

**RESOURCE INVENTORY AND BUSINESS OPPORTUNITY
FOR
COTTAGE AND SMALL INDUSTRY
UNDER PRODUCTION AND MANUFACTURING SECTORS**



**PUNAKHA DZONGKHAG
2015**



Empowering Entrepreneurs

BUSINESS OPPORTUNITY INFORMATION CENTRE

Foreword by Chief Executive Officer

August 27th, 2015.

In line with the mandate of promoting cottage and small industries under the production and manufacturing sectors, BOiC initiated an inventory of resources in the country with the support of Gaeddu College of Business Studies (GCBS) this year.

The primary objective of the report is to inform the Bhutanese on the potential business opportunities based on the resources available in the country.

As of July, 2015, BOiC has received a total of 4,255 project proposals. Out of this, 50% are in agriculture sector, 40% in livestock and 9% in manufacturing sector and 1% in other sectors. In spite of the challenges faced, the BOiC managed to approve a total of 1,337 projects falling under the category of cottage and small industries, amounting to Nu. 387.58 million.

Amid growing concerns of trade deficit due to large volume of imports and limited exports, Cottage and Small Industries Report, 2014 states that only 10.7% of cottage and small industries are in the production and manufacturing sector. With limited capacity to enhance export, external imbalances does not seem to improve any time soon unless import substitution measures of domestic production and value addition are pursued. One of the foremost questions that arise in this regard is the type and volume of resources available in the country that can be value added to meet the domestic demand. Comprehensive information on resource endowment and business opportunities plays a critical role in this regard for both government and private sector for planning and investment. It is against this backdrop BOiC initiated the resource inventory study.

The report takes stock of gross production capacity in the agriculture and livestock sectors and identifies around 120 business opportunities across the 20 Dzongkhags. While some of the opportunities may already have been implemented, opportunities still exist in up-scaling and replicating some of the projects in different parts of the country. The report is expected to help aspiring entrepreneurs across the country to take up various projects in manufacturing and production sectors.

Our zeal and endeavor in supporting the business will not stop with identifying opportunities and publishing the report. Moving to next step, we are under the process of carrying out feasibility studies under each of these opportunities. Based on the feasibility studies, we will be able to share more detailed project reports that can be readily taken up by potential investors/entrepreneurs.

It is our hope that this report will provide necessary information to both government and private sector for planning, policy formulation, resource mobilization and private investment. Further, this is expected to be of useful source of information to the financial institutions for lending towards the growth of production and manufacturing activities.

We would like to thank the faculty members and students of GCBS for their unwavering commitment and effort in carrying out the study, the Ministry of Home and Cultural Affairs, Dzongkhags and other government and non-government agencies for facilitating the team in carrying out the survey. We look forward to continuing our cooperation towards growth of CSI and self-employment opportunities.

Tashi Delek!


(Karma Tshering)

Acknowledgement

This report on inventory of resources and business opportunities was prepared by Gaeddu College of Business Studies (GCBS) with the financial and advisory support of the Business Opportunity and Information Centre (BOiC).

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Most of all, we would like to thank the officials of all the Dzongkhags, local leaders and extension officials of all the Gewogs for their invaluable guidance and input during the survey.

The Centre also owes its gratitude to the Hon'ble Prime Minister of Bhutan and Board of Directors for their valuable guidance and support.

The report is the outcome of the annual plan 2015 activities of the Centre.

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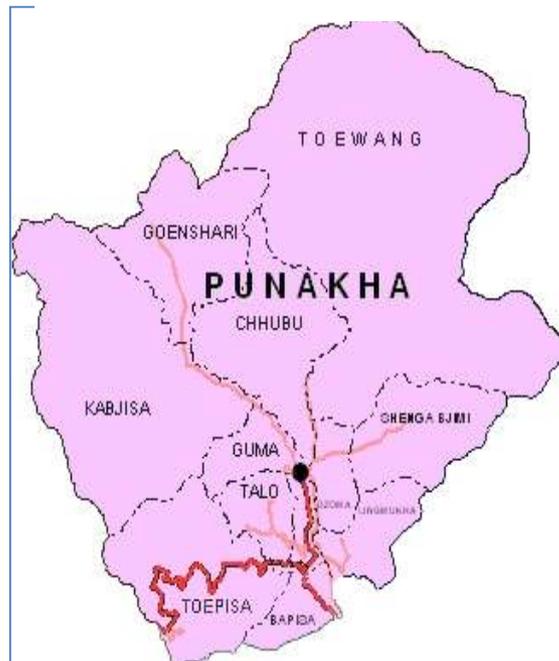
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DZONGKHAG PROFILE

Punakha Dzongkhag is located in western Bhutan at an altitude range from 1,200 to 4,800 meters above the sea level. The Dzongkhag's treasure, Punakha Dzong is situated at the confluence of the two rivers, Phochu and Mochu, which form the Puna Tsangchhu. Punakha Dzong was constructed by Zhabdrung Rimpoche and Punakha was the winter capital of Bhutan until 1955.

Even today, the Dzong serves as the winter residence of the central monastic body. Punakha Dzongkhag consists of 11 Gewogs spread over an area of 1,110 sq. km. There are a total number of 4,519 registered households with a total population of 26,926 persons (2012). The poverty incidence (PAR 2012) is 10%. The unemployment rate is 1.6% and the general literacy rate of the Dzongkhag (BLSS 2012) is 55.2 %. According to the RNR statistics of 2012, 75.87 % of the total land in the Dzongkhag has forest coverage. The temperature ranges from - 4° Celsius in winter to 35° Celsius in summer. All 11 Gewogs have feeder road connections.

Figure 1: Punakha Dzongkhag Map



1. Existing Resources

1.1 Land Utilization

According to the Agriculture Statistics of 2013, 5,771.47 acres of wetland and 1,665 acres of dry land were cultivated while 676.41 acres and 608 acres remained uncultivated respectively.

1.2 Agriculture and Production

Popular cereals of the Dzongkhag are paddy, wheat, maize and mustard. The Dzongkhag also grow seasonal vegetables and fruits owing to its location, soil fertility and climatic conditions. The major vegetables grown are chili, beans, tomatoes, and broccoli, while the primary fruits grown are mandarin and guava. According to the Agriculture Statistics of 2013, Punakha Dzongkhag cultivated paddy in an area of 5,908 acres, and produced a yield of 11,028 metric tons of paddy. Similarly, 551 acres were used for wheat cultivation and produced a yield of 413 metric tons. A total of 291 acres were used for chili production and the yield was 808 metric tons.

There are 9 farmers' groups comprising mostly of livestock and vegetable marketing, and 3 cooperatives. Some of the major constraints to agriculture includes but are not

restricted to human-wildlife conflict, inadequate irrigation facilities, poor yield, and rural urban migration resulting in shortage of labour force.

1.3 Livestock

Cattle and poultry are reared on subsistence basis in most of the Gewogs in Punakha. The practice of rearing pigs in the Dzongkhag is on a decline owing to religious sentiments. Few Gewogs like Chubu, Toewang, and Dzomi have potential in fishery considering the favourable climate and availability of suitable water resources.

1.4 Arts and Crafts

Punakha is not known for any of the arts and crafts activities. However, people in Kabji Gewog have skills in manufacturing *Nga* (ritual drums) for which they gather resources from the neighboring Gewog of Goenshari.

1.5 Cottage and Small Industry (CSI)

According to the Cottage and Small Industry Report of 2013, there are 279 CSI units in the Dzongkhag. However, production and manufacturing sector is only 6.4 % (18 units). Of the 279 CSI units in the Dzongkhag, 66.7 % is furniture manufacturing, 16.67 % bakery and 5.5% is mineral processing units.

GEWOG WISE BUSINESS OPPORTUNITIES

Table 1: Gewog wise business opportunities under agriculture sector

Business Opportunities under Agriculture Sector		Goenshari	Shenga Bjime	Chubu	Kabjisa	Dzomi	Toewang	Barp	Lingbukha	Talo	Guma	Toepisa
Cereal												
P	Paddy	*	*	*	*	*	*	*	*			*
	Wheat	*	*	*	*	*	*				*	
M	Milled rice packaging	*	*	*	*	*	*					
	Puffed rice manufacturing	*	*	*	*	*	*					
	Maekhu	*	*	*	*	*	*					
	Rice noodles	*	*	*	*	*	*					
	Rice bran oil	*	*	*	*	*	*					
	Husk & straw (Compost)	*	*	*	*	*	*					
	Husk & straw (cattle feed),	*	*	*	*	*	*					
	Wheat flour mill	*	*	*	*	*	*					

	Wheat bread, noodles, biscuits	*	*	*	*	*	*					
	Wheat bear	*	*	*	*	*	*					
Vegetables												
P	Chili		*	*		*	*	*	*	*	*	*
	Potato									*	*	
M	Chili pickle		*	*		*	*					
	Dried chili		*	*		*	*					
	Chili powder & spices		*	*		*	*					
Oil and Seeds												
P	Mustard					*						
M	Extraction of mustard oil					*						
	Mustard oil cake					*						

Note: **P** – Production; **M** - Manufacturing

Table 2: Gewog wise business opportunities under horticulture sector

Business Opportunities under Horticulture Sector		Goenshari	Shenga Bjime	Chubu	Kabjisa	Dzomi	Toewang	Barp	Lingbukha	Talo	Guma	Toepisa
P	Pangtse (Symplocos Paniculat)	*			*		*					
	Mandarin			*								
M	Pangtse (Symplocos Paniculat) oil	*			*		*					
	Dye from Pangtse leaves		*									
	Orange juice			*								
	Candied orange slices & toffee			*								
	Orange peels for creams and cosmetics			*								

Note: **P** – Production; **M** - Manufacturing

DZONGKHAG LEVEL BUSINESS OPPORTUNITIES

1. Wheat Production

The wheat is the second most important cereal being cultivated in Punakha Dzongkhag, next to paddy. It is cultivated in all the Gewogs and has been identified as one of the potential business opportunities in production in eight Gewogs. Looking at the current scale of production and its productivity of this crop in eight Gewogs, there is potential for scaling up its production on commercial scale. In 2013, the Dzongkhag produced a total of 413 metric tons of wheat, which accounted for 9.6% of the national wheat production. Although, the average yield per acre was 750 kg in 2013 as compared to 788 kg of national average yield, Punakha Dzongkhag stood 10th in terms of wheat production in the country. The major challenges to commercialization of wheat production in the Dzongkhag are the wildlife conflict compounded by labor shortage due to rural-urban migration.

