison.*

According to case study in the two southern districts, Tsirang and Samtse, domestic broiler production has earned reputation as a source of fresh and healthy broiler meat for the consumers especially in larger markets like Thimphu. Today there are about 30 farms in Tsirang and Samtse, varying in stocking capacity from 250 birds to 2200 birds per cycle of 42- 56 rearing days. Although the demand for meat is huge in the country, farmers are constrained with production factors like irregular input supply and weak marketing system.

There is no value chain at present; it is just an informal setup, which is disrupted by erratic input supply especially day old chicks. However, recent development in chicken sector due to ban on import of poultry and its product from India has attracted a few people for investment in poultry production. The first private hatchery in Bhutan started recently due to huge demand for layer pullets and broiler chicks in the country.

The broiler chain below explains the various actors and chain supporters in the present production and marketing.

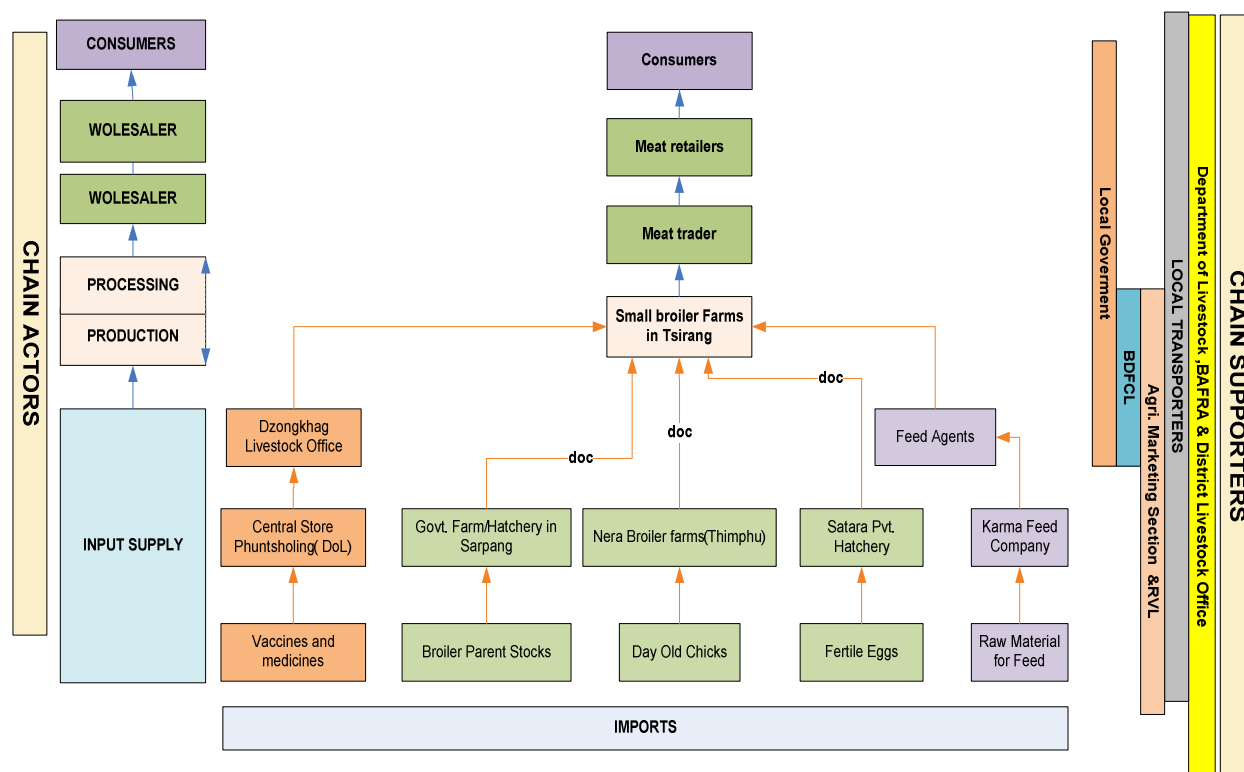


Figure 9: Present boiler chain in Tsirang

## 5.2 BROILER CHAIN SUPPORTERS

In this study, the supporters are classified as policy level supporter, regional level supporter and supporter at the production level. Most of these supporters do not have a mandate to support the broiler production as a special focus. In Bhutan, the development of farmers is taken as a collective responsibility of different sectors. The main coordination in supporting the broiler production is carried out by the District Livestock office.

**Table 3: Present broiler chain supporters and their function**

<b>Supporter</b>	<b>Functions</b>
<b>DOL(Department of Livestock)</b>	Policy and planning, Project monitoring, Technical Backstopping
<b>AMS( Agriculture Marketing Section)</b>	Support the farmers in finding market and training on marketing
<b>BAFRA( Bhutan Agriculture Food Regulatory Authority)</b>	Controlling the Products safety by inspecting the processing of birds at the farm site. Issue of import permit, inspection of day old chicks and feed from India. Checking products quality at the farm and at the sale places. Issue ban on product movement whenever there is disease out break
<b>RVL( Regional Veterinary Laboratory)</b>	Advise on disease control, Analysis of sample ,Disease Monitoring
<b>BDFC( Bhutan Development Finance Corporation)</b>	Provide Micro credit to the farmers
<b>District Livestock office</b>	Provide technical support on establishment of farm, production, and marketing of products. Provide the veterinary health care for the farm. Linking the farmers with hatcheries in India and feed companies. Provide market information and trainings for group management, broiler production, and quality management. Arrange logistic support( transportation) on emergency situation , Support in farmers organization development
<b>Sub-district ( extension officer)</b>	Vaccination of birds, Technical advice, monitoring and data recording, Providing feed back to the district office for interventions
<b>Transporter</b>	Transport chicken meat and inputs on hiring the vehicle

### 5.2.1 DISTRICT LIVESTOCK OFFICE

District livestock office, the main institution that supports broiler chain development in the district functions in a complex external environment. The PESTE tool (see Table 4) shows how the factors are hindering the effectiveness of the organization in supporting commercial broiler production and chain development. The organization has multiple livestock development activities which demands equal attention. The different activities implemented towards livestock development in the district with little focus dilute its effort in supporting the farmers in commercial production.

Therefore, it can be argued that the organization's mission in supporting farmers to move towards commercial production from subsistence farming is unrealistic. The development in chicken production in the District is dependent on initiatives of individuals; rather it should be established in the policy to take up such activities as a mandate. There is no chicken development master plan to guide chicken production activities with special planning and focus.

**Table 4: PESTEC analysis for District Livestock Office**

	Issue	Focus of the organization	Situation	Effect on development
Political	More importance given on table egg production	Improving native chicken breed through cross breeding	Budget prioritization has lesser share on broiler development	Cannot provide support as per technical requirement
Economical	Low consumer base, Low volume of production, Poor accessibility to market and input supply ,Dependency for input	Support subsistence farming	More subsistence development	Low volume, No formal product chain development in chain .
Social	Ethnic diversity with different believe ,Killing animal is a taboo,	Training and creating awareness to change the perception of people on social stigma	It has not changed the perception of people	No positive impact in meat sector development
Technology	Less choice for technology( chicken breed, machineries)	Adaptive research on technology used in other countries	Limited use of technology	Low production, lower quality
Environmental	Disease(avian flu),Scattered location of farmers	Education, Vaccination	Low production, Higher production cost	No enterprise development

**Analysis from the PESTEC:**

*The focus of the organization on chicken farming do not support commercial production at farmer's level, subsistence farming seems a right choice for the rural farmers as the nature of production, capacity of farmers, social taboo, risk and choice of technology leads the farmers away from commercial production. Although this system does not take farmers farther in development, the focus of the organization needs a change.*

## 5.2.2 CAPACITY OF EXTENSION WORKERS

Extension workers are the first line of contact with the farmers in Bhutan. They provide technical support and motivate farmers towards adoption of new farming system and technologies. The study shows that extension agents have the feeling that religious sentiment is the main problem in commercial chicken production. Therefore, it can be stated that the motivation of the extension agents are lower towards encouraging chicken farming which requires killing. Table 5, on problem perceived by extension agent in up scaling broiler production shows that 38.9 % of the extension agents surveyed (n=18) believe religious sentiments as a big hindrance towards chicken production, with strong agreement on input supply as the biggest problem. These findings indicate low confidence level of extension workers in advising or motivating farmers on activities which requires killing animal.

**Table 5: Problem perceived by extension agents in up-scaling broiler production**

<b>What is the main problem you see in encouraging farmers to take up chicken production?</b>					
		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Religious sentiments	7	38.9	38.9	38.9
	Input supply	2	11.1	11.1	50
	Diseases	9	50	50	100
	Total	18	100	100	

Chicken development requires strong technical support especially when it is about commercial production. Poor management in the farm can incur heavy losses to the farmers. The study shows the support required by broiler farmers are sometimes not met by present capacity of the extension agents. Data collected on the capacity of the extension agent on chicken development shows a very big gap between the need of the farmers and the capacity of the extension agents. The frequency table generated from the data shows that 55% of the respondent (n=18) are not able or provide very minimal technical advise to the farmers.

**Table 6: Knowledge and capacity of extension to provide advice on broiler farming**

<b>Are you able to give required advice and technical support on broiler production and up scaling?</b>					
		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Yes	8	44.4	44.4	44.4
	No	2	11.1	11.1	55.6
	Very minimal	8	44.4	44.4	100
	Total	18	100	100	

This finding is supported by case study in Tsirang where which farmers explained that technical support is inadequate for broiler production. This situation can be due to the fact that broiler farming being new in the country, the extension agents are not very competent to provide advises on many issues related to broiler production, processing and marketing. Survey result on Extension Agent <sup>6</sup>in Samtse, who were asked about their confidence in providing technical support to farmers on broiler production revealed the need for more knowledge in broiler production to advice farmers.

67% of the respondent (n=18) said that they need more knowledge on broiler production. 28% said they are not confident in advising farmers on technical issues related to broiler production, only 6% of the respondent is confident.

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<sup>6</sup> A livestock extension agent in Bhutan is not specialized on one particular subject. They handle various activities from vaccination of animal to training the farmers, and input supply management

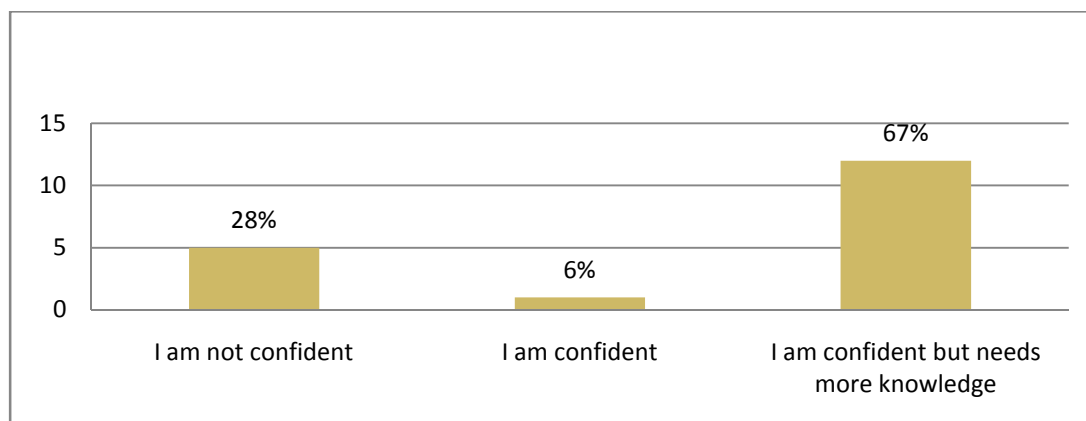


Figure 10: Confidence of extension agent in supporting broiler production

It can be concluded that technical capacity of the extension agent in supporting the farmers are inadequate. With the growing number of farmers opting for commercial production, the present technical capacity should be upgraded.

### 5.3 ANALYSIS ON INPUT SUPPLY (DAY OLD CHICK):

Comparing to farmers in Tsirang broiler farmers in Samtse will be affected more in future due to non-availability of hatchery in the district and long distance from the existing hatcheries in Sarpang, in Bhutan. The issue of continuous supply of day old chick will remain a core problem if the of internal production for day old chick is not established in Samtse. It will take approximately 10 hours to cover 490 km to transport day old chicks from the present hatchery location in Sarpang through land route to Samtse. The consignment need to pass through the Indian state of West Bengal <sup>7</sup> where Avian Flu is a great risk, and ban on poultry import leads to total closure of farms .

The choice to transport broiler chicks from Thimphu (240 km) still has a huge economic loss due to high cost of the chicks, transportation and higher transit mortality of day old chicks.

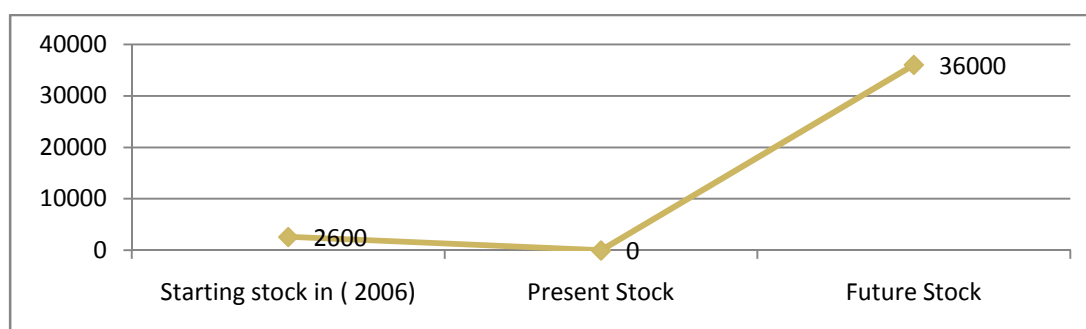


Figure 11: Future day old chick requirement for Samtse

<sup>7</sup> West Bengal is a state in India, bordering with Bhutan

With the growing number of farms and farmers motivated to take up larger production in future, a mini hatchery with parentstock can be economically viable in Samtse.

The calculation on future broiler stocking by farmers shows that the farmers will stock an average of 2400 chicks in a cycle of 7 weeks in future. Therefore, a hatchery and a small parent stock farm with a capacity to produce 5000 chicks per week will be very instrumental in up-scaling production. The hatchery can also supply chicks to Chukha district which has recently seen farmers opting for commercial broiler production.

#### 5.4 PRESENT PRODUCTION SYSTEM:

The farms in study locations are very small and scattered, which are 1-6 km away from motor road head. In Bhutanese situation the present farm size of more than 100 birds can be considered semi-commercial due surplus production for the household. This is because development in chicken sector is taking place recently from subsistence farming to commercial production. However the size and volume of chicken production is very small comparing to other countries in the world and can be categorized as small scale producers. The present production level is considered as huge volume by Bhutanese context, and has impact even at the national market. The farmers follow deep litter system, with stocking rate of 10 birds / meter square. Birds are fed with commercial feed with energy level of 3100 ME, 16% CP. Out of 30 farmers involved in broiler farming, only one farmer with 2200 birds uses de-feathering machine.