1.1 Current Use

Currently, the majority of the wheat produced is being processed into flour locally known as *kapche*, which is usually consumed with butter tea (*suja*). The flour is also used for making *torma* (ritual cakes) during rituals and *chokhus* that Bhutanese households conduct. In 2013, the domestic transaction of the wheat flour stood at 73 metric tons, which fetched an average price of Nu.49 per kg (Agriculture Statistics 2013). The wheat is also used for brewing local alcohol called *ara*. As per the Agriculture Statistics 2013, the total income generated by this trade in a year is Nu.23 million surpassing the trade in other products of the dzongkhag like *zaw*, *kharang* and wheat flour. The by-products of the *ara* is used as animal feed. Also the wheat is sold to the Food Corporation of Bhutan Limited.

1.2 Market and Potential Business Opportunity

The extent of the business opportunity provided by the wheat cultivation in production and manufacturing is reflected by the amount of wheat imported into the country in different forms. The below table provides the volume of raw wheat import and wheat related products into the country in 2013.

Table 3: Import statistics of wheat and wheat related products, 2013

Sl.No	Item	Import (KGM)	Value (Nu.)
1	Seed	45,075	1,127,235
2	Wheat Flour	7,125,954	152,653,259
3	Wheat groats, meal and pellets	1,732,936	24,956,328
4	Other	12,898,637	213,593,791
5	Other	687555	11,259,217
T O T A L		22,490,157	403,589,830

Source: DRC, MOF, 2013

Table 3 shows that in 2013, Bhutan imported approximately 22,490 metric tons of wheat and wheat related products, which were worth Nu.403.5 million. Therefore, the business opportunity appears to exist in the following area:

1. Establishing flour mills for manufacture of wheat flours such as *maida* (finely milled flour), *durum atta* (semi milled), semolina (*suji*), and locally produced *kapchi*.
2. Processing of breads, biscuits, and noodles since the wheat groats and meal seem to constitute the highest import bill.

2. Paddy Production

The paddy is the most important cereal being produced in the Dzongkhag. It is cultivated in all the Gewogs. The fertile valley and adequate availability of waters for irrigation, combined with land holding size and structure, which is suitable for farm mechanization, makes Punakha Dzongkhag the largest producer of paddy in the country. In 2013, approximately 5,908 acres of the land was under paddy cultivation and produced 11,028 metric tons of paddy, which was 14.6% of the total paddy produced in the country as per the Agriculture Statistics 2013. With the yield per acre of 1,867 kg, the Dzongkhag stood 3rd in terms of paddy production. Because of its high volume of production and productivity, the paddy production has been identified as one of the business opportunities in all the Gewogs of the Dzongkhag. In 2013, 177 acres of paddy cultivated land was destroyed by wild animals and lost 145 metric tons of paddy to the wild animals.

2.1 Current Uses

Currently, the major amount of the paddy is milled into rice and any surplus is sold as rice grain both in the local market as well as at Thimphu through Centenary Farmer's Market. The next major product processed out of paddy is *maykhu*, which is sold in the local market and the market shed constructed along the national highways. As per the Agriculture Statistics 2013, the total domestic transaction of rice in 2013 was 1,667 metric tons, which fetched an average price of Nu.70 per kg. The total domestic transaction of *maykhu* in the same year was 17 metric tons sold at an average price of Nu.244 per kg. Although, the week end markets and other retail shops around Punakha also sells lot of *zaw* and *zaw* flour, it turns out that these products are produced from the imported rice as the price of *zaw* produced from local rice is high. Therefore, despite the domestic transaction of *zaw* being about 301 metric tons in 2013, very little of *zaw* may have been produced from the local rice.

2.2 Market and Business Opportunity Potential

The extent of the business opportunity provided by the paddy cultivation in production and manufacturing is reflected by the amount of rice and rice related products imported into the country in different forms. The below table provides the volume of rice and its related products into the country in 2013:

Table 4: Import statistics of rice and rice related products, 2013

Sl.No.	Item	Imports (KGM)	Value (Nu.)
1	Rice in husk	286,261	5,415,032
2	Husked rice	46,438,003	1,061,331,549
3	Semi-milled/wholly milled rice	23,447,258	460,471,608
4	Broken rice	2,414,184	33,887,493
5	Red rice	3,250	93,600
T O T A L		72,588,956	1,561,199,282

Source: DRC, MOF, 2013

The above table shows that in 2013, Bhutan imported approximately 72,588,956 metric tons of rice and rice related products which were worth over Nu.1, 561 million. Therefore, the business opportunity in paddy production appears to be huge. Specifically the business opportunity in terms of paddy may be explored in the following areas:

(a) Milled rice packaging

Punakha Dzongkhag is popular for rice production in Bhutan. However, the current practice in rice trading with lack of proper packaging and branding hinders the sales. The Dzongkhag has a huge potential in rice production and trading provided a rice milling plant is set up to tap this advantage.

(b) Puffed rice manufacturing

The local cottage puffed rice producers also suffer from lack of packaging and branding. Mechanization of the manufacturing process would further accelerate the scale of production.

(c) Manufacturing of *Maekhu*

The manufacturing of *maekhu*, or rice cakes is very popular in places such as Wangdiphodrang, Lobesa and Punakha in general. People consume *maekhu* as snacks with tea and on its own and are also widely used in annual rituals and traditions by the households.

(d) Manufacture of rice noodles

Rice noodles are popular in most of the east and Southeast Asian cuisines. A great potential exists for the people in Punakha in the manufacture and export of organic rice noodles.

(e) Manufacture of rice bran oil

In addition to the aforementioned uses, paddy can even be used to extract rice bran oils.

(f) Compost manufacture by processing paddy husk and straw

Paddy husk and straw can also be used to produce organic compost which would help in increasing the fertility and productivity of land.

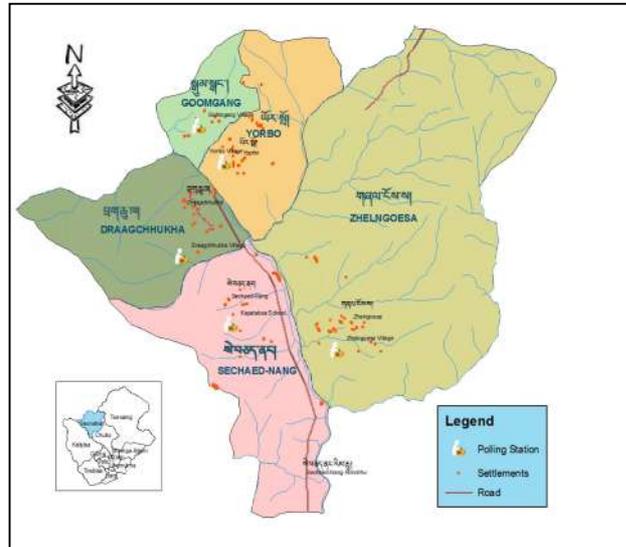
GOENSHARI GEWOG



1. Gewog Profile

Geonshari Gewog is located in the south of Gasa Dzongkhag and stretches over an area of 88.4 sq. km. The Gewog falls at an altitude range of 1,400 to 4,000 meters above sea level. There are 86 registered households with an average of 700 persons. The Gewog is well known for having a hot spring (KomaTshachu) effective for curing joint and muscle pains. The Gewog comprises of five Chiwogs. The Punakha-Gasa national highway runs through the Gewog. However, some villages such as Gumgang, Goen Tshephu, Ritsho Gonpa, Nangse Gonpa, Yourbu, Balana and Komang Tshachhu are more than two hours walking distance from the nearest road. The Gewog has cold winter while the summer is humid and warm. The average temperature ranges from 4 to 30⁰ Celsius. Goenshari has around 90% of its total area under forest cover. Broad-leaf forest accounts for 70% and the coniferous forest account for 20% of the total forest coverage. About 5% of the land is cultivable while the rest of the land is shrub- forest and natural pasture. The Gewog falls in the Jigme Dorji National Park range and has a wide variety of flora and fauna. The soil type is generally sandy loam with high humus content.

Figure 2: Goenshari Gewog Map



Source: Election Commission of Bhutan

2. Infrastructure and Facilities

Geonshari comprises of five Chiwogs. The Gewog has one Community Primary School located just above the Punakha–Gasa national highway, Renewable Natural resources Extension Centre, Park Range Office, Out Reach Clinic (ORC), one multipurpose hall, one community centre and a Grade II Basic Health Unit. All the households have access to clean drinking water. There are six lhakhangs/temples. All the Chiwogs are connected by farm roads (see Table 1). However, lack of public transport services has always remained a major challenge in transporting and marketing agricultural and livestock produce to the nearby markets in Punakha, Wangdiphodrang, and Thimphu.

Table 5: Road Connectivity Details

Name of Farm Roads	Length	No. of beneficiaries	Present status
Tshorim - Drachhukha	5.35 KMS	18 Households	Functional
Kapatapsa – Saychena	11.5 KMS	13 Households	Functional
Tshorim – Shari &Gumgang	7.5 KMS	35 Households	Non-Functional, bridge is under construction
Chhuza Dong Zhengosa	4.5 KMS	23 Households	Non-Functional, motorable bridge is under construction

Source: (Gewog Agriculture Office, 2014)

Almost all the villages in the Gewog are electrified, except for Balana village under Zhengosa Chiwog.

Table 6: Chiwog Level Profile, 2014

Sl. No.	Name of Chiwog	No. of Villages	Name of Villages	Total Household	Road (Yes/No)
1	Zhengosa	2	Zhengosa	23	Yes
			Balana		
2	Yourbo/Shari	1	Yobo	19	Yes
3	Gumgang	1	Gumgang	13	Yes
4	Drochukha	1	Drochukha	18	Yes
5	Saychena	3	Saychena	13	Yes
			Rimchu		
			Yangkana		
Total household				86	

Source: (Gewog Office, 2014)

3. Existing Resource Inventory

3.1 Agriculture, Livestock and Forestry Sectors

For the given land use pattern of the Gewog as shown in table 7 below, small quantities of cereals are grown in Goenshari Gewog pattern of the Gewog, paddy and wheat are the primary cereals. A wide range of vegetables such as chilies, radish, green leaves, turnip, beans, and potatoes are also grown. Potato is the main cash crop and is marketed to the nearby markets in Punakha, Wangdiphodrang, and Thimphu.