In 2004 there were 15 small farms which were categorized as semi-commercial farms by the district livestock sector on the basis of surplus chicken, produced for sale from the farm. Both the district (Tsirang and Samtse ) had similar starting number with birds as well as number of farms. Most farmers started with 100 to 250 birds per cycle, and were producing and average body weight of 1.8 to 2.0 kgs in 56 days of rearing.

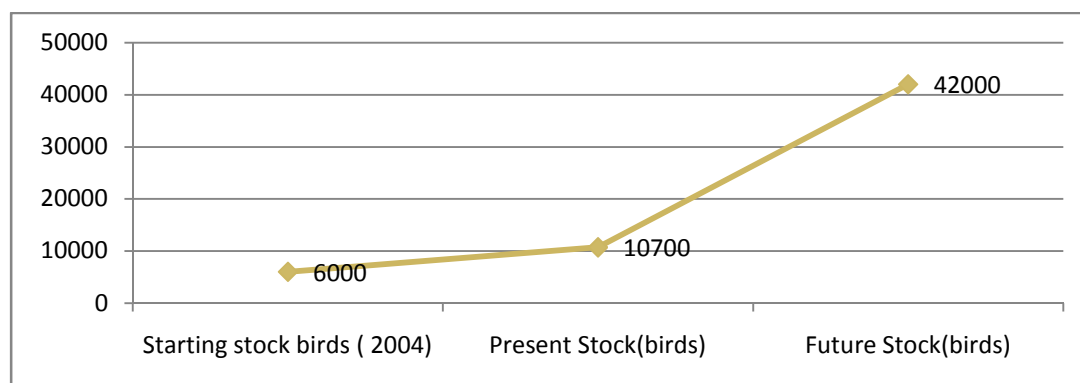


Figure 12: Present broiler farms and future projection in Tsirang

##### 5.4.1 EMPLOYMENT GENERATION:

Due to broiler farming, the labour division in the farm family has changed. The case study shows that male farmers represents the enterprise (Refer Table 2 under methodology), but all respondent said that 60% of the farm management work is done by women. This empowers women and allows greater decision making in future development of the farm. Most respondent expressed the work load of the family member staying at home has increased, but all

participants agrees that the broiler farming is much easier and has replaced heavy works which gave them lesser return.

Case study shows farm sizes with 500 birds require 2 people to manage and this has created direct employment for rural youth. Indirect employment is generated for transportation of feed and chicken from road head to farm and vis-versa. These farms also employ people to slaughter, and process the chicken for marketing. The calculation done on chicken meat consumption and number of farms in Bhutan for next 25 years from 2009, shows a requirement of 166 farms with production capacity of 8100 kilograms of meat per year. (Refer annex 5)

Bhutan will save approximately Nu.153.6 million per year by reducing the import of chicken by 80%, and will generate employment for 4149 people along the broiler chain. (Refer annex 5.1 for calculation)

#### 5.4.2 PRODUCTION COST OF ONE KILOGRAM OF CHICKEN:

Most farmers are not aware of proper farm record and profit calculation. 7 farmers out of two farmers group with 15 members in each group (n=30) could make a rough estimate of the expenditure and profit. It is observed that farmers have a pre conceived notion that broiler production is profitable, although many do not know how much they have spent on production. This situation has hampered the farmer from making bigger investments. The technical analysis on 6 farms shows low growth rate with poor feed conversion ratio of 3.5 (Total feed consumed/Weight gained) against 1 kilogram of meat produced.

The analysis done with the present input cost and other expenditures using the excel program designed to do profitability analysis of broiler production shows, most farmer at present are not in a good business. The high market price of chicken at present has made more positive on the profitability of the farm. Due to ban on chicken from India, farmers are selling their chicken at almost double the price comparing to two years ago. However the economic analysis shows that lowering the market price in future due to import of cheap broiler chicken from India will drastically reduce profit margin of the farmers.

**Table 7: Production cost for 1 kg chicken on different farm size in Tsirang**

Farm Size( birds)	200	500	700	1000	1500	2200
Production cost (Nu)	106	99	97.5	96.5	95.5	86.75
Market price ( Nu)	120	120	120	120	120	120
Profit per (kg)	14	21	22.5	23.5	24.5	33.25
Income per cycle (Nu)	2283	12682	19616	30000	47348	64682

Analysis shows that the farmers in Tsirang will run into loss if they sell below Ngultrum (Nu) 106.00 per kg. The market price for imported chicken at present is about Nu.120/kilogram; this price drops as low as Nu.85 when there is no import ban.

The farmers can make profit if the choice and preference of Bhutanese consumer are backed with capacity to pay higher for locally produced than the imported chicken if the market price drops below the production cost. There is positive indication on consumer willing to pay higher, especially the institutional consumer willing to pay 5% more than the actual market price of imported chicken.



The above analysis on profit will change with the increase or decrease in market price. Therefore, it can be said that increasing the farm size and reducing production cost will keep the farmers on the profitable business. The unit cost of production is higher with small farms and these farmers will have lesser bargaining power in price negotiation as they cannot take their product for sale to larger market by themselves and needs to depend on wholesale buyer.

#### 5.5 ISSUES IN PRESENT MARKETING SYSTEM:

Although Tsirang produces huge quantity of chicken meat compared to other Districts the sale in Tsirang is only 11 percent (IMS, DoL, MoA, 2008). Likewise, in Samtse the chicken produced by farmers is directly transported to other districts. The biggest market for both is Thimphu, which has the highest urban population in the country. The transport of chicken is mostly done without cold chain facility.



Figure 13: Broiler chicken ready for transport to Thimphu

The case study in Tsirang shows that chicken marketing is not developed. There is no proper marketing channel which guarantees buyers and fair price. Farmer depends upon buyers, which are mostly the meat vendors' <sup>8</sup>from Thimphu. Dressed chicken is transported by farmers until motorable road head and sell to the whole sale buyers. The biggest problem is in getting a price which will cover the cost of production with a decent profit margin. Most farmers cannot bargain for higher price and sell at the price fixed by the whole sale buyers. This is due to lack of formal relationship with the buyers. Small volume of production is one major factor which impedes the development of marketing channel that can guarantee market and reasonable selling price.

Local broiler chicken retailing represents only a small part of the urban meat vendors' business, accounting on an average of less than 12% of their business (MoA, 2005). Due to small volume of business, urban meat vendors are not interested in helping the small farmers. It is interesting to note that the farmers cannot make big profit regardless of high demand in the market; this is because the meat vendors in the larger towns which are the only outlets for the broiler farmers control the price. A cartel among the meat vendors in the larger cities is experienced and do not let the farmers get higher price. There is not much farmers can do on the marketing mix. The demand for the product is already high in the market, and the meat vendors who take larger share of the profit does product positioning.

The farmers in western, eastern and central part of the country do not go for commercial meat production (DoL, MoA 2008). This part of the country largely depends on imports. This indicates a huge market for the future meat production in the southern belt of country, keeping other districts as a potential market.

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<sup>8</sup> Meat vendors in this study are not the people selling meat on the road sides. These are established meat shops with license who also act as wholesaler and retailer.



### 5.5.1 MARKET SEGMENTATION

Farmers have very poor knowledge about market segmentation, targeting and positioning. The production at the farm level does not follow any principle of the market mix directly; however, the meat vendor's dictates on what type of chicken in size and weights they need. The meat vendors target the large section of urban dwellers that are in medium income bracket for sale of locally produced chicken. The meat vendors (wholesaler) offers smaller profit margin to the producers by fluctuating the price. These vendors often compel farmers to sell their chicken at very low price by not accepting their product at the first transaction. Fearing the risk of losing the highly perishable product farmers reduces their selling price. These vendors look for volume as well as continuous and daily supply rather than unplanned production.

The farmers as a producers have very weak supplier power; the inputs are sought from very faraway places and in most cases the price fluctuates. The capacity for day old chick production by present hatchery in the country cannot substitute the import. The private hatchery is not well linked with farmers and do not have the idea of future requirement of the farmer. The hatchery is sceptical and fear to lose money due to inconsistency buying of chick by farmers. The private hatchery does not go for full capacity production at present due to low demand of farmers which incurs higher unit cost.

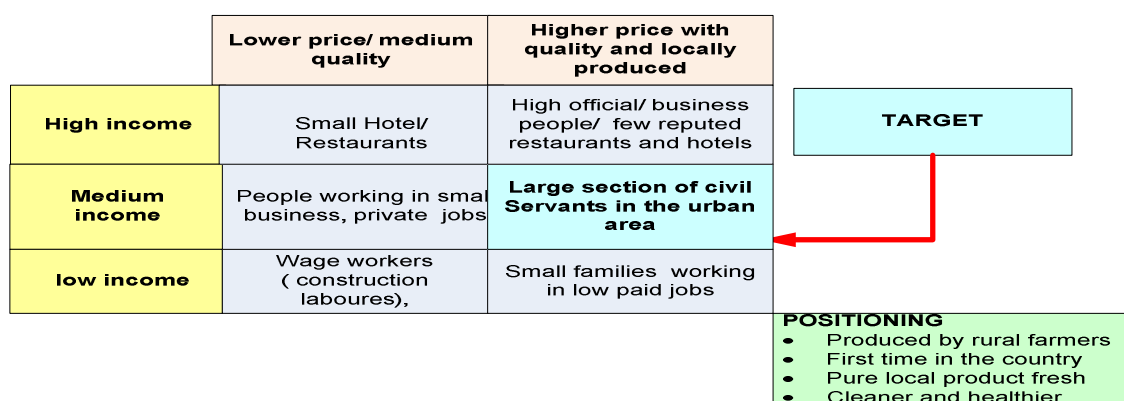


Figure 14: Market segmentation by meat vendors

### 5.6 VALUE DISTRIBUTION IN THE CHAIN

The value addition on the product is done highest by producers while the highest share of gross income is taken by wholesaler. The farmers at present gets a fair share of income as the calculation on selling price shows more than 20% mark up on the actual variable cost. Wholesaler and the retailer enjoys relatively higher share of income in contrast to the value addition done by these actors. It can be said that the wholesaler is the chain coordinator and the producers have lesser power in the chain at present. Although discussion with wholesaler shows that chicken produced by farmers have very small margin in their meat business. This is because the farmer's produces low volume and wholesaler needs to pay higher transportation cost. However it is observed, the difference in price paid to producers and the price received from end consumer is very huge for both wholesaler and retailer.

**Table 8: Value distribution in present broiler chain with 1000 birds with unit value of ( Nu 120/kg)**

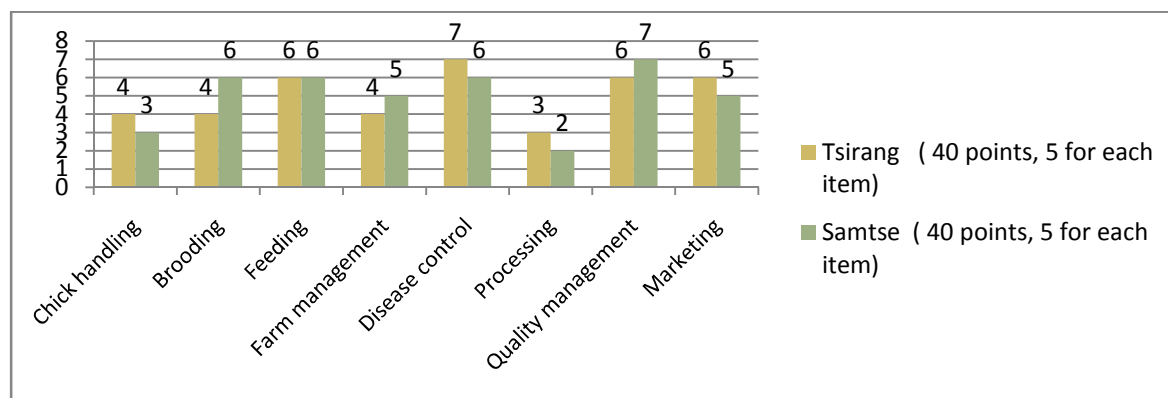
Chain Actor	Variable cost/kg	Revenue	Gross income	Added value	Gross Margin	Value share
		Selling price	Revenue-Cost	Revenue-Previous actors' revenue	Gross income *100/Revenue	Added value*100/retail price
Producers	96	120	24	120	20 %	70 %
Wholesaler	127	155	28	35	18 %	21 %
Retailer	160	170	10	15	6 %	9 %
						100

**Formula (Source: KIT & IIRR. 2008)**

In this study, the input cost used for value calculation, especially day old chick was based on the average for last 5 years from 2005 to 2009. This is done to avoid error in the future projection. The normal cost of one day old chick is Nu.18 to 19.00, due to ban on import of chick from India, the import from other countries has escalated the doc price to Nu.45/chick at the time of this study.

## 5.7 FARMER'S KNOWLEDGE ON BROILER PRODUCTION AND MARKETING

A simple question on broiler production was asked during the group discussion and respondents were made to list the area in which they lacked knowledge. Eight important areas on broiler production and management were prioritized with use of ranking method. 15 farmers were divided into two groups of 7 and 8 members and given 20 maize seed per group. A table was drawn on the ground and put 10 X 10 cm (card board) with different pictures drawn on it to represent different management items. Farmers were explained on why it is done and asked to prioritize their concern by placing maize seed over each items. This method is repeated with farmers in Tsirang. The comparison shows that farmers in both district lack knowledge about feeding, disease control, quality management and marketing.



**Figure 15: Farmers priority for capacity training on broiler production**

*Note: The points mention in the legend is the total maize seed given for ranking.*

<sup>9</sup> NU: is the acronym for Ngultrum , the Bhutanese currency ( 1 Euro : 67 Nu/as of 25/8/2009)

In general farmers in both districts need training on both production and marketing. The aspect of quality management cannot be improved only with training but requires facilities to improve processing, storage and transportation to market. Group discussion shows that farmers have doubt on improving quality the issue is beyond the control of the farmers at present and it needs intervention from chain supporters.

Most farmers when asked if they are confident to take up larger farms with present capacity, 70% of the respondent (n=30) said that technical knowledge on production is not a constraint, although all participants agrees that they require higher skills and knowledge for higher production.

Group discussions and analysis shows that farmers are willing to invest in broiler production. The farmers in both districts are confident to up-scale in future by looking at the future plans of these farmers.

## 5.8 CHICKEN MEAT QUALITY CONTROL

At the farm level, there is neither cold storage nor a processing unit. The farmers use traditional method of slaughtering and scalding with hot water for de-feathering. It is labour intensive and has high risk towards meat contamination. People involved in the chicken processing are with little or no skill and knowledge about good processing practice. The study observed many problems with quality control in terms of processing and transport to the end consumer.

Although quality control standard are based on the food safety regulation of Bhutan, implemented by BAFRA, farmers cannot maintain the quality standard as prescribed due to low level of skills in quality management and lack of required facilities. However the quality control inspectors do their best to control quality by adjusting to the situation of the producers.

The critical control points in the chain are divided into four areas:

1. Checking the required document ( government certified document of the chick and feed supplier from India are only allowed to import)
2. Check vaccination and medication records in the farmers farm
3. Inspect the slaughtering and processing
4. Consumer feed back on meat related issues

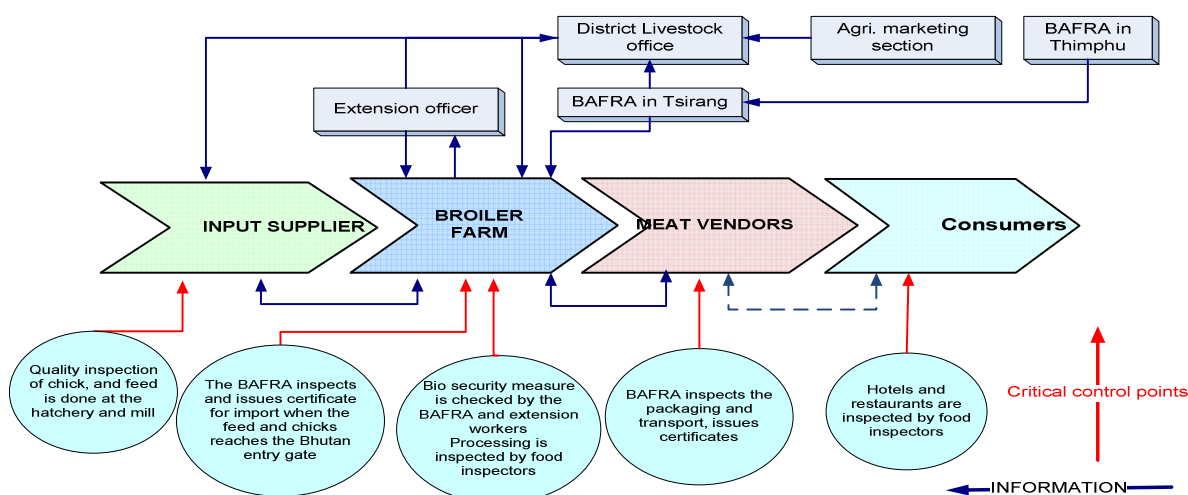


Figure 16: Quality management and information flow in the present broiler chain

### 5.8.1 QUALITY ISSUE IN THE PROCESSING

The detail observation on the time taken by farmers with 200 birds to complete the journey of chicken meat production from a matured live bird to the wholesale buyer shows that it almost takes 6 hours in an average to complete the process of making the chicken ready to market. There is no deep freezer to store chicken meat. It is dipped in cold water right after de-feathering to keep it cool. The chicken, which is de-feathered at the start, gets bluish in meat colour due to prolong exposure to heat, and a foul smell develops. It is a threat to food safety and meat quality management, when meat starts getting spoilt at the processing stage.



**Figure 17: Banana leaves used to cover chicken meat (Source: Author 2009)**

The slaughtering and processing is done manually with very minimal consideration on animal welfare. It takes approximately 5 hours to kill 400 birds by two people. Birds are killed randomly by catching three to four birds to slit the throat at a time. Such practise can lead to lack of social acceptance, which may become a hindrance to the commercial chicken production in future. It takes 7-8 minutes in average to de-feather one bird and make it ready for the market. This has a huge impact on maintaining meat quality and freshness when the carcass is handled for several minutes. The other effect is seen in the higher cost of labour which needs to be paid due to less efficiency.

Technically it is very important that bleeding should be done properly after slaughtering to maintain meat quality as well as increase shelf life. Farmers have no idea about bleeding, and do incomplete bleeding which affects meat quality. Proper washing and packaging is not done due to lack of washing equipments and clean packaging house. Dressed chicken are sometimes heaved on ground and covered with banana leave, which is believed to have cooling effect. This practise is technically wrong and it can further deteriorate the meat quality due to bacterial growth when kept without refrigeration. Therefore the wholesale buyers reduce the price when the meat is seen in poor condition.

There is a huge marketing loss due to lack of cold storage facility for transport, both in weight and meat quality. Five farmers in the case study said that they sell their chicken directly to the consumers in Thimphu, Wangdue and Bumthang. It takes seven hours by car to cover a distance of 200 kilometres to reach these markets. About 30 kilograms of meat weight is reduced due to shrinking in weight from 400 kilograms of meat. Transportation is done in traditional bamboo baskets with banana leave over it to protect from sun.

## 5.9 CONFIDENCE OF THE BROILER FARMERS IN PRODUCTION

It is interesting to note that despite several problems in chicken production and marketing farmers are still motivated to go for larger production. One explanation for this phenomenon is the demand for chicken in the market. Meat production is a specialized business with each process of the chain requiring a specific set of skills. (DoL, MoA 2008). However, in Bhutan it is not a matter of skills at the moment, rather having enthusiasm and motivation to take up meat production by farmers and private entrepreneurs. The recent Avian Flu and ban on poultry input from India did not discourage farmers. Farmers are willing to share cost on basic vaccines and medicines which otherwise is provided free by the government. This is a sign of entrepreneurship development, which is rarely noticed with small farmers in Bhutan.

## 5.10 EFFECT OF RELIGIOUS SENTIMENT AND SOCIAL STIGMA ON CHICKEN PRODUCER

The case study in Tsirang and Samtse shows that social stigma and religious sentiment, perceived as constraints in chicken production, is of lesser importance to the broiler farmers in both the districts. Here the people are more sentimental about slaughtering cows, chicken and is preferred as a cash earning livestock with lesser sentiment and social stigma.

To find out if religious sentiment affects chicken production the matrix ranking method was used with 15 respondents divided in three groups. All respondents practiced Hinduism as their religion. There were three female participants

30 maize seeds were distributed equally to the three groups, and a table was drawn on a flat ground. Five different factors were explained and farmers were made to place the maize seed on the table which they felt was the important factor which discourages or affects broiler production at present.

**Table 9: Matrix ranking on farmers' opinion on factors affecting commercial chicken production**

FACTORS	RESPONDENT GROUP			Ranking
	Gr A	Gr B	Gr C	
Religious and social stigma	0	1	1	2
Fear of disease	7	6	8	21
Lack of regular Input supply	13	17	13	43
Inadequate technical support	2	1	2	5
Poor marketing system	8	5	6	19
<b>Total</b>	<b>30</b>	<b>30</b>	<b>30</b>	<b>90</b>

The analysis on matrix ranking shows that social stigma is not at an issue. Rather production related issues were ranked as the top discouragement.

Similar exercises done with broiler farmers in Tsirang revealed that religious and social issue is not an important factor discouraging chicken production. Lack of regular supply of chicks and feed are the main constraints expressed. Farmers in Samtse are more comfortable with the market, however it was found through observation that the farmers in Samtse had only two or three times of chicken marketing experience. In general, farmers feel that marketing is not a constrain if regular input supply can be established. The main problem expressed in marketing

is not being able to maintain continuous supply of chicken in the market leading to breach of trust and business relation with buyers.

*It can be concluded that domestic chicken production in Bhutan has huge potential and it is economically feasible. The main problem at present is poor quality management and inconsistent production. Producers are not affected by religious and social sentiment to start commercial broiler production. Chain supporter need higher capacity in supporting the producers as well as other actors in the chain. If production is done in right place with right facilities Bhutan will achieve Chicken meat self-sufficiency.*

## CHAPTER VI: THE FUTURE BROILER CHAIN FROM CONSUMER PRESPECTIVE *THE RESULT OF THE CONSUMER ANALYSIS*

*Bhutanese consumer are fond of eating meat, beef if most preferred and eaten followed by chicken. This sub-chapter discusses the findings from consumer surveys. The findings show the potential to build a domestic broiler chain from the consumer perspective.*

### 6.1 MEAT CONSUMPTION AND CONSUMER CHOICE

Although most Bhutanese are believed to be religious and sentimental towards killing animal, study shows meat as an important part of the Bhutanese diet.

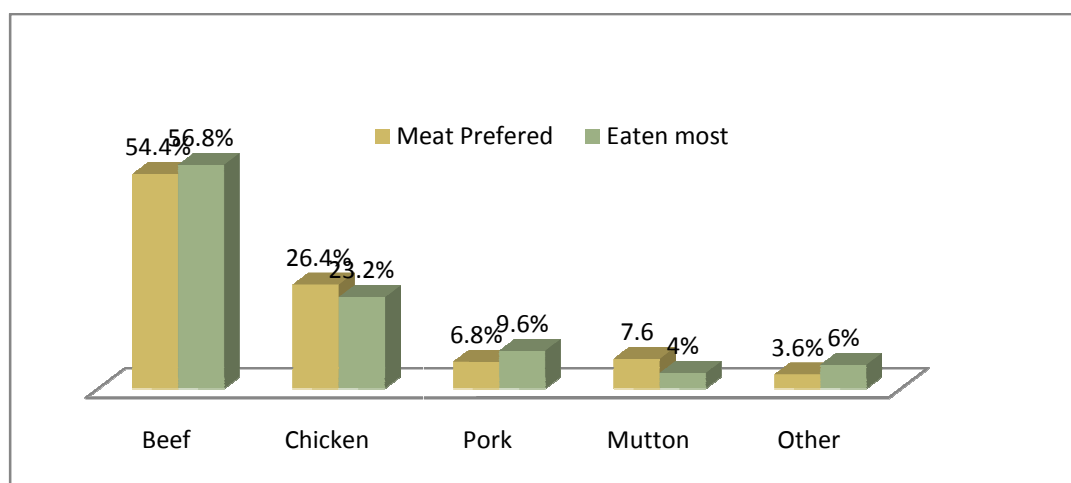


Figure 18: Type of meat most eaten and most preferred by Bhutanese

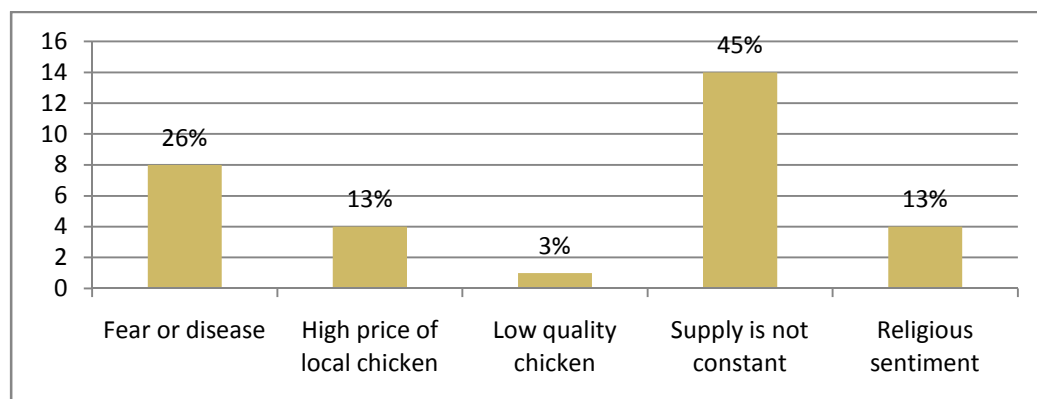
Many Bhutanese condemn slaughtering cow and it is believed to be a great sin. However, the survey shows beef is the most eaten and most preferred meat. This finding makes it difficult to explain how religious sentiment effects meat production, and develops a doubt on whether people are really religious.

The trend in chicken meat consumption will increase in the near future, due to decline in the beef production inside the country due to religious advocacy (MoA, 2004). Therefore, chicken is likely to become the most eaten meat in the country in future.

The survey result on type of chicken meat preferred by Bhutanese consumer shows, higher preference for chicken with less fat, soft and of higher quality. 203 respondent out of (n=250) said that they look for quality rather than the price.

Most Bhutanese consumers are sensitive and generalize the first negative encounter as a general practice, and change its buying behaviour. For example if there is no locally produced chicken in the market when a consumer wants to buy on that particular moment, this experience is negatively generalized and in future his buying decision changes more towards available choices. This assumption is supported by the data collected on what factor limits the institutional

consumers from buying chicken. 45% (n=30) said when the supply is not constant, and on asking what will make the household consumer buy locally produced chicken, 21 % said they would buy if it is regularly available and 56 % (n=250) said if it is of higher quality than imported chicken, ( refer figure 21)



**Figure 19: Factor limiting consumer to buy locally produced chicken**

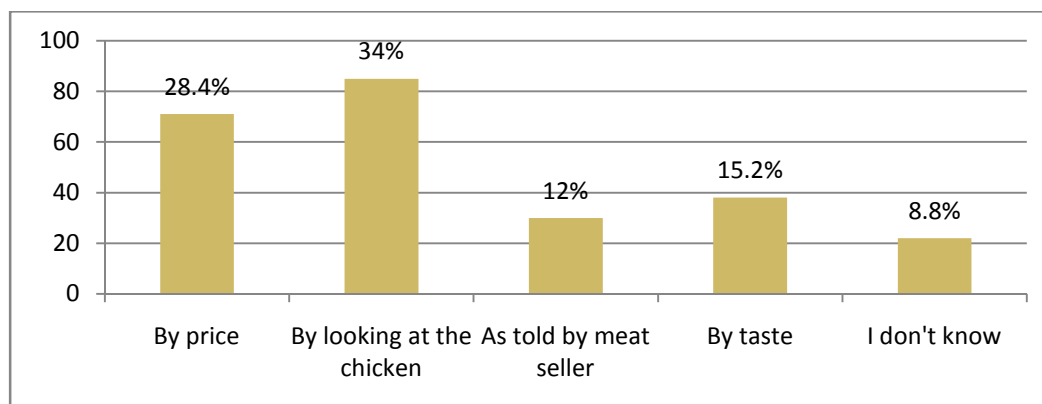
The above phenomenon represents the particular situation when this study was conducted. Due to fear of avian flu outbreak in India, and ban on import of chicken, Bhutanese consumer has shifted into a temporary decision making pattern on chicken consumption. The correlation can be seen on the price of chicken, which was escalated inside the country by meat vendors and a negative experience was created on consumers. Therefore, it is highly controversial to conclude from this data on the consumer decision for locally produced chicken and their buying behaviour.

#### 6.1.1.1 PREFERENCE FOR QUALITY CHICKEN:

Quality is not defined in this study from any perspectives, although study shows consumers are quality conscious. It is difficult to say what really a quality is for Bhutanese consumer. Consumer's definition of quality in chicken as understood by the author is freshness of the meat and produced within the country.