Table 7: Agriculture Land Use

Name of the Chiwogs	Land Category & Size (Acre)			
	Wet Land	Dry Land	Kitchen Garden	Chimsa
Zhengosa	66.66	5.32	4.55	1.35
Yourbo/Shari	60.64	49.76	4.40	1.37

Gumgang	35.18	8.89	0.75	1.07
Drochukha	71.84	-	2.12	1.59
Saychena	36.79	19.43	1.08	1.09
Total	271.11	83.4	12.9	6.47

Source: (Gewog Office, 2014)

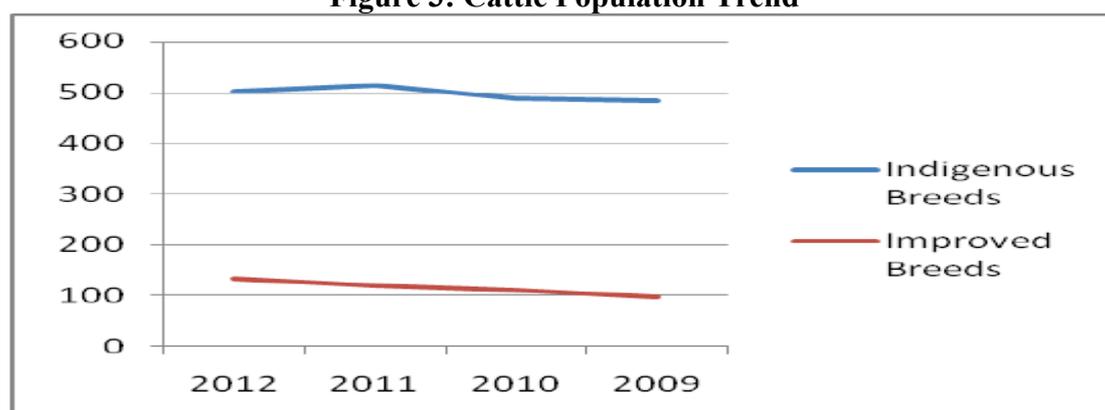
Table 8: Varieties of Paddy Cultivated

Sl. No	Paddy Variety	Remarks
1	<i>Chum-roo</i>	Improved variety
2	<i>Bunap</i>	Local
3	<i>Phuling -Sup</i>	Local
4	<i>Geri-Gap</i>	Local
5	<i>Macham</i>	Local
6	<i>Gangri</i>	Local
7	<i>Gyemja (red)</i>	Local
8	<i>Wangdi-Karma</i>	Local
9	<i>Machapurchary</i>	Improved
10	<i>Chunja Karp</i>	Local
11	IR-64	Improved

Source: (Gewog Agriculture Office)

Rearing of cattle for commercial dairy products is not so popular in the Gewog, although the Gewog Livestock Office has put in efforts to promote livestock activities. As shown in Figure 3 below, the number of local-breed cattle such as *doep*, *doebum*, *doethra*, *thrabum*, *jatsha*, *jatsham*, *yangku*, and *yangkum* are more in numbers as compared to the improved-breed such as jersey and brown Swiss.

Figure 3: Cattle Population Trend



Source: (DOA, MOAF, 2009-2012)

During the Focus Group Discussion (FGD), the people of the Gewog raised the issues of difficulties in rearing improved-breed cattle given the geographical and climatic conditions of the Gewog. Poultry farming and fishery are not popular primarily because of the religious sentiments of the people.

Although not accounted in the official data of the Gewog, the forest in Goenshari is rich in flora and fauna. Several wild flowers and vegetables such as orchids, fiddlehead, *patsha*, *damroo* (wild greens), *pangtse* seeds (oil seeds) are harvested from the forest. This has helped in uplifting the local economy.

4. Business Ideas Generated from Gewog Profile, Focus Group Discussion and Key Informant Interview (KII)

The Gup, Gewog Administrative officer, Mangmi, Tshogpas, Gewog RNR Extension Officers and one to two representatives from each Chiwog participated in the FGD. The discussion mainly focussed in four areas: agriculture, livestock, non-wood forestry products, and arts and crafts.

All the Chiwogs reported cultivating most of the cereals but focussed more on paddy and wheat. Similarly, in the vegetables category, focus is given to potato and chilli production.

Table 7: Business Ideas Generated from Focus Group Discussion and Key Informant interviews

Chiwogs	Agriculture	Livestock	Forestry	Arts & Crafts
Zhengosa	Paddy* Wheat*	Dairy farming* Poultry Fishery	<i>Symplocos Paniculata (Pangtse)*</i> Wild mushroom, Fiddlehead <i>Calamus Spp. (Patsha)</i> <i>Elastostema Spp (Damroo)</i> Orchids	Manufacturing of <i>Nga</i> (Drum used in rituals) is feasible due to availability of <i>Ngashing</i> (Primary raw material)
Yourbo/Shari	Paddy* Wheat* Potato	Dairy farming* Poultry Fishery	<i>Pangtse</i> Seed*, Wild mushroom Fiddlehead, <i>Patsha</i> , <i>Damroo</i> Orchids	
Gumgang	Paddy* Wheat*	Dairy farming* Poultry Fishery	<i>Pangtse</i> Seed*, Wild mushroom Fiddlehead, <i>Patsha</i> , <i>Damroo</i> Orchids	
Drochukha	Paddy* Wheat*	Dairy farming* Poultry Fishery	<i>Pangtse</i> Seed* Wild mushroom, Fiddlehead <i>Patsha</i> , <i>Damroo</i> , Orchids	
Saychena	Paddy* Wheat*	Dairy farming* Poultry Fishery	<i>Pangtse</i> Seed*, Wild mushroom Fiddlehead, <i>Patsha</i> , <i>Damroo</i> Orchids	

*Priority & potential

Source: (Tabulated from FGD)

Attractiveness Matrix

Table 8: Attractiveness Matrix

Potential for production	High			Paddy*
	Medium		Wheat <i>Pangtse</i> Seed (Potential)	
	Low			
		Low	Medium	High
	Potential Demand			

The above table reveals that paddy has potentially high demand and high production in the Gewog. *Pangtse* oil extraction was traditionally very popular. However, its usage and demand has dropped drastically because of the laborious process of oil extraction and the easy availability of refined cooking oils in the market. Nevertheless, proper research in *Pangtse* tree plantation and up-grading oil extraction technology would certainly increase the production as well as market demand for such oil.

5. Trend Analysis of the Major Existing Resources

(a) Cereals

Figure 4: Trend for Comparative Yield of Paddy, Maize and Wheat

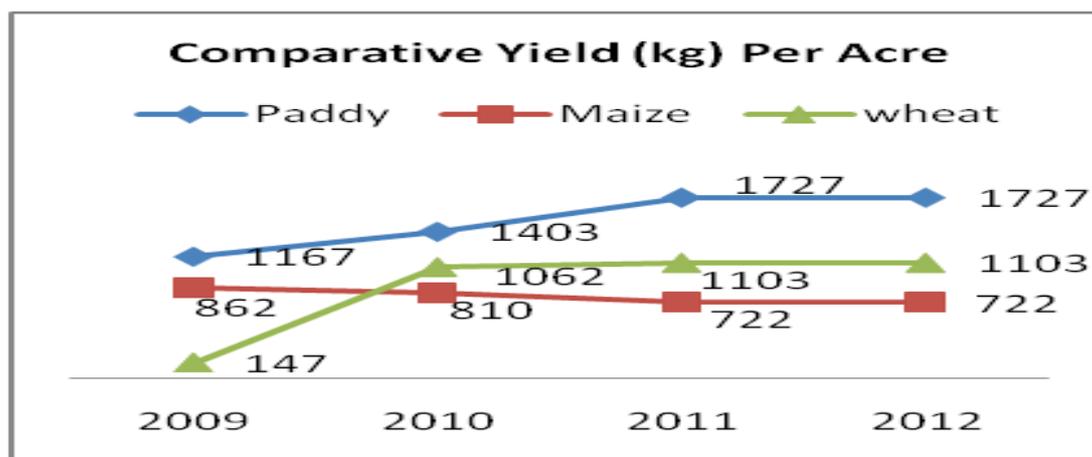
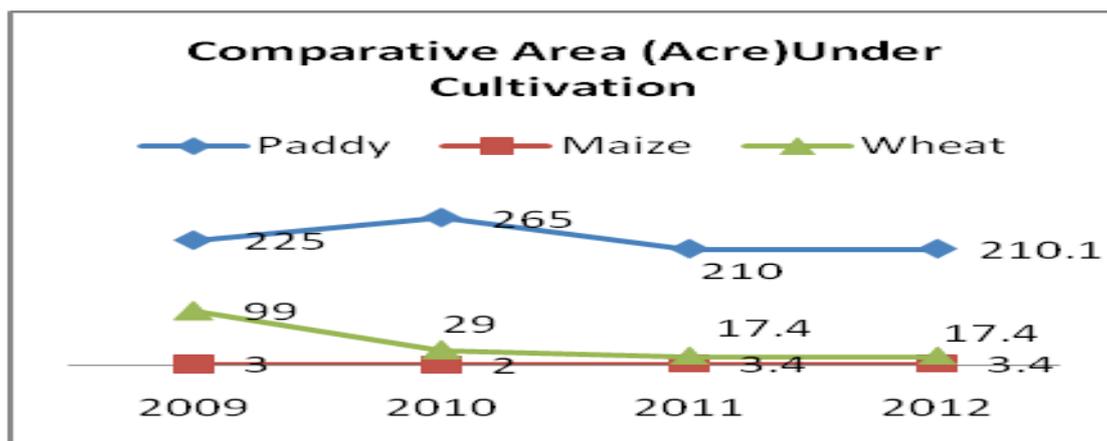