The analysis on how consumers know the difference between locally produced chicken and imported chicken gives an answer to what quality is for Bhutanese consumer. 28.4% of the respondent said they know the difference by price, 34 % by looking at the chicken, 15.2% by taste, and 12% through seller while rest is not sure. It can be concluded that consumers are not able to say what quality is for them but knows the criteria to decide while buying chicken. In absence of a quality measurement indicator, import of similar chicken meat by traders will risk the Bhutanese farmers by losing potential buyers who may by mistake buy imported chicken as local produced.

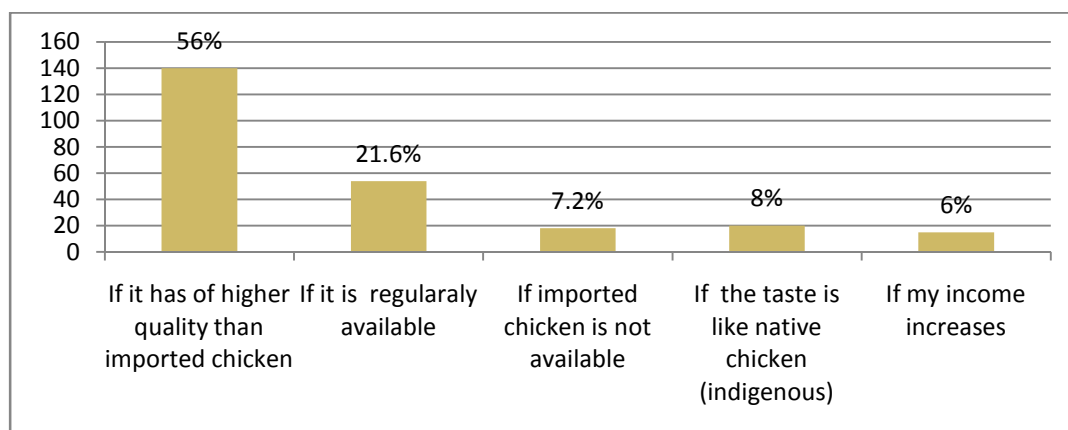




**Figure 20: The way consumer differentiates between local and imported chicken**

The recent avian flu outbreak in India has instilled fear in the Bhutanese consumer buying imported chicken. The data on preference of chicken and why they prefer locally produced chicken shows a relation between fear of disease and the choice the consumer make. Most consumer feels chicken produced in Bhutan does have disease and are safer to consume.

Consumers are more concern about quality and availability in the market. 140 (56%) respondent out of (n=250) said higher quality chicken will make them buy more and 21.6% said they would buy more if there is a constant supply. Bhutanese consumers are not limited in buying due to taste of the chicken. Although few respondents had the opinion that locally produced chicken is tastier. Decision to buy locally produced chicken is highly determined by quality and availability.



**Figure 21: Factors, which will make Bhutanese consumer, buy locally produced chicken**

Survey result shows that religious sentiment has a minimal affect on the amount of chicken consumed and future consumption. Only 13% of the total respondent (n=250) mentioned religious sentiment as a factor, which affect their decision in buying chicken. The frequency analysis of the respondent by religion shows 197 Buddhist, 45 Hindu, 2 Christian out of 250 sample units. Cross tabulation, analysis shows 103 Buddhist, 36 Hindus, are supporting chicken production in the country. While only 28 respondents opposed chicken production due to religious sentiments and 68 respondents are neutral on this subject.

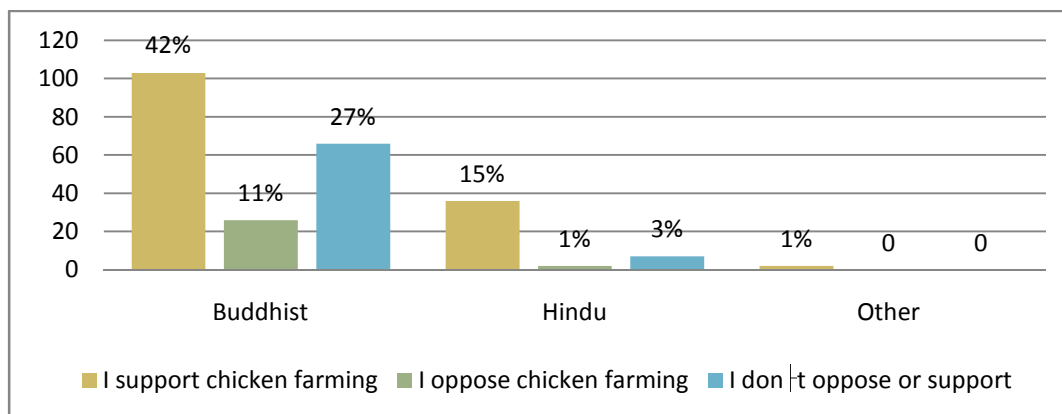


Figure 22: Religious background in supporting and opposing chicken production

Urban consumers are looking for convenience in cooking, and it is associated with food habit and nature of work they do. The changing food habit can be due to change in the nature of work people do and more amount of time they spend in their work. 159 respondent out of (n=250) said it would be convenient for them if they could buy chicken in different cuts. 26.4% said they prefer breast meat, 35.2% prefers chicken thigh meat (drum stick). While 24.8% said they would prefer to buy whole chicken. This result indicates the potential for meat processing and value addition which can be done by a separate actor in the chain.

Table 9 : Consumer preference for various chicken cuts

	Frequency	Percent
Breast meat	66	26.4
Chicken thigh meat	88	35.2
Chicken wings	8	3.2
Heart and gizzards only	5	2
Whole chicken	62	24.8

Although Bhutan does not have any chicken processing plant at present there is a potential for a chain actor to play an important role in meeting the demand of urban consumers. The urban consumers are mostly busy people who look for fast to cook items.

The choice for chicken in the country is limited at present. This has greater effect on institutional consumers. It is either the imported chicken or no chicken for these buyers as they require huge quantity at a time. The institutional consumers (hotels and restaurants) have a different set of buying habits. On asking what type of chicken they usually buy 18 out of (n=30) (74 %) responded that they buy frozen chicken imported from India and Thailand. It was revealed that these consumers have no other source to buy fresh chicken in huge quantity as required.

The future demand for chicken will increase with increase in population and income. The consumer study shows that the income and family size has direct influence on chicken consumption. The population forecast for Bhutan in 2020 shows 809396 people, with an annual growth of 1.4 % (PHCB 2005). The per capita GDP is increasing at the rate of 5.44% per year (Global property guide, 2009) which indicates the income level of the people will increase in

future. The future consumer will look for more choice in chicken. Chicken produced within Bhutan will be preferred by people as shown by data on chicken preference of institutional consumers.

**Table 10: Chicken preference of Institutional Consumers**

<b>Which chicken you would prefer to buy if there is a choice?</b>				
		Frequency	Percentage	
Valid	Chicken produced in Bhutan	21	67.7	
	Imported Chicken	3	9.7	
	Both	7	22.6	
	Total	31	100	

The above frequency table shows that 67.7% of the consumers prefer to buy chicken produced inside Bhutan. The institutional consumers will become an important market for the domestic chicken production in future. The frequency over chicken demand in future shows significant increase, while it also indicates the demand will not go down in future. The estimate chicken consumption as per the future population forecast shows 30,777 kgs of chicken consumption per week. Bhutan will require more than 140 semi commercial farms to supply chicken for growing population in future (Refer annex 5.2 for detail calculation). The starting point of calculation on chicken consumption is based on per-capita chicken consumption as reported by Tobias & Morrison (2009) as 2.3 kgs, and the actual calculation done on the present population and chicken consumption. The population forecast is based on NSB and PHCB (2005).

**Table 11: Prospect of Chicken consumption and farm requirement in Bhutan till 2030**

<b>Year</b>	<b>Forecasted Population (Number)</b>	<b>Chicken Consumption Per year( kg)</b>	<b>Weekly meat Required(kg)</b>	<b>Farm required (number)</b>
2010	695819	1600384	30777	148
2015	757042	1741197	33485	161
2020	809396	1861611	35800	172
2025	850976	1957245	37639	181
2030	886523	2039003	39212	189

Source (own conclusion based on survey and calculation. Refer annex 5.1)

*The conclusion from this table gives an indication that there will be huge demand for chick meat in future and domestic production should be encouraged.*

At present price is not a factor for not buying locally produced chicken, it is the volume and inconsistent supply which hinders consumption. 93% of the total respondent (n=250) in consumer survey agrees that they can pay more if constant supply of locally produced chicken is available in the market. Farmers will enjoy minimum of 5% higher price above the imported chicken as shown by the survey on how much can institutional buyer pay above the actual price which is about Nu.120 per kg at present.

It is interesting that household consumer shows similar result with institutional consumer on the quality issues, and supply in the market. Both survey results shows consumers are more conscious about quality and consistency in the supply. This finding indicates a need for better

production system which will guarantee quality product and continuous supply of chicken in the market.

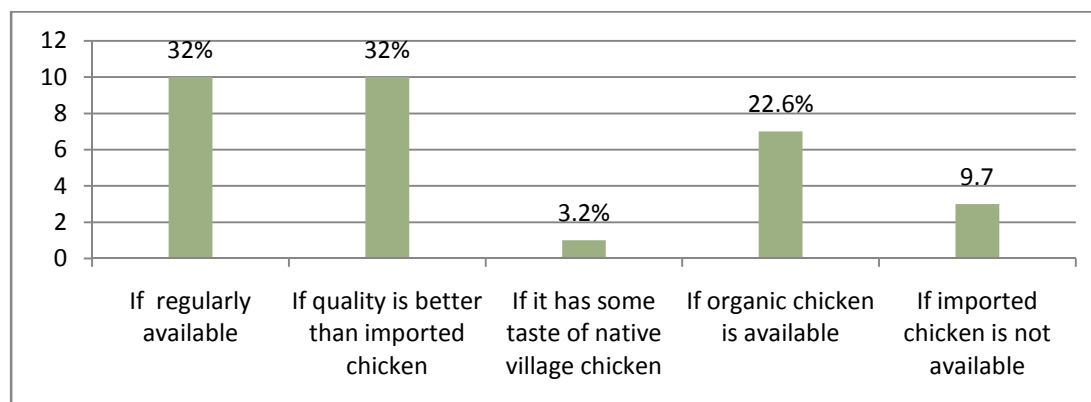


Figure 23: Factors, which will make Institutional consumers, buy more chicken in future

Education and globalization is playing an important role in making the people aware of food self-sufficiency and the importance of lesser dependency on import. This survey did not cover enough respondent from lower education level. The data shows that educated people support chicken farming. This does not say that educated people are not religious. This is an important indication for meat sector development in country like Bhutan. The acceptance on commercial farming is the first step towards development of meat sector in future, which will have positive effect on development of subsistence farming at higher level.

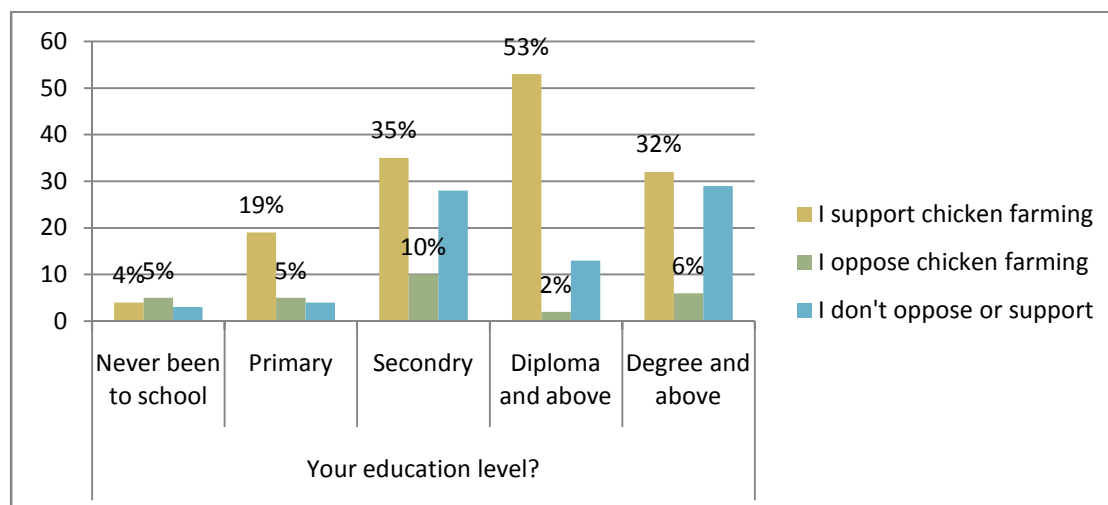


Figure 24: Who in the society support or oppose chicken farming

### 6.3 INTEREST IN CONTRACT FARMING

The data shows a prospect to develop linkage between farmers and the institutional buyers through establishment of contract farming. The institutional buyers are interested to develop business in Tsirang and Samtse with the farmers in chicken production. This adds a dimension on the future domestic broiler chain in the country. However the case study result in Tsirang

with the 15 broiler farmers shows low level of interest on contract farming as the farmers are not confident in present production system and doubt the continuous supply to contract buyers.

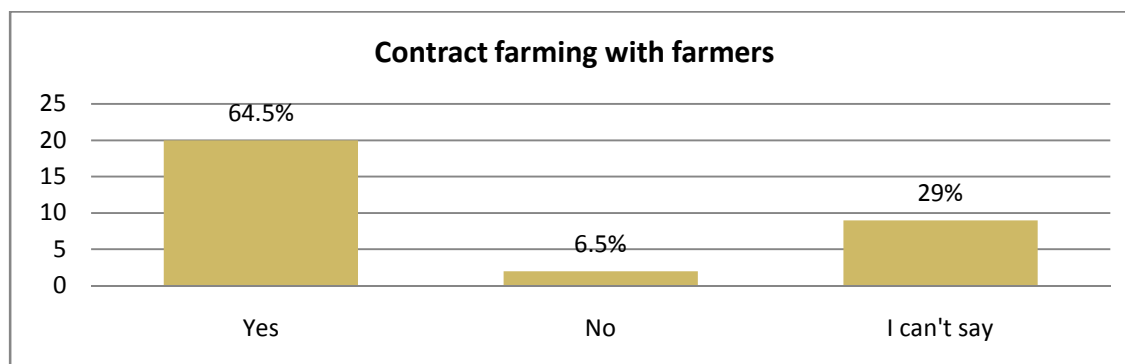


Figure 25: Are institutional consumers interested to start contract production with farmers

Meat shops in the urban towns are the main outlets for chicken. In both consumer surveys, it is seen that the main source of chicken for the consumer is the meat shop. 80% of the institutional consumer and 70% of the normal consumer buy chicken from meat shops in the town. This clearly shows the importance and the role, which the meat shop plays in domestic broiler chain development. This situation if left unchecked can pose a threat for the farmers who are weak in bargaining the selling price.

There is a significant level in the type of meat people eat and their religious background. Hindus are against eating beef. Although it is obvious that Hindus do not eat beef, but it is also accepted that Buddhist are equally sentimental about slaughtering cows for meat.

Therefore the statistical test result is used to understand how strict are Buddhist in meat eaten and their religion. The figure below illustrates that beef is most eaten by Buddhist, while it is also discussed that slaughtering animal for meat is sin by Buddhism in Bhutan.

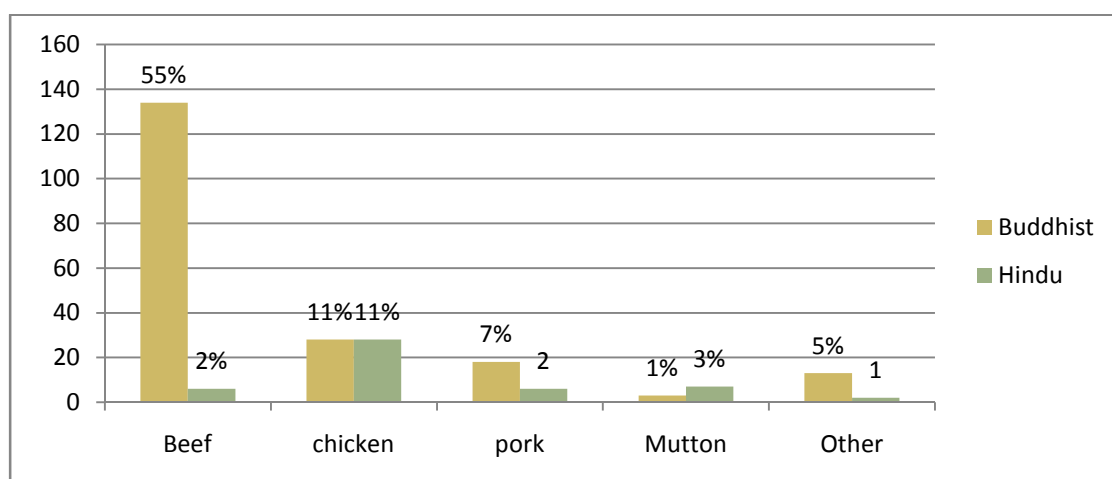


Figure 26: Meat eaten and religious background

Table 12: Mann Whitney Test

Test Statistics <sup>a</sup>	
	Which meat you eat most?
Asymp. Sig. (2-tailed)	0

*The interpretation of test:*

Research Question: Is there a difference in choice of meat eaten between the religion?

H<sub>0</sub>: There is no difference in choice between Buddhist and Hindu

H<sub>1</sub>: There is a difference in choice between Buddhist and Hindu

Significance 95 %: compare p with 0.05

*In this test the significant value is less than 0.05 which means the hypothesis of religious background has influence over meat eaten is true.*

#### 6.4 FUTURE CHICKEN MARKET

The major market for future commercial production will be the Urban cities inside Bhutan. Of the total chicken consumed in 2006-2008, 81 % was imported into the urban market.( BAFRA 2009).The percentage of people living in the rural area is more than 90% of the total population of the country, these sections of people are mostly farmers and they depend on their own production. Data collected on weekly chicken sale from five meat vendors in Thimphu presents an unrealistic figure on the demand calculated, using National population data. The study shows that urban consumer cannot be based on the national population census, it is largely a floating<sup>10</sup> in nature and has higher consumer base, which are not counted in the population census. For example, the chicken demand calculation for Thimphu using per capita consumption and population record shows only 3500 kgs per week. Whereas the real demand in the field shows 10,200 kgs weekly.

*This chapter concludes that religious sentiment and social stigma prevails in Bhutan, but it has lesser effect on the chicken consumer.*

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<sup>10</sup> Floating population is considered to be the number of people moving in and out on transit with temporary residence in one fixed place

## CHAPTER VII: CONCLUSION

*This study concludes with five main areas to be taken as a guiding principle for the future development towards commercial chicken production in Bhutan. These are elaborated as conclusions and recommendations with specific strategies for implementation.*

1. There is a growing demand for locally produced chicken and people are opting for commercial production
2. Commercial chicken production is more acceptable in the southern part of the country
3. Consumers want higher quality chicken and are willing to pay higher price for locally produced chicken
4. Constant supply in the market will lead to higher consumption
5. Bhutanese consumer chooses locally produced chicken over imported

Policy towards poultry production in the country is focused more towards subsistence farming. The PESTEC analysis in chapter IV clearly shows that the poultry development is hindered due to less focus on the commercial production. Chicken consumption and farm requirement in Bhutan till 2030 shows a weekly requirement of 30,777 kilogram of meat per day in year 2010. The highest production in Tsirang District with 15 small farms in average produces 1284 kilograms of chicken meat in average in every seven week of cycle per farm. The internal production is very small and therefore, more than 80% of the chicken requirement is imported. Consumer survey result under chapter six shows 67.7% of the consumer prefers to buy chicken produced inside Bhutan. Therefore it can be concluded that domestic chicken production in Bhutan has high potential and it is economically feasible. The district livestock office which is the main chain supporter at present cannot focus on commercial poultry production and dilute its effort in supporting the farmers in commercial production.

Focus on commercial poultry enterprise development will not be possible with the present poultry development approach which is more focussed on improving native birds for higher production. Change in policy towards poultry production will enhance the development in future.

Data from the present poultry population in the country shows Samtse, Tsirang, Chukkha, Sarpang and Samdrupjongkhar has highest level of poultry population. This indicates the need for regional focus for commercial production.

The case study on farmer's opinion on whether religious sentiment is a hindrance on chicken production shows less than 10% are affected by social and religious sentiment. Religious and social sentiment is of lesser constraint to start commercial broiler production in southern district of Bhutan. This conclusion supports the hypothesis of the study that *“Religious sentiment and social stigma, is a not a hindrance for future commercial chicken production”* The result from chapter six on factor limiting consumer from buying chicken indicates that religious sentiment is of lesser importance even for consumer. It can be concluded that eating chicken is not associated with religion while killing is condemned when people see and hear about killing animal. This gives a clear indication that commercial chicken production needs to consider social acceptance and geographical location of the production farms.

The technical capacity of district livestock office and extension workers in most poultry producing district shows inadequacy to support broiler production. The need for higher level of technical support will be an issue in commercial production when producers and other chain

actors opt for upgrading the volume of production. Both extension workers and farmers need to upgrade their knowledge on broiler production, marketing and strengthening the farmers' organization.

Bhutanese farmer will not be able to produce quality chicken meat with out hygienic processing facilities. Figure 19, under chapter six shows fear of disease as an important factor for not buying chicken and assurance of higher quality as the main buying factor for Bhutanese consumers. It can be concluded that urban consumers are more conscious about health and risk of disease from eating unhealthy meat and are more towards quality meat. Improvement in quality of chicken will make people gain more confidence on the local production and increase consumption. Results from the consumer survey on how local chicken is differentiated from imported, indicates that consumer are not able to say what quality indicator they should be looking in chicken meat. Therefore it can be concluded that quality indicators which are more measurable and standardized will enhance chicken consumption.

The result from chapter six (Figure19) shows that consumer are limited from buying chicken due to inconsistent supply in the market. However the case study result on chapter V indicates that future production will be hampered if Bhutan depends on import of day old chick. Analysis on day old supply under chapter (5) shows a demand of 5000 day old chick (doc) per week. It is feasible to start a mini parent stock farm and a hatchery. Without an alternative chicken meat outlet for the farmers at present, monopoly by meat vendors lowers the bargaining power of farmers. Cartel is formed at the wholesale and retail level which lowers the selling price of farmers. The consumer survey shows the meat vendors as the main outlet. These meat vendors are the main wholesale buyers for the farmers which lowers bargaining power of the farmer.

Chicken meat self-sufficiency inside the country will lower the influence of import from other countries and will lower dependency. The present ban on chicken import leads to price escalation of other meat type, and has a direct impact on the family income and diet. This is due to higher spending on other meat or people eat less meat without cheaper choices. Achieving chicken meat self-sufficiency at least by 2015 can be realistic for Bhutan; emphasis needs to be given on a strong chicken value chain development. If an indicator to measure happiness is developed from the choice of meat in Bhutan, domestic chicken production will increase the happiness level of the people and contribute to the Gross National Happiness in the country.



## CHAPTER VIII: RECOMMENDATION AND STRATEGIES FOR BROILER CHAIN DEVELOPMENT

*This chapter elaborates on the recommendations for future broiler production in Bhutan. The recommendation is supported with strategies on how to implement the recommendations. It is mostly directed towards the broiler chain supporters in Bhutan: the Department of Livestock, Agriculture Marketing Section and the District Livestock Sector in the broiler producing area.*

### 8.1 DIFFERENT POLICY FOCUS ON CHICKEN SECTOR DEVELOPMENT

Bhutan at present focuses more on the subsistence farming. The study shows high potential for chicken with more farmers in the Southern part of the country opting for commercial production. Therefore the department of livestock should set up double orientation policy for poultry production.

1. *Subsistence and backyard development policy*
2. *Commercial production and Enterprise development policy*

It is recommended to have a different approach to support backyard and commercial chicken development separately. The policy towards national chicken development should be revisited to see if it is catering to the changing situation and need of present development.

The present approach of trying to develop the whole chicken sector with single approach of backyard development with breed improvement should be revisited. The strategies should focus towards increasing volume of production.

#### IMPLEMENTATION STRATEGY

To develop a policy which can cater to both commercial and subsistence chicken production, a study should be conducted in consultation with the different stakeholder. A stakeholder workshop on the present need in the field in terms of commercial production will lead to framing strategies which are practical and need base.

The activities implemented in the field should not be diluted by focusing on different need at the same time.

The social taboos are passed from generation, which may not be possible for the organization to change the perception of the people. It is therefore more logical to let the society believe in what they believe in area specific; rather, the organization should change the priority of livestock development which are accepted by the people. For example, people in western part do not like to rear large number of pig or chicken for meat, due to tradition in which killing animal to make income is regarded as sin. It is not worth to train or advice farmers on commercial chicken or pig production in such places, rather this part of the country should be developed as net consumer for chicken produced by instituting marketing facilities.

The focus of the government should start to supports broiler chain development for urban market through capacity building for chain actors and supporters in production and marketing. This can be done by developing a master plan for poultry development with different approach for subsistence and commercial production with clear market and consumer.

## 8.2 CREATION OF CHICKEN PRODUCTION BELT

In reference to the *Commercial production and Enterprise development policy* it is recommended to take up commercial production in districts which has higher acceptance for chicken rearing for meat purpose. The future commercial production will be more favourable in Tsirang, Samtse, Sarpang, Chukha and Samdrupjongkhar districts. It is recommended to create a production belt to have more focus on the commercial chicken production in future.

### IMPLEMENTATION STRATEGY

Economic analysis on production in the particular place should be carried by concern district livestock office. The creation of chicken production belt should start with pilot phase, taking few potential Districts inside the belt.

The production belt creation will require further study to see the market in the region and available resources for production. The areas which have potential for chicken production should be designated as production belt. The designated area should be given priority in chicken development activities while other livestock development efforts can be diverted to other part of the country.

Technical person should be deployed to motivate and support producers and other chain actors. It is important to create conducive environment for the producers to produce enough by linking different chain supporter like financial institutions, input supplier and wholesaler. This should be done through higher level of advocacy on chicken production inside the country.

## 8.3 HUMAN RESOURCE DEVELOPMENT

With higher support on commercial production and large number of farmers in more than 4 districts in the country up-scaling chicken production, it is recommended to build capacity of both farmers as well as extension agent in broiler production and marketing.

### 1) *Trainings for extension agent*

Extension agents who advise and support farmers need to be trained on Broiler production and marketing. The concept of value chain development should be taught as a new dimension in the capacity building to various levels for successful domestic broiler production.

### 2) *Farmers training on production*

Farmers should be trained on production and farm management. It is recommended to strengthen the existing farmers group to take risk in market management and securing input supply to have more influence over the broiler chain. The group should be trained to influence the price in the market to establish a counter balance against the monopoly marketing. It is recommended that farmers group get legal registration to get legal support in future.

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## IMPLEMENTATION STRATEGY

The concern agency should encourage sending extension worker for specialized chicken production training. One such place can be Barneveld PTC in The Netherlands. The District Livestock officer should support extension agents to avail such training through scholarship possibilities. The department of livestock should make arrangement with the College of Natural Resources to include subject on commercial broiler production and chain development. This will increase the capacity of graduates who will come as extension officers to work with farmer.

The yearly training conducted by district livestock office for farmers should focus mainly on the needs of the farmers in present production system. Training should be more practical oriented. The District Livestock office should seek collaboration of Rural Enterprise Development Centre to train farmers on specialized subject like farm management, chick brooding and marketing etc. Annually two to three farmers should be sent for commercial farm internship in commercial farms within or outside Bhutan.

The livestock sector should take up study on potential and feasibility for contract farming to support farmer in building up strong producers' organization.

### 8.4 MINI PROCESSING UNIT ESTABLISHMENT IN SAMTSE AND TSIRANG

A mini processing plant with a capacity to process 15000 birds per week with live birds quarantine shed and mechanized slaughtering facility should be established to enhance quality and volume of production. Such facilities will lead to higher confidence in chicken produced inside Bhutan and will increase demand from the consumer. Bhutanese farmers should be encouraged to produce higher quality chicken to have better competitive edge over cheap imported chicken. Establishment of mini processing plant will solve the problem of slaughtering and unhygienic production.

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## IMPLEMENTATION STRATEGY

Economic study should be carried out before the investment is made. The processing plant should be designed to serve as chicken meat out let with deep freeze storage facility to encourage wholesale buyer to collect chicken at any time.

The department of livestock should explore the technology and machineries used in neighbouring countries like Bangladesh, India and Thailand, and see if it can be used in Bhutanese context.

The processing plant should be manageable by farmers under local situation and capacity. The establishment cost should not be too huge which require huge investment. The plant should have required facilities which will reduce the environmental issue.

It is very important that the processing plant is established on public partnership basis. Farmers or private entrepreneurs should be made to share investment and running cost from the start of the plant.

#### CAUTION IN ESTABLISHMENT OF THE PROCESSING PLANT

*As a part of feasibility study it is important to consider the social sentiment of people in choosing the location for the establishment of the plant. The development should not be in between the human settlement, and the waste from the plant should not pollute the water source. It is very important that the location minimize cross contamination of disease.*

*A thorough study in consultation with the beneficiaries and the community will help to establish a plant, which will be sustainable and socially acceptable. It is advisable not to start with a very sophisticated technology. The processing plant should have more technology, which requires more manual operation. This is because simple break down of the plant should not stop the work, which can be done manually with required machineries.*

*As a start up the government should look for small and compact processing plants, and should start as a pilot test, preferably in Samtse and Tsirang.*

#### 8.5 MARKET OUTLETS ESTABLISHMENT AND PRODUCT BRANDING

It is recommended the Agriculture Marketing Section of Bhutan study market outlets with required facilities. As a trial, it will be good to establish one in Thimphu and one in Phuntsholing.