Figure 5: Trend for Comparative Area under Cultivation

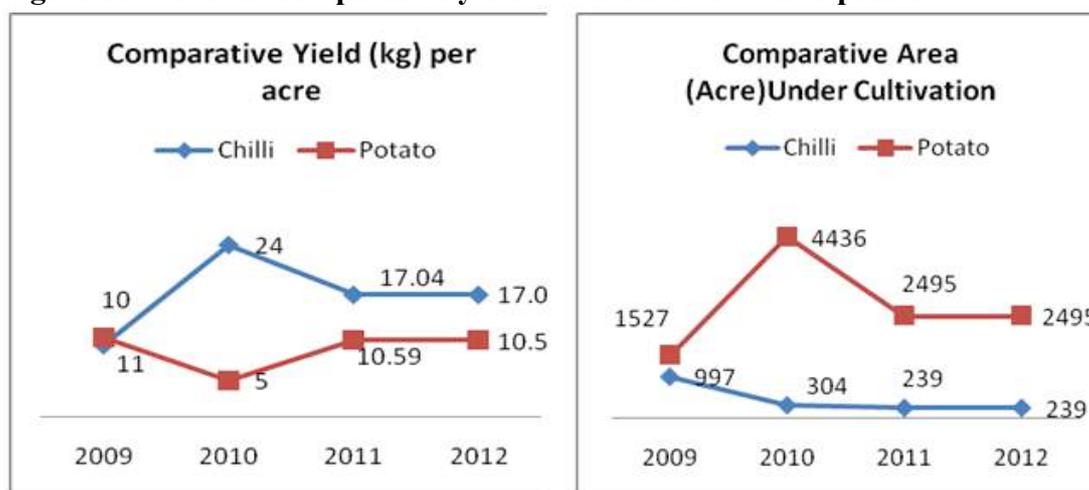


Source: (Policy and Planning Division, MOAF, 2009-2012)

The most popular cereals grown in the Gewog are paddy, wheat and maize. Paddy has the highest yield per acre and even the highest in terms of land usage. The yield per acre for paddy seems to have increased considerably between 2009 and 2011, although there is a noticeable decline in the land usage for paddy cultivation between 2010 and 2011. Only few acres of land have been used for maize cultivation and even the yield of maize production has declined over the years. Although, there is a sharp decline in the land usage for wheat cultivation between 2009 and 2010, the yield per acre has drastically increased during the same period. This could have been due to the increase in the yield.

(b) Vegetables

Figure 6: Trend for comparative yield and area for chili and potato



Source: (PPD, MOAF; 2009-2012)

While little of most vegetables are grown for self-consumption in Geonshari, the two primary vegetables grown are potato and chilli. FGD informed that there are several reasons for people not taking up vegetable farming on a larger scale, some of them being the limited land holdings per household and also the lack of transport services.

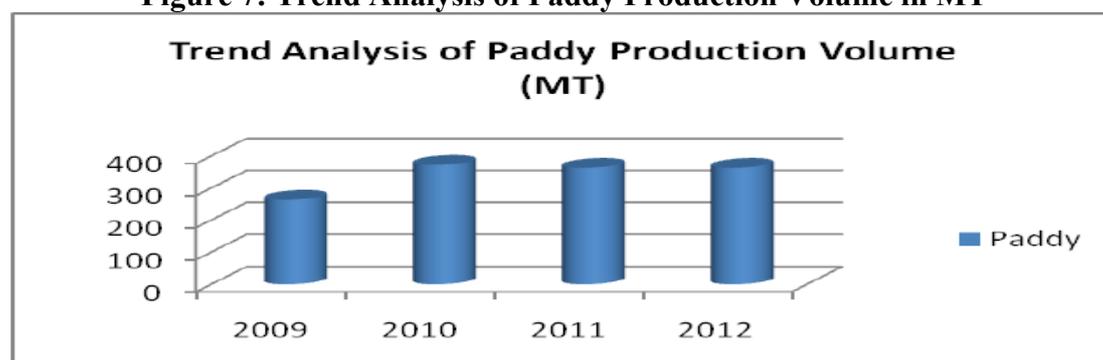
6. Business Opportunity Scanning and Validation.

6.1 Paddy

Production Volume

According to the Agricultural Statistics (2013), Punakha Dzongkhag has the highest land used for paddy cultivation and stands third in terms of yield per acre in Bhutan. A total of 5,908 acres were cultivated in total and produced 1,867 kgs per acre during 2013. Goenshari Gewog alone grows around 11 varieties of paddy. The Gewog has over 270 acres of wet land usually used for paddy cultivation.

Figure 7: Trend Analysis of Paddy Production Volume in MT



Source: PPD, MOAF; 2009-2012

It is clear from the above figures that the Gewog has potential in producing over 3.5 metric tons of paddies every year.

Market

Table 9: Import and Export Statistics of Rice

SL. No.	Particulars	Imports		Exports		Trade Gap	
		QTY (KG)	Value (Mil. NU)	QTY (KG)	Value (NU)	QTY (KG)	Value (Mil. NU)
1	Rice in husk	286,261	5.42	1,200	3,500	-285,061	- 5.41
2	Husked (Brown) rice	46,438,003	1,061.33	0	0	-46,438,003	-1,061.33
3	Red rice	3,250	0.09	0	0	-3,250	-0.09
4	Semi and wholly milled	23,447,258	460.47	0	0	-23,447,259	-460.47
5	Broken rice	2,414,184	33.88	0	0	-2,414,184	-33.89
Total		72,588,956	1,561.20	1,200	3,500	72,587,758	-1,561.20

Source: DRC, MOF; 2013

Rice is the staple food for the Bhutanese. It is clear from Table 11 that Bhutan suffers from trade deficit in terms of trade in paddy and rice. Considering the trade deficit

value of over Nu.1.5 billion, there is a huge potential for commercialisation and marketing of domestic paddy and rice produce.

Opportunities associated with paddy cultivation

The following are some of the business opportunities associated with paddy cultivation:

(a) Milled rice packaging

Punakha Dzongkhag is popular for rice production in Bhutan. However, the current practice in rice trading with lack of proper packaging and branding hinders the sales. The Dzongkhag has huge potential in rice production and trading provided a rice milling plant is set up to tap this advantage.

(b) Puffed rice manufacturing

The local cottage puffed rice lack proper packaging and branding. Mechanisation of the manufacturing process would further accelerate the scale of production.

(c) Manufacturing of *Maekhu*

The manufacturing of *maekhu*, or rice cakes is very popular in places such as Wangdiphodrang, Lobesa and Punakha in general. People consume *maekhu* as snacks with tea and on its own and are also widely used in annual rituals and traditions by the households.

(d) Manufacture of rice noodles

Rice noodles are popular in most of the east and Southeast Asian cuisines. A great potential exists for the people in Punakha in the manufacture and export of organic rice noodles.

(e) Manufacture of rice bran oil

In addition to the aforementioned uses, paddy can even be used to extract rice bran oils.

(f) Compost manufacture by processing paddy husk and straw

Paddy husk and straw can also be used to produce organic compost which would help in increasing the fertility and productivity of land.

(g) Processing cattle feed from paddy husk and straw

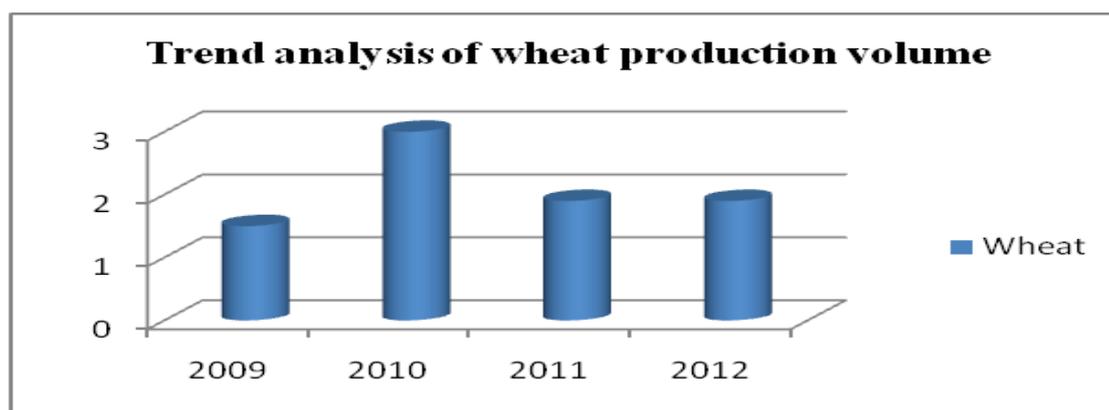
Presently, the paddy husk and straw are fed raw to the cattle. So, there is opportunity for value addition in husk and straw for cattle feed.

6.2 Wheat

Production Volume

Wheat is also a primary cereal next to paddy for the people of Goenshari. The following figure depicts the production volume trend of wheat in the past four years.

Figure 8: Trend analysis of



Source: PPD, MOAF; 2009-2012

The Gewog produced 3 metric tons of wheat in 2010. However, the production dropped to about 2 metric tons during 2011 and 2012 owing to reasons such as lack of manpower, human-wildlife conflict, lack of organised market and transport services (as gathered from the FGD). Nevertheless, the Gewog has potential to scale up the production if the challenges are appropriately addressed.

Market

Table 10: Import and export of wheat and Meslin

SL No.	Particulars	Imports		Exports		Trade Gap	
		QTY (KGM)	Value (Mil. NU)	QTY (KGM)	Value (Mil. NU)	QTY (KGM)	Value (Mil. NU)
1	Seed	45,075	1.13	N/A	N/A	N/A	N/A
2	Other	12,898,638	213.59	N/A	N/A	N/A	N/A
3	Other	687,556	11.26	N/A	N/A	N/A	N/A
Total		13,631,269	225.98	246,918	4.49	-13.38	-2,21.49

Source: DRC, MOF; 2013

The domestic beverages industry and animal feed producers are the major consumers of wheat in the country. For instance, the annual wheat requirement of AWP Distillery in Gelephu is 30,000 metric tons while *Karma Feed* procures around 8,400 metric tons annually. Considering, the current trade deficit of Nu. 221.48 million worth of wheat, there is a prosperous and reliable market in wheat production.