Outlets in major cities throughout the country will allow the farmers to take up wholesale business and deliver chicken as far as in the eastern part of the country. At present wholesaler and retailers control the outlet and farmer have low bargaining capacity.

Bhutanese consumer wants quality chicken. However consumer cannot define quality. In future, a brand name with proper packaging and required information of the chicken produced will set a mile stone in the quality definition of the Bhutanese consumers. This development will uphold competition edge over imported chicken. As the buying decision is determined by reliability in the product due to fear of disease, this behaviour will decrease demand for chicken if the quality is low.

The potential brand creation for chicken should be studied by concerned District livestock sector in consultation with department of livestock and Agriculture marketing section.

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#### IMPLEMENTATION STRATEGY

The market outlets should serve as an emergency selling point and should not directly compete with the potential chain actors like wholesaler and meat traders. The outlets should be made available on rent and users should be made responsible for management and maintenance of the outlets. As a start-up project government should build two to three outlets infrastructure with required facilities to store meat and sell from the same place. These outlets should be kept under the supervision of the district livestock office and slowly let the private entrepreneurs take over as a business option.

Branding the local chicken production should focus more on packaging and in providing required information. The Agriculture marketing section should create awareness about the chicken production in the country and its availability with brand name. Once the chicken is marketed with brand name, the future production should improve on quality or maintain the

status as desired by consumer. For example a brand name like” *Druk<sup>11</sup> Samtse Chicken*” will attract people with higher confidence to buy.

#### HATCHERY WITH PARENT STOCK FOR WESTERN REGION

It is highly recommended to establish a hatchery with boiler parent stock farm in Samtse as it is located far away from existing hatcheries in Bhutan. Due to geographical location and inaccessibility to input supply during the disease outbreak in India, Samtse will be affected the most in-terms of broiler day old chick supply.

Samtse has a potential to produce fresh chicken with lower production cost comparing to other District. The biggest and only feed company is located only 80 kilometres away from Samtse. This gives an opportunity for broiler farmers in Samtse to produce at lower cost and become a leading chicken producer in Bhutan in future.

#### IMPLEMENTATION STRATEGY

Feasibility study should be carried out before the investment is made. The location of the hatchery is important and it should be situated in place that minimizes disease cross contaminations. The main facilities like water and electricity should be put in place. The investment for hatchery and parent stock farm should not be huge in the beginning. The size of hatchery should be according to the production capacity of the area; this should be done with data collected on future production and market.

The government should encourage private entrepreneurs to take up such activities. A public private partnership approach where beneficiaries can invest as a share holder will encourage the promotion of enterprise and chain actor development. The role of the government should be more at the quality level and should not be involved in the management of the business.

Management plan should be developed before it is operational. Along with the infrastructure development competent and skilled workers should be deployed.

#### 8.7 RECOMMENDED FUTURE BROILER CHAIN

A new broiler chain is recommended with appropriate support to the chain actors. The chain development should not be left on the market force at present. It is very important to see the inclusion and exclusion of actors in the chain. The future broiler chain should guarantee following aspects:

- *Easy traceability and information flow*
- *Continuous flow of input and out put*
- *Fair value and profit share*
- *Build trust and persistent relationship among the actors*

The above characteristic will play an important role for successful product chain development in Bhutan.

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<sup>11</sup> *Druk* in direct translation to english is dragon, but it is used with same meaning to refer as Bhutan.

A study is needed to see the future role of trader, and retailers and how to build stronger relationship between the actors in the chain. More emphasise on framers organization building will lower the cartel and monopoly by meat vendors and wholesalers.

### *Recommended future broiler chain*

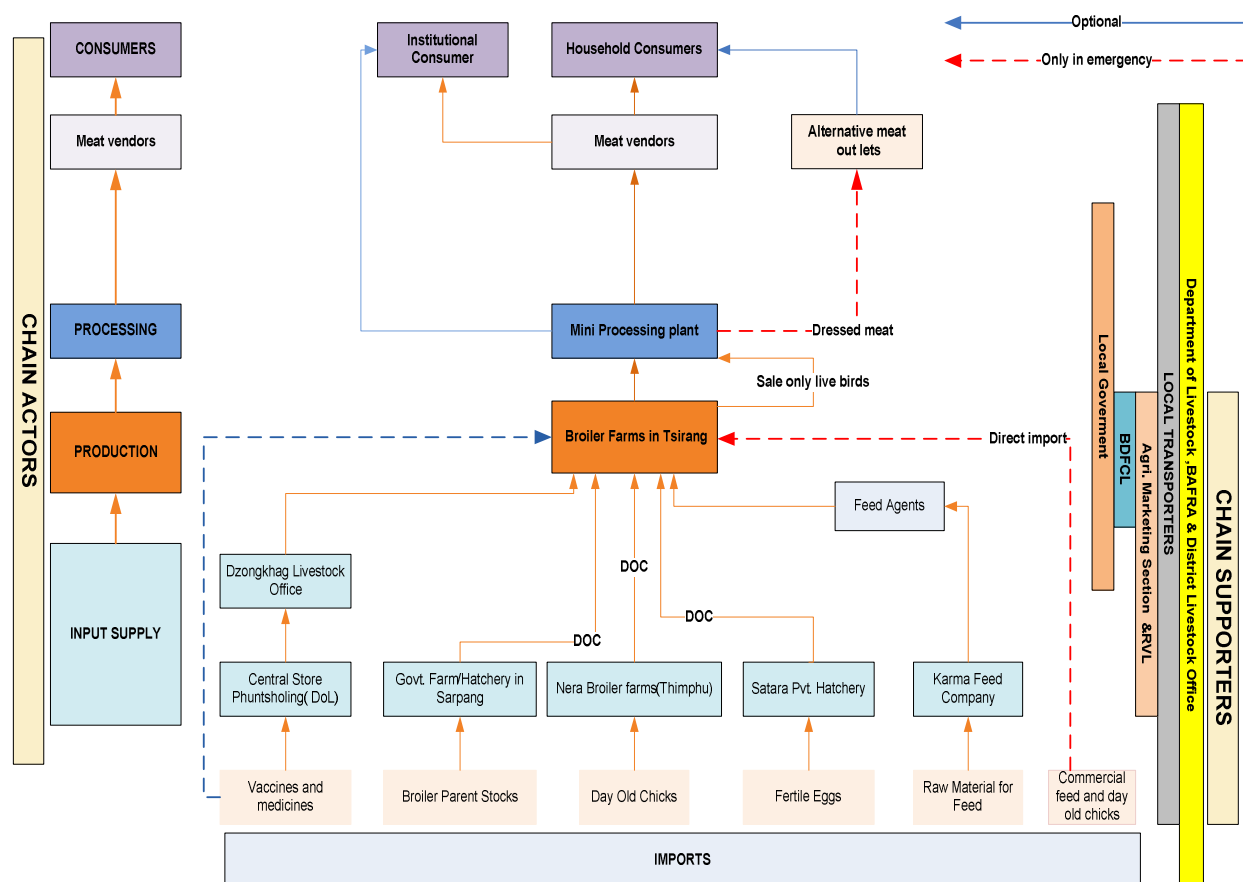


Figure 27: Recommended broiler chain for Tsirang

### 8.7.1 IMPLEMENTATION STRATEGY

The chain development should not be left on the market force at present. There should be strong policy support to develop the chain in the country. The district livestock office should take up detail study on inclusion and exclusion of actors in the chain in consultation with other stakeholders. A consultative workshop on broiler chain building will be very instrumental to understand the perspective of different stakeholders.

The role of the government in the chain building should be more on facilitation rather than taking decision in the process. District livestock office takes the responsibility in supporting the up farmers to build strong farmers group. This should be done with trainings on group formation and management.

The farmers should be supported to take up one specialize activity rather than trying to make vertical integration in the chain.

## REFERENCES

- Bhutan, PHCB. 2005. *Population & Housing Census of Bhutan*.
- Dixie., 2005. *Marketing extension guide horticulture marketing an introduction to horticultural marketing*.FAO,Rome
- DoL, MoA , Bhutan. 2004. *A Report on the Study of The "Social and Religious Sentiments of The Bhutanese Farmers on Culling and Slaughter of Animals in Bhutan"*. Bhutan.
- DoL, MoA., Bhutan. 2009. *Review of the Consumption and Production of Meat in Bhutan .Social, Religious and Economic Aspects*. Bhutan.
- DoL,MoA., Bhutan. 2008. *Social, Religious & Economic Aspects: Livestock Production*
- DoL MoA, 2003. *Chicken project up scaling semi -commercial farms* .Project report
- MoA, RNR Census 2005., Bhutan
- Global Property Guide. 2009. *Residential property data (online)* .Available at : <http://www.globalpropertyguide.com/Asia> (accessed 9 August 2009)
- GTZ. 2007. *Value Links Manual: The Methodology of Value Chain Promotion*, First edition. Available at: [www.value-links.de/manual/pdf/valuelinks\\_complete.pdf](http://www.value-links.de/manual/pdf/valuelinks_complete.pdf) ( accessed 15 August 2009)
- Gueye E.F., 2002., *Family aspects in Chicken Management Systems in Developing Countries*. Senegalese Institute of Agricultural Research Dakar, Senegal
- Hashimoto E., Nagano M., Kobayashi S. and Koizumi S., 1996. *Studies on the consumer behaviour for egg in Japan. Department of Animal Science and Resources Nihon University, Fujisawa-shi 252,Japan( Online)* Available at: (<http://hp.brs.nihon-u.ac.jp/~keiei/resourse/ronbun/r96-5.pdf>) (accessed on 26 July 2009)
- IMS, DoL, MoA., 2007. *Livestock Statistics*. Bhutan.
- IMS ,DoL,BAFRA, 2009. *Meat import data*. Bhutan
- K, Marina., 2008. *The World's Happiest Countries Business week London(online)* Available at [http://images.businessweek.com/ss/06/10/happiest\\_countries](http://images.businessweek.com/ss/06/10/happiest_countries) (accessed 23 July 2009)
- KIT & IIRR. 2008. *Trading up, building cooperation between farmers and traders in Africa*
- Kotler, P., veronica, W., John, s. &Gray, A., (n.d) *principle of marketing*. 4th E.U. ed. Pearson Education Limited
- Lecture Outline. *Consumer Markets and Consumer Buying Behaviour* (e-book). Available at: <http://www.csustan.edu/market/williams/Chapter> ( accessed 18 August 2009)
- MoA,2005 *National RNR Census* Ministry of Agriculture , Bhutan
- Ministry of Agriculture, Royal Government of Bhutan. 2004. *Selected RNR Statistics*. Bhutan.
- Ministry of Agriculture, Royal Government of Bhutan. 2002. *RNR Input Supply Workshop*. Bhutan
- Ministry of Agriculture, Royal Government of Bhutan. 2007. *9th Annual RNR Conference: "Accelerating PAM For Rural Prosperity"*. Bhutan.
- Ministry of Agriculture, Royal Government of Bhutan.1994. *A National Extension Policy*. Bhutan.
- Ministry of Health, Royal Government of Bhutan(MoH,2009). *Annual Health Bulletin*. Bhutan
- Norbu, T & Wangdi, S., 2009. *Demand Analysis of High-End Hotels in Thimphu* ,Bhutan
- National Statistical Bureau , Bhutan 2005 *The National statistics of Bhutan*
- Porter M.E., (1979) *How competitive forces shape strategy*. Harvard Business review. Available at: <http://www.amazon.com/exec/obidos> [accessed 10 July 2009].
- Porter M.E. (n.d.) *Five Competitive Forces (Porter)*. Available at :[www.12manage.com/methods\\_porter\\_five\\_forces\\_nl.html](http://www.12manage.com/methods_porter_five_forces_nl.html). [accessed 16/7/09].
- Richtner, Peter. (2005). *Linking value chains Analysis and Making markets work better. Application of value chains in development projects. Reporting on Srilanka experiences*.



Available at : [www.mesopartner.com/publications/Meyer-Stamer+Waeltring](http://www.mesopartner.com/publications/Meyer-Stamer+Waeltring)( Accessed 20 August 2009)

Stephen E.J. Swan. (1999). *The chicken Development Strategy of the participatory Livestock Development Project in Bangladesh*, Available at :<http://www.fao.org/DOCREP/004/AC154E/AC154E05.htm>(accessed 28 August 2009)

Schiere, H. (January 2001). *Peri-Urban Livestock Systems: Approaches and Opportunities*. Wageningen, The Netherlands.

S V Gerard., 2008. Presentation on logistic and supply chain (APCM 2008) based on lecture notes agriculture supply chain analysis by R.K. Hack 2005

Tobias M & Morrison G J., (2009). "*Animal Rights in Bhutan*" (online) Available at: [http://search.yahoo.com/search; Animal\\_Rights\\_in\\_Bhutan.pdf](http://search.yahoo.com/search; Animal_Rights_in_Bhutan.pdf) (accessed 12 August 2009)

Tashi T. et al., 2006. *Practical Management Plan for Wang Bahamo Broiler Farm: A Guide*( internal report DoL, MoA, Bhutan)

Tashi T., 2003 *Chicken project semi-commercial farm "Enhancing semi commercial chicken farming in potential areas"* (internal report DoL, MoA Bhutan)



## ANNEXES

### Annex I: Broiler farmers in Tsirang and Samtse

#### 1.1 List of Broiler farmers in Tsirang

Sl.no	Name	Gender	Religion	Educational Level	Starting year	Starting stock	Present Stocking
1	K B Chuwan	M	Hindu	Primary	2004	200	250
2	KS Pardhan	M	Hindu	primary	2004	250	500
3	Om Nath Pardhan	M	Hindu	primary	2004	400	600
4	Gelong Sinchuri	M	Hindu	primary	2005	350	500
5	Dewan	M	Hindu	primary	2004	350	600
6	Loknath Korila	M	Hindu	Secondary	2006	800	2000
7	Tek Bdr Subbha	M	Hindu	primary	2006	300	450
8	Gopal Kali Koti	M	Hindu	primary	2006	350	600
9	Kharka Bdr	M	Hindu	primary	2006	400	600
10	Padmala Pardhan	M	Hindu	primary	2006	400	700
11	Shem Kumar	M	Hindu	primary	2006	250	600
12	Mon Bdr Pardhan	M	Hindu	primary	2007	350	500
13	Tara Bir	M	Hindu	primary	2007	400	700
14	D B Rana	M	Hindu	primary	2007	500	600
15	DB Puwaner	M	Hindu	primary	2007	700	1500
<b>15</b>	<b>Total</b>					<b>6000</b>	<b>10700</b>