Opportunities associated with wheat cultivation

The following are some of the business opportunities connected with wheat production:

- (a) Establishing flour mills for manufacture of wheat flours such as *maida* (finely milled flour), *durum atta* (semi milled), semolina (*suji*), and locally found *kapchi*.
- (b) Processing of breads, biscuits, and noodles
- (c) Manufacturing of wheat beer.

6.3 Pangtse (Symplocos Paniculata) Oil Manufacturing

Pangtse trees are found in Goenshari, Kabji, Chubu, Teowang and Shenga Bjime *Gewogs* in Punakha. The FGD and Economic Development Plan (EDP) for Punakha Dzongkhag informs that the farmers in the mentioned *Gewogs* have 50 to 60 trees (naturally grown) per household which yields 300-700 kgs of *pangtse* fruits annually. *Pangtse* trees also provide good shade to the farmers while working on the fields. Traditionally, the *pangtse* fruits were used to extract cooking oil and are well known to the senior citizens for its taste and medicinal value. *Pangtse* oil was commonly used in cooking until its substitutes were available in the market. The challenge with the harvest of *pangtse* oil is the tedious process of extracting oil from the seeds. Nevertheless, Punakha Dzongkhag is currently carrying out a research to revive the practice of using *pangtse* oil. Such research will go a long way by exploring the commercial plantation of *pangtse* trees and customising the right technology of oil expelling to scale up the *pangtse* oil manufacture and use in the country.

Note: Please refer the report for Shenga-Bjemi *Gewog* for details on production volume, market and opportunities associated with *Pangtse* tree

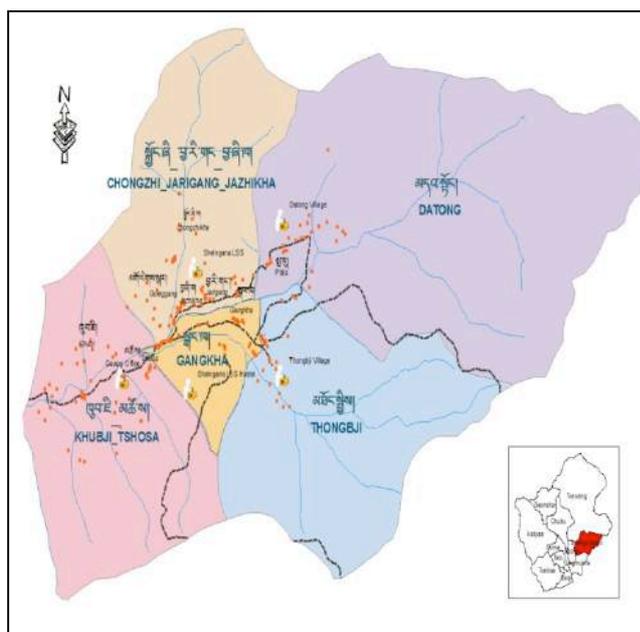
SHENGA BJIME GEWOG



1. Gewog Profile

Shenga-Bjemi Gewog is known in Bhutan for its rice production. The Gewog stretches over an area of 62.43 sq. km (as per LCMP 2010) in the altitude range from 1,480-3,800 meters above sea level. As per the 2014 Gewog data, there are 188 registered households with a population of 1,749 persons. The Gewog comprises of five Chiwogs namely Khubji Tshosa, Jazhikha Jarigang Chongzikha, Datong, Thomji and Gangkha. The Gewog shares its borders with Toewang Gewog in the north, Lingmukha Gewog and Wangdi Phodrang Dzongkhag in the south and Dzomi Wewog in the west. It has warm and humid summers and temperatures reaching up to 30⁰ Celsius and experiences cold and dry winters. The Gewog has 60% of its land area under forest cover.

Figure 9: Shenga-Bjemi Gewog Map



2. Infrastructure and Facilities

Shenga-Bjemi Gewog has an RNR Centre, one Basic Health Unit, one Lower Secondary School, and a multipurpose hall. Around 95% of the household have access to clean drinking water. In addition, the Gewog has four *lhakhangs* and all the Chiwogs have accessible by farm road. However, the people are still deprived of motorable roads, which make transportation difficult, especially during the rainy season. All the households under the Gewog are well electrified.

Table 11: Chiwog Level Profile, 2014

Sl. No.	Name of Chiwog	No. of Villages	Total Household	Total Population	Road (Yes/No)
1	Khubji-Tshosa	3	53	485	Yes
2	Gangkha	2	27	245	Yes
3	Chongzhi-Jarigang-Jazhikha	7	56	425	Yes
4	Thombji	3	25	284	Yes
5	Datong	3	27	310	Yes
Total			188	1,749	

Source: Gewog Office

3. Existing Resource Inventory

Agriculture, Livestock and Forestry Sectors

Almost all the Gewogs under Punakha Dzongkhag have a similar agricultural cropping practice. Shenga-Bjemi Gewog is not different from other Gewogs in growing the common cereals. However, the Gewog produces the popular *Shengabi Yeuchum* (rice grown in Shenga-Bjemi), a popular rice variety preferred over the other varieties by customers in Thimphu, Khuruthang and Wangdiphodrang. What distinguishes this variety is its size, finer quality and mainly the superior taste that sets it apart. Around seven varieties of paddy are cultivated in Shengana Chiwog. Another popular variety of rice of the Gewog is the *Hentshom*, and is harvested much before the other varieties. However, the numbers of farmers cultivating the *Hentshom* variety have declined over the year owing to human-wildlife conflict. In addition, the Gewog also cultivates wheat and mustard on a considerable scale.

Shenga-Bjemi is also very rich in *Pangtse* trees. The *Pangtse* trees are popularly used for edible oil extraction which however has declined over the years owing to hardship involved in oil extraction and the easy availability oil substitutes in the market. The Department of Forest and Park Services sponsored one *Pangtse* oil expeller each to Shenga-Bjemi, Toewang and Chubu Gewogs to revive the use of *Pangtse* oil. The pictures below show the recent visit by the officials from Agricultural Machinery Centre in Paro to exhibit the oil extraction process to the farmers in Shengana.



Picture courtesy: Kinzang Choden, Gewog Administrative Officer, Shenga-Bjemi

Pangtse oil package of 750 ml fetches Nu. 300 to 350 in local markets. To make it competitive with its substitutes in the market, there will have to be interventions by the Government to encourage large scale plantation, enhance the oil expeller

techniques and train local people to make it into a viable economic product of the Gewog.

The Gewog depends dominantly on local-breed cattle. The FGD informed that people of Shenga-Bjemi Gewog do produce cheese and butter which are sold in the local markets of Punakha and Wangdiphodrang.

Few species of ferns, orchids and wild mushrooms are also found in the Gewog. However, they are not reaped for commercial purpose.

Table 12: Agriculture land use

Wet Land	Dry Land
729.58 Acres	130.69 Acres

Source: Gewog Office

4. Business Ideas Generated from Gewog Profile, Focus Group Discussion and Key Informant Interview (KII)

Table 13: Business ideas generated from FGD and KI

Chiwogs	Agriculture	Livestock	Forestry	Arts & Crafts
Khubji-Tshosa	Paddy* Wheat Pangtse seeds* Cucumber	People in the Gewog rear cattle and have poultry at a very negligible scale. These are done for self-consumption.	Fern (fiddlehead) Wild mushrooms	There are no special arts & crafts activity or product manufactured in the Gewog. This is due to lack of skills and materials.
Gangkha	Paddy* Wheat Pangtse seeds*		Fern Wild mushrooms	
Chongzhi-Jarigang-Jazhikha	Paddy* Wheat Pangtse seeds*		Fern Wild mushrooms	
Thombji	Paddy* Wheat Pangtse seeds*		Fern Wild mushrooms	
Datong	Paddy* Wheat Pangtse seeds*		Fern Wild mushrooms	

*Priority & potential

Table 14: Attractiveness Matrix

Potential for production	High			Paddy* <i>Pangtse</i> Seeds*
	Medium			Wheat
	Low			
		Low	Medium	High
	Potential Demand			

The attractiveness of the above mentioned products have been generated based on the FGD and RNR Statistics 2009 to 2011. Paddy and *Pangtse* seeds are seen to have high production potential as well as high potential demand. Although wheat has high potential demand, the production has declined from 145 metric tons in 2009 to 88 metric tons in 2012.

5. Trend Analysis of the major existing resources

(a) Cereal

Figure 10: Trend for yield and area under cultivation of paddy and wheat

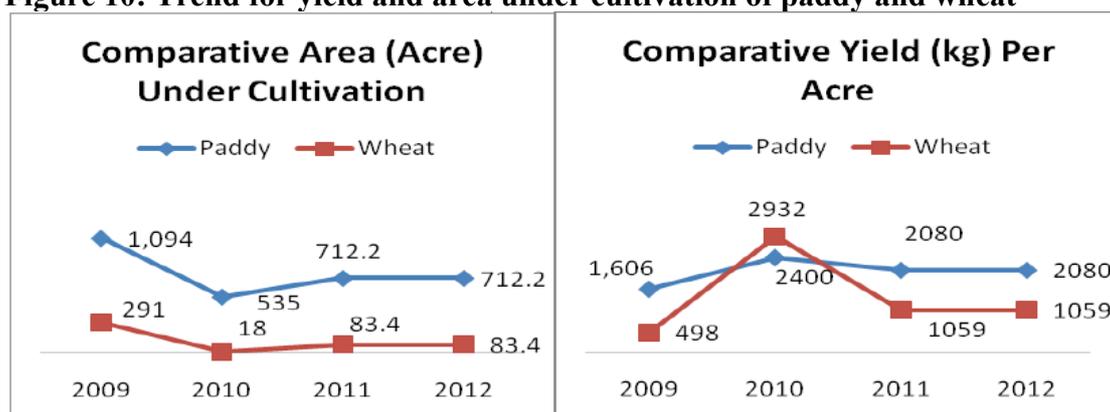


Figure 1 Source: (RNR Statistics 2009-2012)

Figure 10 above shows a comparative area (acres) under cultivation and comparative yield in kilogram per acre. The land used for both paddy and wheat cultivation has declined over the years. Close to 1,100 acres were used for cultivation of paddy in

2009, and the figure has drastically dropped to 712 acres in 2012. Similar trend is seen in the cultivation of wheat as well. In terms of per acre production, considerable rise is seen for wheat while per acre production for paddy has declined from 2,932 kg in 2010 to 2,080 kg in 2012.