#### 1.2: List of broiler farmers in Samtse

Sl.no	Name	Gender	Religion	Educational level	Starting year	Starting stock	Present Stock
1	Mon Bdr Subba	M	Hindu	No	2006	400	Nil
2	Barun Chhetri	M	Hindu	primary	2006	200	Nil
3	Suk Maya	F	Hindu	primary	2006	400	Nil
4	Kumar Rai	M	Hindu	primary	2006	0	Nil
5	Kopila Biswa	M	Hindu	primary	2006	400	Nil
6	Alexandra	M	Christian	primary	2006	500	Nil
7	Saroj Gurung	M	Hindu	BA Degree	2006	700	Nil
8	Rosan Rai	M	Hindu	primary	2006		
9	Babu das subha	M	Hindu	primary	2006		
10	Jaki Gurung	M	Christian	primary	2006		
11	Bhim Rani Rai	F	Hindu	primary	2006		
12	Afi dul teley	M	Muslim	primary	2006		
13	Mani Kr Galey	M	Hindu	primary	2006		
14	Seman Gurung	M	Hindu	primary	2006		
15	Jankey Teley	M	Muslim	primary	2006		
<b>15</b>	<b>Total</b>					<b>2600</b>	<b>Nil</b>

*Annex 2: List of sample and respondent for filed study*

<b>SURVEY</b>	<b>SAMPLE</b>	<b>DISTRIBUTION</b>
Consumer I ( Normal )	250	8 Dzongkhag in Bhutan
Consumer II ( Institutional)	31	8 Dzongkhag in Bhutan
Extension Agent	18	Samtse Dzongkhag
<b>Total</b>	<b>299</b>	

*2.1: List of people interviewed for case study in Bhutan*

<b>CASE STUDY( Interviewee)</b>	<b>Category</b>	<b>Respondent</b>
Broiler Farmer Group	Producer	1( 15 members)
Broiler Farmer Group	Producer	1( 15 members)
Meat vendor	Wholesaler	3
Chief livestock officer	Policy maker	1
Chief Health officer	Policy maker	1
Chief inspector	Policy maker	1
Feed company(Karma feed)	Input supplier	1
Hatchery (private)	Input supplier	1
Hatchery (Government)	Input supplier	1
Financial institution(BDFC)	Financial	1
Dzongkhag BAFRA in-charge	Technical supporter	1
Dzongkhag Livestock Officials	Technical supporter	2
Feed agent	Input supplier	2
<b>Total</b>		<b>17</b>

*Note: Producers are two farmers group with 15 members in each group*

*2.2: Sample list according to selected district*

<b>District</b>	<b>Normal consumer</b>	<b>Institutional Consumer</b>	<b>Extension Agent</b>	<b>Urban Population</b>
Samtse	41	2	18	10156
Tsirang	11	2		1661
Thimphu	136	11		79136
Sarpang	14	3		12589
Dagana	5	0		1949
Wangdue	15	1		7534
Yangtse	14	5		3015
Haa	14	6		2492
<b>Total</b>	<b>250</b>	<b>30</b>		

## Annex 3: Case study check list

### 3.1 Case study check list for producers' interview

Time : 6 hours

Method: Group discussion, Interview of random sample

Study location..... Date.....

#### BASIC DATA

No of participants, by gender, religion and educational standard

Starting stock of chicken, when did you start, present production, size?

Sl.no	Name	Gender	Religion	Edu.	Start date	Start stock	Present Stock
1							

#### STAKE HOLDER IN THE CHAIN

1. Who else are involved in broiler production chain?
2. Can you show me the whole journey of your chicken from DOC to market in simple chain, with all the actors in it?
3. What constraints you face with different stakeholders in the chain?
4. What is your opinion the extension support especially on chicken production?
5. Can you suggest a better structure to improve the present chain?

#### PRODUCTION

1. From where do you get your day old chicks and feed, what constraint you face?
2. What is the cost of 1 day old chick, and 1 kg feed?

Doc	Feed/kg
-----	---------

3. Can you briefly explain the total cost of production for 1 kg broiler?

Sl.No	Items	Rate	Amount
1	DOC		

4. Who controls the quality aspects and when do they check the quality?
5. What are the main constraints in production?

#### PROCESSING

1. How do you process your chicken, what equipment are used?
2. How much time does it take to process (de-feather and packing) one chicken?
3. If an private entrepreneur wants to invest in processing unit, what support will you provide?
4. What are the main constraints in processing?

## MARKETING

1. Where do you sell your chicken and who buys it?
2. How easy or difficult it is to sell your chicken?
3. Who decides the price of your chicken?
4. What are the costs incurred in marketing your chicken?
5. Are you satisfied with the price of chicken?
6. How do you get your market information?
7. What kind of market information do you think will be important for you?
8. Do you have sufficient relationship and contact with wholesaler, meat vendor or supermarket?
9. Can you show me how much you sell and what is the different margin share in the chain
10. What is the selling price of chicken at farm to retailer/shop, vendor, and supermarket?

## PLANS FOR FUTURE

1. Do you want to increase production in future?
2. If you do not get chicks what will you do with your farm?
3. How do you think the opportunities of broiler production in Samtse/ Tsirang district?
4. Will you go for contract production for a wholesale buyer if conditions are favorable?
5. Can you comply with the quality requirement, price and supply?

What are the main hindrances in up-scaling broiler production?

Main constraints	Ranking

## SUPPORT REQUIRED

1. What type of support is important for you to increase chicken production and marketing?

Main supports	Ranking

2. What type of capacity building do you need in which area?
3. What is your opinion on Extension service especially on chicken production?
6. In your opinion, do you think that you feel social pressure in producing chicken, how does it affect your production?

### 3.2 Case study check list for producers' interview

*Time: 1.30hours for each*

#### **Meat vendors and wholesaler**

1. Do you buy locally produced chicken from Bhutanese farmers, what advantages and disadvantages you face?
2. How much do you normally sell per week?
3. What problems do you face in buying and selling chicken?
4. In your opinion, which chicken do the consumer prefer, locally produced or imported chicken?

#### **Feed company:**

1. Do you have the capacity to produce high quality chicken feed and maintain a constant supply?
2. What will be your feed price and quality in comparison to the feed from India?
3. Will it be possible to make a contract on feed supply for the farmers at their farm gate?
4. What is your broiler feed price, and how much will it cost farmers if you deliver them?
5. What type of support can you provide for up scaling broiler production from the perspective of your own business with win- win situation?

#### **Day old chick supplier ( Hatcheries)**

1. Can you maintain high quality and constant supply?
2. What will be your chick price if delivered to farmers?
3. Will it be possible to make a contract on chick supply for the Bhutanese farmer?
4. Is it possible for you to supply feed to Bhutanese farmers?

#### **Bhutan Development Finance corporation( BDFC)**

1. Can farmers avail loan for chicken farming?
2. What will be the conditions for taking loan?
3. What type of loan can you provide to the small farmers?
4. What will be the interest rate and mode of payment system?

#### **Department of Livestock**

- 1) How do implement poultry development program?
- 2) What plans does the organization have on domestic chicken production?
- 3) What are the constraints in up-scaling broiler production?
- 4) In your opinion what needs to be done, by whom, to strengthen the chicken production and marketing?
- 5) How can the organization solve the input supply problem, looking at the location producers and road network?
- 6) Does the organization encourage commercial production?
- 7) Does the organization have required capacity to focus on broiler commercialization program?
- 8) What type of support can be provided, Eg: can transport subsidy be included for encouraging production?

**Agriculture Marketing Section**

1. What are the plans and priorities of the government with regards to chicken marketing?
2. Is there a possibility of establishing a formal market? What would be the constraints?
3. What do you think is the biggest problem in helping the small chicken producers?
4. What type of collaboration and with whom should the organization have to improve chicken marketing for farmers?
5. How is market information transferred to farmers?
6. Do you think there is enough market for domestic chicken production in Bhutan?
7. What type of support can the organization provide to the small chicken farmers?

**District Livestock officer**

1. What are your present plan and strategies in broiler development?
2. What should be done for the smallholder chicken farmers to upscale into commercial production?
3. Does your organization see constraints in doing this?
4. What support do you provide to the farmers in chicken production and marketing?
5. What are the roles and capacity building requirements of producer and other actor to make the chicken production successful?
6. From your opinion what is the main limiting factor in chicken development, and what can be done to upscale production?

**Bhutan Agriculture Food Regulatory Authority (BAFRA)**

1. What are the food safety requirements that a farmer should meet to sell their chicken?
2. Do the farmers at present meet the requirement?
3. What are the main constraints in chicken quality, produced by Bhutanese farmers?
4. Can you suggest some strategies to improve quality?
5. What are the basic imports rules that farmers should follow in importing DOC and feed?
6. What policy or regulatory support can be provided if chicken production is up-scaled?

**National Center of Animal Health**

1. What is your opinion on commercial production of chicken in Bhutan?
2. What do you think about the disease and risk?
3. What is the capacity and measures in place if there is an outbreak of chicken disease?
4. In your opinion, should the government encourage commercial broiler production?
5. Can you suggest some strategies to minimize the risk of disease?

*Annex 4: Survey questionnaire for data collection.* 4.1 Questionnaire for household consumer survey  
**SURVEY QUESTIONER 1**

*Objective:*

This survey is a part of thesis research done to see the potential of developing domestic chicken production in future from the perspective of Bhutanese consumer in relation to chicken consumption and purchasing habit.

1.Respondent details /No..... Date.....

Location.....

Occupation:

Civil servant ☐ Pvt. Business ☐ Farmers ☐ House wife ☐ Other (specify).....

Sex of respondent : Male ☐ Female ☐

Religion: Buddhist ☐ Hindu ☐ Christian ☐ Others ☐

Which Part of country  
You are from : Western ☐ Eastern ☐ Southern ☐ Northern ☐ Central ☐

Educational standards

Primary level ☐  
Secondary level ☐  
Diploma & above ☐  
Degree and above ☐  
Never been to school ☐

2 What is your family size? (Children, wife, and if any staying with you) ☐

3 What is your income level per month (if applicable?)

Less than 5000 ☐  
More than 6000 less than 10000 ☐  
More than 11000 less than 20,000 ☐  
More than 21000 ☐

4. Which meat do you eat most?( Rate from 1 to 5 in scale, 1 is the most eaten , while 5 is the least eaten)

Beef ☐ Chicken ☐ Pork ☐ Mutton ☐ Other ☐

5. Which meat do you prefer most?( Rate from 1 to 5 in scale, 1 is the most preferred , while 5 is the least preferred)

Beef ☐ Chicken ☐ Pork ☐ Mutton ☐ Other ☐

6. How often you eat chicken.

Less than 2 time a week  
2 times a week  
More than 2 times a week


7. From where do you usually buy chicken?

Meat shop in the town  
Super market  
From chicken farmers  
From bordering Indian town  
I raise my own chicken


8. Which one is most important for you when buying chicken?

Price  
Quality


9. Which chicken you prefer to buy?

Chicken produced in Bhutan

--

Imported chicken

--

Both

--

10. What is your opinion on the locally produced chicken in comparison to imported chicken?

Very high price  
High price but higher quality  
It is reasonable in price  
Its tastier than imported  
There is no difference


11. Do you know some farmers in Bhutan are producing chicken and selling in the market?

Yes I know

--

No I didn't hear about it

--

12. What factors will make you buy more locally produced chicken in future.  
(Please rate from 1 to 5 in scale, 1 is the biggest factor 5 is the lowest)

If it is of higher quality than imported chicken  
If it is regularly available  
If imported chicken is not available  
If the taste is like native chicken (indigenous)  
If my income increases




13. What limits you from buying locally produced chicken? (Please rate from 1 to 5 in scale, 1 is the biggest limiting factor 5 is the lowest)

Fear or disease	<input type="text"/>
High price of local chicken	<input type="text"/>
Low quality chicken	<input type="text"/>
Supply is not constant	<input type="text"/>
Religious sentiment	<input type="text"/>

Other: please (Specify).....

14. How do you know the difference between locally produced and imported chicken?

By price	<input type="text"/>
By looking at the chicken	<input type="text"/>
As told by meat vendors	<input type="text"/>
By taste	<input type="text"/>
I don't know	<input type="text"/>

15 .Will it be convenient if there is a choice to buy the following? Which portion would you prefer to buy most ?  
(Rate from 1 to 5 in scale, 1 is the biggest choice 5 is the lowest)

Yes	<input type="text"/>	Not really matters	<input type="text"/>
Breast meat	<input type="text"/>		
Chicken thigh meat	<input type="text"/>		
Chicken wings	<input type="text"/>		
Heart and gizzards only	<input type="text"/>		
Whole chicken	<input type="text"/>		

16.What characteristic of good meat ( eg: white and soft/hard meat, no fat etc) you would prefer in a chicken meat?

Please specify.....

17.What size of chicken is the most suitable for you ? ((Rate from 1 to 5 in scale, 1 is the biggest choice 5 is the lowest)

Less than 1 kilo gram	<input type="text"/>
1.kilo gram in weight	<input type="text"/>
1.5 kilo in weight	<input type="text"/>
2 kilo in weight	<input type="text"/>
more than 2 kilo in weight	<input type="text"/>

18. How strongly you support or oppose people from starting a chicken farm in Bhutan?

I support chicken farming

I oppose chicken farming

I am netural


If you oppose why:.....

19 . Overall how would you rank the quality of a chicken that you buy

Very Good

--

Good

--

Average

--

Poor

--

20. Are you willing to pay a higher price for locally produced chicken ( in Bhutan) ?

Yes

No

I cannot say


21. Did the latest ban on chicken import in the country affect your family diet?

Yes

--

No

--

I don't know

--

22.If yes what was the effect:

Most of the time no meat in the diet

I spent more money buying other meat

I spent less on meat

I don't like eating chicken any more


23. In your opinion do you think you are eating more or less meat comparing to 5 years ago?

I eat more meat than before

I eat less meat than before

I eat the same


#### 4.2 Questionnaire for institutional consumer survey

##### **SURVEY QUESTIONER II( Institutional Consumer)**

###### *Objective:*

This survey is a part of thesis research done to see the potential of developing domestic chicken production in future from the perspective of Bhutanese consumer in relation to chicken consumption and purchasing habit.

1 .Respondent No..... Date.....

Location.....

Institution type :

Hotels ☐ Restaurant ☐ Guest House ☐ Resort ☐ Meat vendors ☐

3. From where do you buy chicken?

Local supplier (farmers)  
Meat shop from the town  
Suppliers from India/thailand


4.What type of chicken you usually buy?

Fresh chicken from Bhutan  
Frozen chicken from India/Thailand  
Canned chicken  
Others.....


5.How much chicken you normally require?

..... kgs per day

.....kgs per week

.....kgs per month

6.Which one do you consider most when buying chicken?

Price	Yes	<input type="checkbox"/>	No	<input type="checkbox"/>
Quality	Yes	<input type="checkbox"/>	No	<input type="checkbox"/>

7.Do you buy more, or less chicken in certain period of time ?