(b) Chilli

Figure 11: Trend for Yield and Area under Chilli Cultivation



Source: PPD, MOAF; 2009-2012

The land usage for chilli cultivation has declined from 61 acres in 2009 to 38.5 acres in 2012. The yield per acre has dropped by over 55% between 2009 and 2012.

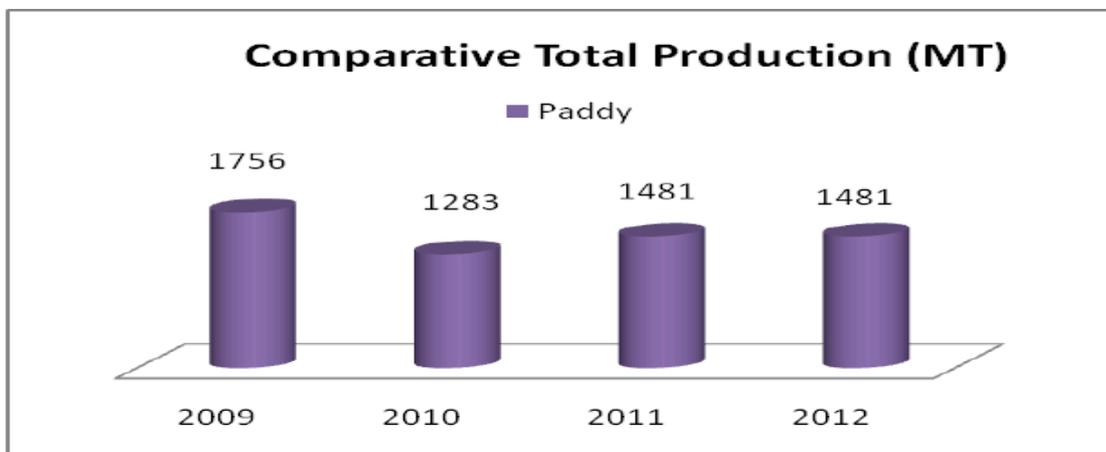
6. Business Opportunity Scanning and Validation.

6.1 Paddy

Production Volume

It is quite clear from the below figures that the Gewog has potential to produce paddy in large quantity up to the tune of 1,481 metric tons in a year although the production has declined in the recent years.

Figure 12: Comparative production of paddy



Source: PPD, MoAF 1

Market

Bhutan is hugely dependent on imported rice. In rice trade alone, the country has a trade deficit of over Nu. 1.5 billion as per the Bhutan Trade Statistics, 2013. The boarding schools, tertiary educational institutes, hospitals, restaurants and even every household prefer to consume imported rice over the local rice due to its availability at cheaper rates than the local varieties. Farm mechanization, improved paddy seeds and large scale production are some of the interventions that would bring down the cost of production of domestic rice to fill the trade gap.

Opportunities associated with paddy cultivation

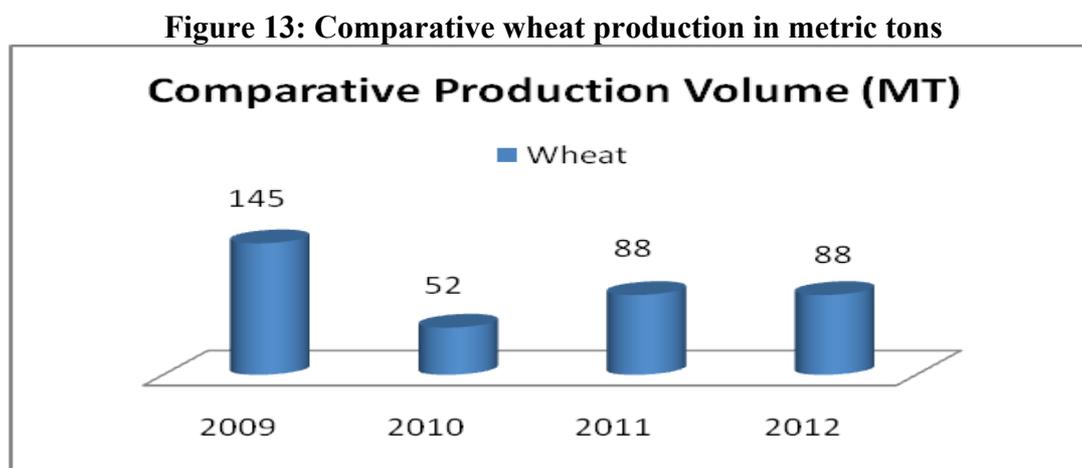
The following are some of the business opportunities associated with paddy cultivation:

- (a) Branding and packaging of *Shengabi Yeuchum*
- (b) Puffed rice manufacture
- (c) Manufacture of rice noodles
- (d) Manufacture of *Maekhu* (rice cakes)
- (e) Manufacture of rice bran oil
- (f) Compost manufacture by processing paddy husk straw.
- (g) Processing cattle feed from paddy husk and straw.

Note: Please refer the report for Goenshari Gewog for description of the opportunities associated with paddy cultivation.

6.2 Wheat

Production Volume



Source: PPD, MOAF; 2009-2012

Shenga-Bjemi Gewog focuses more on production of rice than wheat. Although not much importance is given to production of wheat, the Gewog has potential to produce wheat considering the fertile agricultural land of the Gewog. However, the food

production in the Gewog is also hugely dependent on issues such as the human-wildlife conflicts, rural-urban migration, and the aging society.

Market

Bhutan suffers a trade deficit of Nu. 221.48 million in wheat and wheat related products. There is a huge potential for cultivation of wheat and its associated businesses taking into consideration the existing deficit. Wheat is also required in the domestic beverages and food industries in Bhutan.

Opportunities associated with wheat cultivation

The following are some of the business opportunities connected with wheat production:

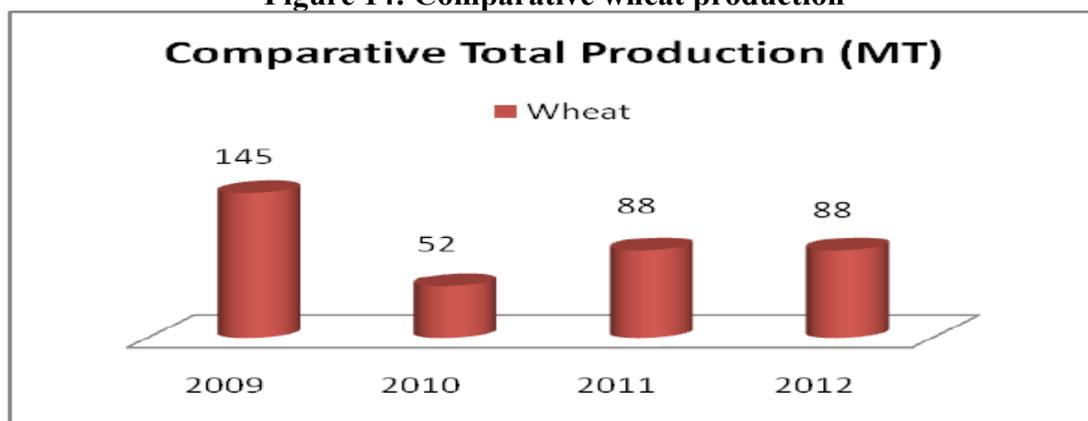
- (a) Establishing flour mill
- (b) Processing of breads, biscuits, and noodles
- (c) Manufacture of wheat beer

Note: Please refer the report for Goenshari Gewog for description of the opportunities associated with wheat cultivation.

6.3 Chilli

Production Volume

Figure 14: Comparative wheat production



Source: PPD, MOAF; 2009-2012

Although the FGD did not inform the production of chillies in Shenga-Bjemi Gewog, the RNR Statistics from 2009, 2010, 2011 and 2012 state that chilli is cultivated in the Gewog. The Gewog produced 88 metric tons of chilli in 2012.

Market

Chilli is the staple everyday household ingredient used in almost all the Bhutanese cuisine. The Bhutan Trade Statistics, 2013 reveal that Bhutan has a trade deficit of close to Nu. 47.5 million in fresh chilli trade with India, clearly indicating that Bhutan needs to cultivate more chillies to realise food self-sufficiency.

Opportunities associated with chilli cultivation

The following are some of the business opportunities connected with production of chili:

- (a) Commercial farming of chillies
- (b) Manufacture of chilli pickles
- (c) Packaging and branding of dried chillies
- (d) Processing chilli powder and spices

6.4 Pangtse (*Symplocos Paniculata*) trees

Pangtse tree and seed



Photo courtesy: Daw Penjor, Mangmi, Shenga-Bjemi Gewog

According to a study titled ‘Vegetable Oils and Ornamental Plants’ conducted by B.B. Chhetri, *Pangtse* trees are grown in Punakha at an altitude of 1,500 to 3,000 meters. It is a medium sized tree that grows from 5 to 10 meters in height, and has a grey bark and is of the deciduous specie. The tree starts flowering in April and the fruits are ready for harvest by October.

Production Volume

Almost all the *Pangtse* trees found in Goenshari, Kabji, Chubu, Toewang and Shenga Bjemi Gewogs are naturally grown in and around the paddy fields, on the other

agricultural land, pasture and even in the forest. There is no official published data regarding the yield of *Pangtse* trees in the RNR Statistics. According to the Economic Development Plan of Punakha Dzongkhag, every household in the aforementioned *Gewogs* have around 50 to 60 *Pangtse* trees which yield from 300 to 700 kgs of *Pangtse* oil. Considering this data, it reveals that there are a good numbers of *Pangtse* trees found in the region. Further, investment in the improved new plantation of *Pangtse* trees would certainly help in increasing the volume of oil production.

Market

Bhutan has traditionally depended on indigenous cooking oils such as mustard and *Pangtse* oils which is substituted today by huge imports of the edible oils. Considering the oil consumption habits and imports there is a guaranteed market for *Pangtse* oil. However, the product needs to be made competitive in terms of price and packaging.

Opportunities

(a) Establish *Pangtse* tree nurseries. The present *Pangtse* trees are all naturally grown. There is no effort put in place to raise *Pangtse* plants for sale. The establishment of hybrid nurseries would aid in scaling up the *Pangtse* oil production.