Yes we buy more in winter  
Yes we buy more in summer  
There is no difference we buy same


8.Which chicken you would prefer to buy if there is a choice?

☐☐☐

Chicken produced in Bhutan

Imported chicken from India

Both

9. What factors will make you to buy more chicken in future.  
(Please rate from 1 to 5 in scale, 1 is the biggest factor 5 is the lowest)

Higher quality chicken  
If regularly available

If locally produced is available

Organic chicken is available  
If other meat is not available


10. What limits you from buying chicken produced in Bhutan? (Please rate from 1 to 5 in scale, 1 is the biggest limiting factor 5 is the lowest)

Fear or disease

High price

Low quality chicken

Supply is not constant

Religious sentiment


11. If you are looking for quality in chicken, what is quality for you?

Not frozen, but fresh and hygienic

Frozen for less than 1 week with good packaging

Hard meat with lots of fat

Soft and tender meat


12. In your opinion do you think you will be buying more, or less chicken in future?

I will buy more  Buy less  Remain same as now

13. Overall how would you rank the quality of a chicken that you buy?

Very Good  Good  Average  Poor

14. Are you willing to pay a little bit more than the imported chicken if high quality and constant supply of chicken is available from Bhutanese farmer in Bhutan?

Yes

No


15.How severely did the latest ban on chicken import in the country affect your business?

Very severe ☐ Severe ☐ Not severe ☐ did not affect ☐

16.If farmers want to produce chicken for you, will it be possible for you to make a contract production with farmers?

Yes ☐ No ☐ can't say ☐

17.What supports can you provide if you have a group of farmers producing chicken for you?

Financial support for buying inputs as credit	<input type="checkbox"/>
Support for transportation of chicken from farm	<input type="checkbox"/>
Cold chain to maintain quality	<input type="checkbox"/>

Others.....

18.Are you confident to work with farmers as your contract chicken producer?

Very confident ☐ Confident ☐ Not Confident ☐ need to work first ☐

4.3 Questionnaire for extension agent capacity evaluation survey

**SURVEY QUESTIONER (EXTENSION SERVICES)**

1. How do you rate your own job?
  - I am happy with it
  - I am not satisfied
  - It is challenging
  - It is an easy job
  - I need improvement
2. Are you able to give required advice and technical support on broiler production and up scaling?
  - Yes
  - No
  - Little bit

3. In your opinion do social stigma and religious sentiment that you have or believe keeps you away from encouraging farmers to up scale livestock production which needs killing?
  - Yes
  - No
  - Little bit

4. Are you confident of the knowledge you have to support farmer if they want to increase chicken production in future?
  - I am not confident
  - I am confident
  - I am confident but needs more knowledge

5. What is the main problem you see in encouraging farmers to take up chicken production? List 3 problems
  - .....
  - .....
  - .....
6. What type of capacity building you require in chicken production?
7. Are farmers in your Geog keen to start chicken production, what did you do to promote?
  - Yes
  - No


List 3 activates you conducted. To encourage

- .....
- .....
- .....

1. What do you think is the main constrain to develop sustainable domestic chicken production in Bhutan? Give 3 important reason

- .....
- .....
- .....

2. As a livestock professional, we need to advise people to cull, and encourage livestock farming which requires killing. Do you willingly advise or encourage farmers on such activities?

- I advise farmers but I feel sentimental
- I advise and don't feel anything
- I don't really encourage farmers
- 
- I advise and encourage because it is my work
- I don't want to advise but I can't do that


3. In your opinion: What do you think about the potential of domestic chicken industry development in Bhutan?

Annex 5: Economic calculation on broiler production

5.1 Calculation on total farm required to substitute 80% import of chicken in the country

Total farm required to substitute present import quantity of chicken						
Forecasted year	Population	Farm required	Consumption	Farm production	Production	Weekly meat
		(number)	Per year(kg)	per cycle	per year	required
2009	695819	198	1600384	1350	8100	30777
			1600			
<b>Total</b>	<b>695819</b>	<b>198</b>	<b>384</b>	<b>1350</b>		<b>30777</b>

Calculation parameter

Characteristic	Qty	Type
Farm Size( no of birds)	750	Broiler
Production cycle	6	times a year
Production per cycle(kgs)	1350	Cycle in 7 weeks
Dressed wt	1.8	Kgs
Per-capita consumption(kg)	2.3	kgs
labour required	2	per 500 birds management
	2	processing, carrying/cycle
Market price of chicken	120	

Total chicken farm required in Bhutan

198
-----

Estimate employment generation

3	Direct employment( farm management)
---	-------------------------------------

Indirect employment( slaughtering, cleaning)

Per farm per year

**Total employment generation**

4149	per year
------	----------

Estimate savings from substitution of import

Expected Import ( at present rate 80%)

1280307	import against
153636835.2	total chicken consumption
	Market rate of Nu 120/kg
153.6368352	Million per year



5.2 : Total chicken consumption and farms required for 25 years from 2010

Total farm required for 20 years						
Forecasted year	Population	Farm required (number)	Consumption Per year( kg)	Farm production per cycle	Production per year	Weekly meat required
2009	695819	148	1600384	1800	10800	30777
2010	695819	148	1600384			
2015	757042	161	1741197			
2020	809396	172	1861611			
2025	850976	181	1957245			
2030	886523	189	2039003			
<b>Total</b>	<b>4695575</b>	<b>1000</b>	<b>10799823</b>	<b>1800</b>		<b>30777</b>

Calculation parameter

Characteristic	Qty	Type
Farm Size( no of birds)	1000	Broiler
Production cycle	6	times a year
Production per cycle(kgs)	1800	Cycle in 7 weeks
Dressed wt	1.8	Kgs
Per-capita consumption(kg)	2.3	kgs

Total chicken farm required in Bhutan for 20 years

1000

5.3: Formula used for value calculation

**Gross output:(turn over)/revenue**

Total produce X selling price

**Gross income**

Revenue - Variable cost

**Gross Margin**

Gross income X 100/revenue

**Added value**

Price received by actor - price paid by actor

Value share = Added value X 100/ Final

retail price

**Value share**

**Net Income**

Revenue - Variable cost - Fixed cost

**Net Margin**

Net income X 100/ revenue

5.4: Cost of production for 1 kg chicken and last selling price with farm size

Farm Size	200	500	700	1000	1500	2200
Production cost/kg chicken	106	99	97.5	96.5	95.5	86.75
Market price	120	120	120	120	120	120
Last selling rate	144	106	105	104	103	102.5
Profit per kg	6	14	15	16	17	17.4
Income per cycle	2283	12682	19616	30000	47348	64682
Enterprise profitability	5.4	12.8	14.4	15.53	16.5	17

5.6: Value share calculation for producer

Farm Information	Specification	Unit
Investment on shed & equipment	120000	Nu
Scrap value	20000	Nu
Lifespan	20	yr
Interest	10	%
Maintenance	3	%
Cycle per year	6	Batches(7 weeks)
Labour per hour	60	hours
Total Chicks	1000	No
Cost of chick	25	
Cost of Feed	20	
Total feed consumption	6	kgs
Rearing days	60	days
Mortality	5	%
Dressed weight	1.8	kgs
Cost of processing/bird	7	
Cost per kg/chicken	0	Nu
Total mortality	50	No
Live birds	910	No
Total dressed weight	1638	Kgs
Price received	120	Nu
<b>Fixed cost</b>		
Depreciation on shed	1000	Nu
Interest	1272.727273	Nu
Maintenance	600	Nu
Labour	6000	Nu
Electricity and water	0	
Fixed over head/batch	1500	Nu
<b>Total fixed cost</b>	<b>10372.72727</b>	
<b>Variable cost</b>		
Day old chicks	25000	No
Feed	120000	Kgs
Vaccines	5000	Nu
Processing & packaging	7000	Nu
<b>Total variable cost</b>	<b>157000</b>	
<b>Total cost</b>	<b>167372.7273</b>	
<b>Variable cost/kg</b>	<b>95.84859585</b>	
<b>Wholesale price</b>	<b>120</b>	<b>Nu</b>
Final retail price	170	Nu
Cost of production/kg	<b>102.1811522</b>	

<b>Gross output:(turn over)/revenue</b>	<b>196560</b>	Nu
<b>Gross income</b>	39560	Nu
<b>Gross Margin</b>	20.12617013	%
<b>Added value</b>	17.81884782	Nu
<b>Value share</b>	10.48167519	%
<b>Net Income</b>	29187.27273	Nu
<b>Net Margin</b>	14.84903985	%

5.7: Value share calculation for wholesaler

Wholesale level	Cost	Unit	
Chicken	196560	Nu	( Meat from two farms)
Packing cost	2457	Nu	( 1.50 per kg)
Cost of transport	4392	Nu	(244 km*18/km)
Overhead cost	4914	Nu	(1638*2/kg)
<b>Total cost</b>	<b>208323</b>	Nu	
<b>Variable cost/kg</b>	<b>127.1813</b>		
Supplier price	120	Nu	
Final retail price	170	Nu	
Price received	155	Nu	
<b>Gross output:(turn over)/revenue</b>	<b>253890</b>		Total produce * selling price
<b>Gross income</b>	45567		Revenue - Variable cost
<b>Gross Margin</b>	17.94754	%	Gross income *100/revenue
<b>Added value</b>	27.81868		Price received by actor - price paid by actor
<b>Value share</b>	14.64141	%	Value share = Added value * 100/ Final retail price
<b>Net Income</b>	45567		Revenue - Variable cost - Fixed cost
<b>Net Margin</b>	17.94754	%	Net income *100/ revenue

5.8: Value share calculation for retailer

Retail level	Cost	Unit	
Chicken	253890	Nu	( Meat from two farms)
Un-Packing cost	2457	Nu	( 1.50 per kg)
Cost of transport	0	Nu	(244 km*18/km)
Overhead cost	4914	Nu	(1638*3/kg)
<b>Total cost</b>	<b>261261</b>	Nu	
<b>Variable cost/kg</b>	<b>159.5</b>		
Supplier price	155	Nu	
Price received	170	Nu	

<b>Gross output:(turn over)/revenue</b>	<b>278460</b>		Total produce *selling price
<b>Gross income</b>	17199		Revenue - Variable cost
<b>Gross Margin</b>	6.176470588	%	Gross income *100/revenue
<b>Added value</b>	10.5		Price received by actor - price paid by actor
<b>Value share</b>	5.526315789	%	Value share = Added value * 100/ Final retail price
<b>Net Income</b>	17199		Revenue - Variable cost - Fixed cost
<b>Net Margin</b>	6.176470588	%	Net income * 100/ revenue

### 5.9 Chicken production cost analysis

#### Broiler farm

#### Production cost analysis

Designed by Tshewang Tashi  
FOR THESIS RESEARCH

Inputs		Labour	Fattening days	Birds			Total	Cost of	Capital investment
Capital cost	Days	Feed/ day	60	500		Kgs/bags	Things	production for	for the first start
						Space	Needed	one batch	
Housing	1 msq	Sqft	Unit	Density	Rate	Requirement	Nos	Cost	
Life span(years)	10	10	Sqm	10	2000	50		100000	100000
Batch per year	5	12							
Batch in 15 years	50								
Total birds renting	25000								
Rents per bird								4	
Rent per batch								2000	
<b>Equipment</b>			cm						
Feeder	Cicumfrance of one		125	5	200	2500	20	4000	4000
Drinker	Feeder/drinker		140	5	150	2500	17.85714	2678.571429	2678.571
Life span 5 years	5	5	25					6678.571429	
Rental /batch	25	12500	0.534285714					267.1428571	
<b>Recurring expdt</b>									
Chicks			Birds		45		500	22500	22500
<b>Feeding days/feed/day</b>									
Feed strater	15	0.065	Grams		20	487.5		9750	9750
Feed Finisher	45	0.125	Grams		20	2812.5	56250	56250	56250
Labour	12.5	240	hours		150	240		3000	3000
Electricity/kerosen		150	Hours					150	150
Litter		500	Bags/sqm	60		0.833333333	0.833333	500	500
Marketing cost		0						0	0
Transport of inputs		1000						1000	1000
Marketing cost		3500						3500	3500
<b>Total Recurring cost</b>								98917.1429	203329
Interest		0 %							
<b>Income</b>									
	Meat	Income				Meat sold			
Rate of Meat/kg	120	111600	Meat in kgs			930			
		Mortality				Live birds			
Liveweight (Kgs)	2	35	7			465			
Gross income		111600.00						111600	
<b>Total expenditure</b>		98917.1429	Income per batch					98917.14286	
<b>Net income</b>		12682.8571	12682.85714					12682.85714	
<b>Enterprise profitability %</b>		12.8216978	Monthly	6341.4				12.82169781	
<b>Price fixing for 1 kg broiler meat</b>									
<b>Cost of production</b>		Total produce	Meat	Rate per kgs					
Chicks		Live birds	465	Last price					
House		Live wt.	2	930	106.3625192				
Feed									
Labour									
Equipment									
Mecellenous									
Litter									
Heating									
<b>Total</b>	98917.1								

Capital cost recovery  
in how many batch

Batches 16.03176391

In year  
2.493829942

## Annex 6: Different test used in quantitative data analysis

### 6.1. Mann-Whitney Test

#### Descriptive Statistics

	N	Mean	Std. Deviation	Minimum	Maximum
Which meat you eat most?	249	1.79	1.153	1	5
Religion	246	1.1992	0.4002	1	2

	Religion	N	Mean Rank	Sum of Ranks
Which meat you eat most?	Buddhim	196	110.66	21688.5
	Hinduis m	49	172.38	8446.5
	Total	245		

#### Test Statistics <sup>a</sup>

	Which meat you eat most?
Mann-Whitney U	2382.5
Wilcoxon W	21688.5
Z	-6.096
Asymp. Sig. (2-tailed)	0

a. Grouping Variable: Religion

### 6.2 Nonparametric Correlations

#### Correlations

			How strongly you support or oppose people from starting a chicken farm in Bhutan?	Education level
Spearman's rho	How strongly you support or oppose people from starting a chicken farm in Bhutan?	Correlation Coefficient	1	-0.085
		Sig. (2-tailed)	.	0.182
		N	248	248
	Education level	Correlation Coefficient	-0.085	1
		Sig. (2-tailed)	0.182	.
		N	248	250

### 6.3 Cross tabulation

#### Case Processing Summary

	Cases			
	Missing		Total	
	N	Percent	N	Percent
Your income level? * Family diet affected	6	2.40%	250	100.00%

Your income level? * family diet affected Cross tabulation		
Count		
	Diet affected	Total
	Not affected	
Your income level?	16	30
	33	87
	51	112
	3	15
Total	103	244

### 6.4 Nonparametric Correlations

#### Correlations

	Which meat you eat most?	new income
Spearman's rho	1	-0.064
	.	0.317
	249	246
	-0.064	1
	0.317	.
	246	247