(b) Establish *Pangtse* expelling and refinery plants. Increase in the production capacity of *Pangtse* seeds will also ensure abundant raw materials to feed the oil expellers. The present small scale oil extraction mill set up in the *Gewog* is seen as a feasible start up.

(c) Manufacture of dye from *Pangtse* leaves. The leaves of *Pangtse* trees are also used to produce natural or organic dyes.

CHUBU GEWOG



1. Gewog Profile

Chubu Gewog is one of the largest Gewogs under Punakha Dzongkhag and it stretches over an area of 91.3 sq. km (as per LCMP 2010). There are 273 registered households in the Gewog, with a population of 2,167 persons. It comprises of five Chiwogs and is located between Phochu and Mochu, the two main rivers that flow through Punakha Dzongkhag.

Figure 15: Chubu Gewog Map



2. Infrastructure and Facilities

Chubu Gewog has an RNR Centre, one Community Centre, one multipurpose hall and three Out Reach Clinics that provide health care services to the remote villages. In addition, the Gewog has 13 *lhakhangs*. Three Chiwogs have access to farm roads while Bali and Yebesa Chiwogs are isolated without connectivity to farm roads. Almost all the households are electrified except for 7 households in Chimchuna village under Ngedruchu Chiwog.

Table 15: Chiwog Level Profile

Sl. No.	Name of Chiwog	No. of Villages	Total Household	Total Population	Road (Yes/No)
1	Bali	2	32	220	No
2	Yebesa	3	62	573	No
3	Ngedruchu	2	41	281	Yes
4	Bumtakha-Tamakha	4	68	535	Yes
5	Jangwakha-Sewla	4	70	558	Yes
Total		15	273	2167	

Source: Gewog Office

3. Existing Resource Inventory

3.1 Agriculture, Livestock and Forestry Sectors

Just like the other Gewogs under Punakha, Chubu Gewog also is popular in cultivation of paddy. According to the RNR Statistics 2012, the Gewog produced about 987 metric tons of paddy and 81 metric tons of wheat during the year. The Gewog is also known for its production of mandarin. As of 2012, the Gewog has over

6,850 fruit bearing mandarin trees which yield about 196 metric tons of mandarin fruits.

The following table depicts the land category and size at the disposal of the Gewog for agriculture use.

Table 16: Agriculture Land Use

Wet Land	Dry Land
820.42 Acres	210.31 Acres

Source: (Gewog Office)

Although the people in the Gewog have cattle and poultry in negligible numbers for household consumption, there is no officially published data till date. Similarly, the collection and consumption of wild vegetables such as ferns and mushrooms, and herbs are also not accounted for officially.

3. Business Ideas Generated from Gewog Profile, Focus Group Discussion and Key Informant Interview (KII)

The Gewog Administrative Officer, Mangmi, Tshogpas, Gewog RNR Extension Officers and representatives from each Chiwog took part in the FDG. The discussion was mainly focussed in the four areas of agriculture, livestock, non-wood forestry products, and arts and crafts.

All the Chiwogs cultivate in little quantities most of the cereals but more focus is given to cultivation of paddy and wheat. Similarly, in the vegetables category, focus is given to chilli production.

The Gewog also focus on harvest of mandarin and has, as of 2012, close to 7,000 mandarin trees.

Table 17: Business Ideas Generated from FGD and KI

Chiwogs	Agriculture	Livestock	Forestry	Arts & Crafts
Bali	Paddy* Chilli* <i>Pangtse trees*</i> Mandarin*	Fishery	Fern Wild mushrooms	The arts and crafts popular because of activities are not lack of raw materials and skills.
Yebisa	Paddy* Chilli* <i>Pangtse trees*</i> Mandarin*	Poultry Fishery	-	
Ngedruchu	Paddy* Wheat <i>Pangtse trees*</i>	Poultry Fishery	Fern Wild mushrooms	

Jangwakha-Sewla	Paddy Chilli Beans <i>Pangtse trees*</i>	Poultry	Fern Wild mushrooms
Bumtakha-Tempakha	Paddy Chilli <i>Pangtse trees*</i>	Poultry Fishery	Fern Wild mushrooms

*Priority & potential

Source: FGD

Table 18: Attractiveness Matrix

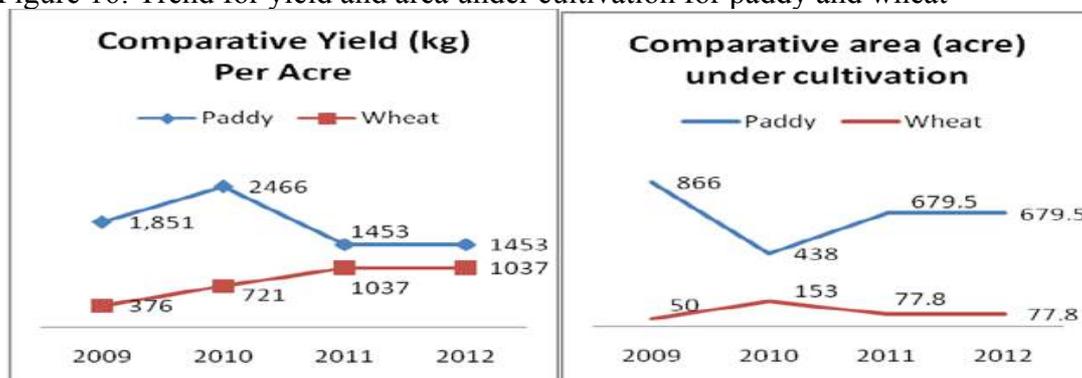
Potential for production	High			Paddy* Mandarin* Chilli*
	Medium		<i>Pangtse trees</i>	Wheat
	Low			
		Low	Medium	High
	Potential Demand			

The attractiveness matrix of the products mentioned above has been plotted based on the FGD and analysis of the RNR Statistics from 2009 to 2012. It is revealed that paddy, mandarin and chilli have high production potential as well as high demand, while wheat despite its high potential demand, and has medium production potential.

4. Trend Analysis of the major existing resources

4.1 Cereals

Figure 16: Trend for yield and area under cultivation for paddy and wheat

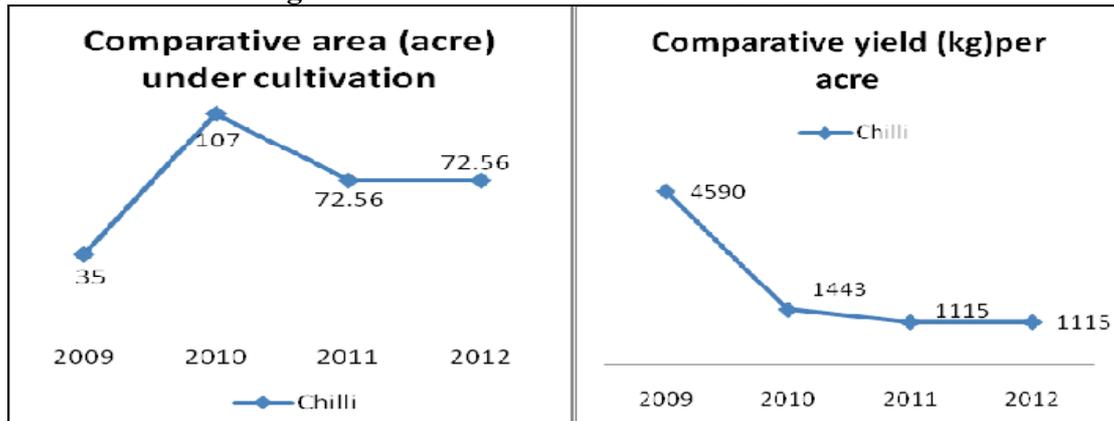


Source: PPD, MOAF; 2009-2012

As shown in figure 16, paddy and wheat are the primary cereals for Chubu Gewog. The land usage for paddy has declined from 866 acres in 2009 to about 680 acres in 2012. Similarly, the productivity for the same has dropped from 1,851 kg per acre in 2009 to 1,453 kg per acre in 2012. While there is a decline in the land usage for wheat cultivation from 153 acres in 2010 to about 78 acres in 2012, there had been a remarkable rise in terms of per acre productivity from 721 kg in 2010 to 1,037 kg in 2012.

4.2 Chilli

Figure 17: Trend for Area and Yield of Chilli



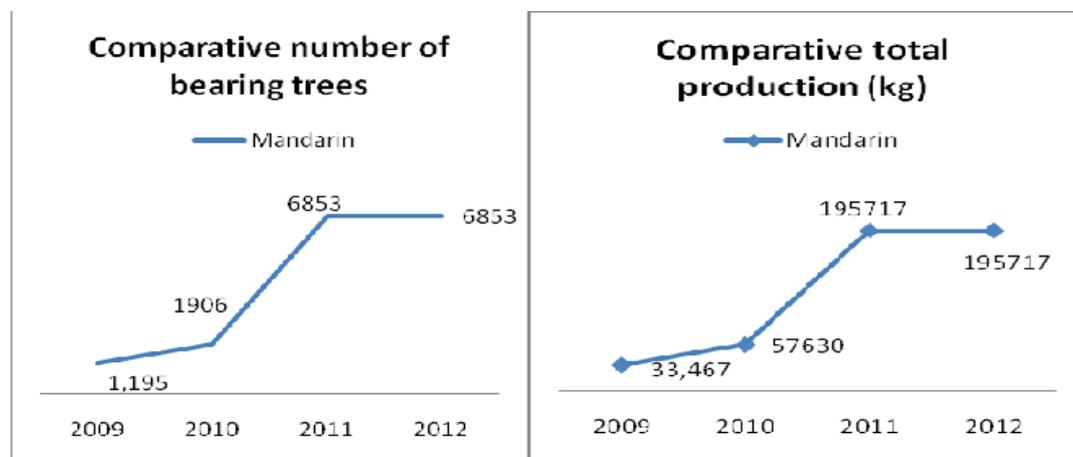
Source: RNR Statistics (2009-2012)

Amongst the vegetables, chilli has always been a source of income for the people of Chubu Gewog. There had been a drastic rise in land usage for cultivation of chilli from 35 acres in 2009 to 107 acres in 2010. Paradoxically, there was a drastic drop in yield per acre from 4,590 kg in 2009 to 1,443 kg in 2010. Nevertheless, the Gewog produced over 80 metric tons of chillies in 2012.

4.3 Mandarin

Bali and Yebisa Chiwogs in Chubu Gewog are strongly feasible for production of mandarin owing to the climatic condition and soil fertility of the regions. There had been a remarkable increase in the number of fruit bearing mandarin trees from 1,195 trees in 2009 to 6,853 trees in 2011. Correspondingly, the total productivity increased from over 33 metric tons in 2009 to about 197 metric tons in 2011.

Figure 18: Trend for Mandarin Trees and Production



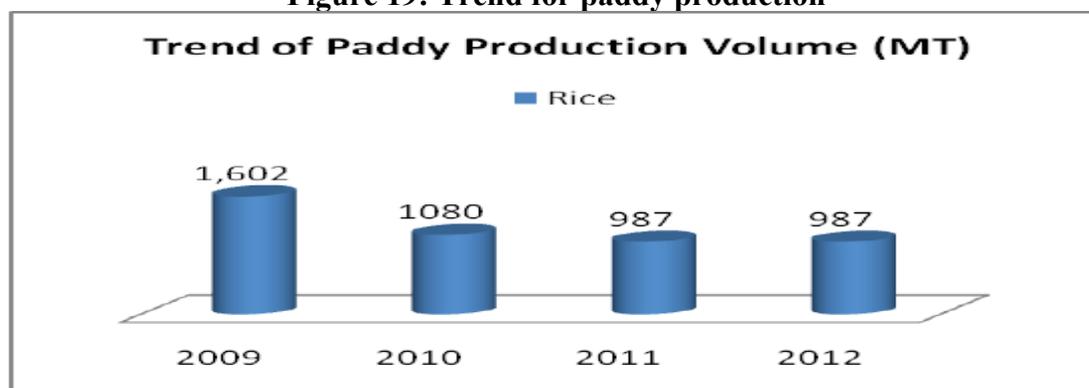
Source: PPD, MOAF; 2009-2012

5. Business Opportunity Scanning and Validation.

5.1 Paddy

Production Volume

Figure 19: Trend for paddy production



Source: PPD, MOAF; 2009-2012

There is a clear decline in the production volume of paddy in the Gewog which can be attributed to easy availability of imported rice and rural urban migration of people among other reasons.

Market

While the production volume of paddy for Chubu Gewog seems to have declined over the years, rice remains the staple food for every Bhutanese household. To meet the annual requirement, Bhutan depends on imported rice and paddy products. As of

2013, there is a trade deficit to the tune of over Nu. 1.5 billion in rice trade with India. Considering this gap, there is a huge potential for commercialisation and marketing of domestic paddy and rice produce.

Opportunities associated with paddy cultivation

The following are some of the business opportunities associated with paddy cultivation:

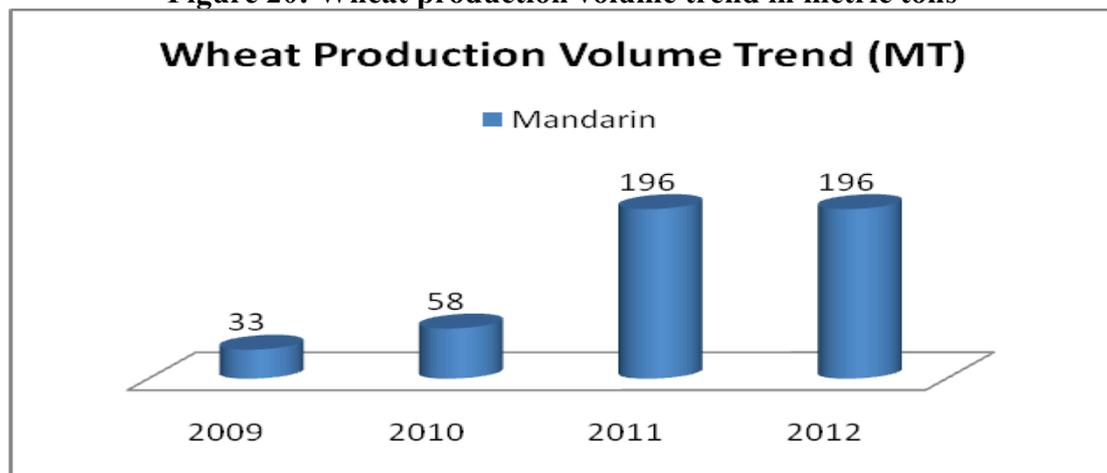
- (a) Milled rice packaging
- (b) Puffed rice manufacture
- (c) Manufacturing of rice noodles
- (d) Manufacturing of rice bran oil
- (e) Manufacturing of *maekhu*
- (f) Compost manufacturing by processing paddy husk straw
- (g) Processing cattle feed from paddy husk and straw

Note: Please refer the report for Goenshari Gewog for description of the opportunities associated with paddy cultivation.

5.2 Wheat

Production Volume

Figure 20: Wheat production volume trend in metric tons



Source: PPD, MOAF; 2009-2012

There had been a huge stride in production of wheat from 19 metric tons in 2009 to 110 metric tons in 2010. However, the production has declined to 81 metric tons in 2011 and 2012 respectively.

Market

Bhutan faces a trade deficit of Nu. 221.48 in wheat trade with India and therefore there is definitely a huge potential for its production and demand in Bhutan.

Opportunities associated with wheat cultivation

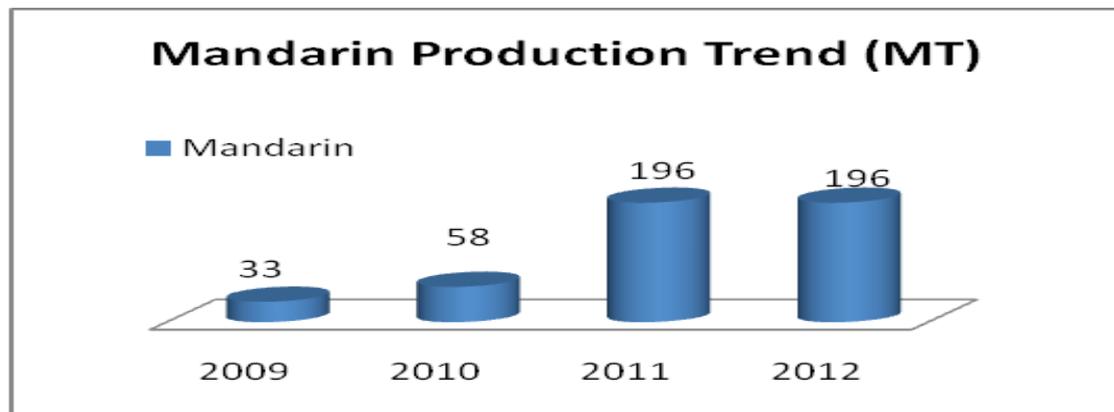
5.3 Pangtse Oil Manufacturing

Note: Please refer the report for Goenshari and Shenga-Bjemi Gewogs for description of the opportunities associated with Pangtse oil extraction.

5.4 Mandarin

Production Volume

Figure 21: Mandarin production trend in metric tons



Source: PPD, MOAF; 2009-2012

The volume of production of mandarin grew consistently from 33 metric tons in 2009 to 196 metric tons in 2012.

Market

According to Bhutan Trade Statistics, 2013, Bhutan exported 2.3 million kg of oranges to India. In addition, the domestic agro and food establishments such as Bhutan Agro Industries Limited and Zimdra Food Pvt. Limited are also the major buyers of mandarin as raw materials for the citrus related food products.

Opportunities associated with mandarin cultivation

The following are some of the opportunities associated with mandarin cultivation:

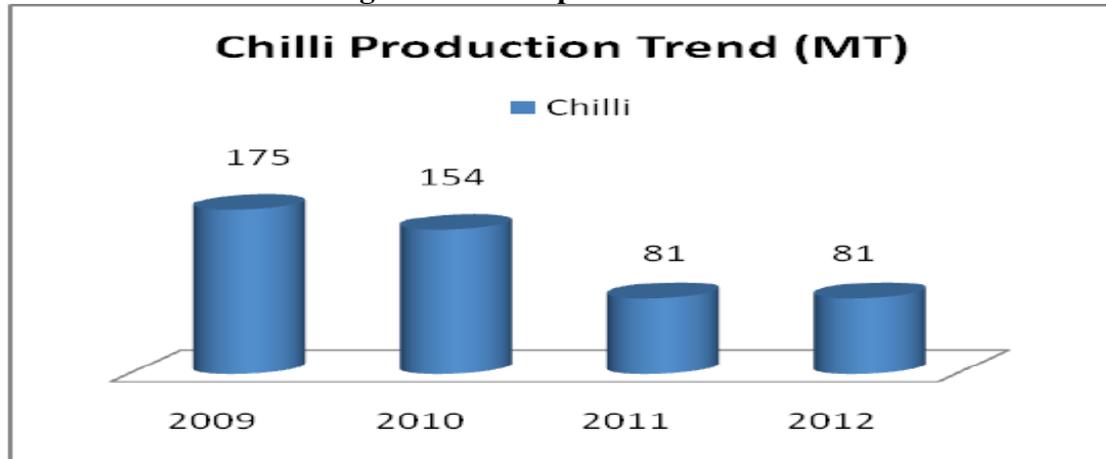
- (a) Processing of orange juice and drinks
- (b) Processing of candied orange slices and toffee

(c) Processing the orange peels for creams and cosmetics

5.5 Chilli

Production Volume

Figure 22: Chili production trend



Source: PPD, MOAF; 2009-2012

Punakha Dzongkhag is among the top producers of chilli in the country along with Paro and Wangdiphodrang in west, and Trashigang in the east. However, the production of chilli in Chubu Gewog in 2009 dropped from 175 metric tons to 81 metric tons in 2012.

Market

The trade deficit of chilli definitely calls for more cultivation and production of the produce in Bhutan.

Opportunities associated with Chilli cultivation

Note: for more details on import and export statistics of Rice, Wheat, Meslin, refer Table 14, 15 & 16.

KABJISA GEWOG



1. Gewog Profile

Kabjisa Gewog covers over an area of 206.1 sq. km with altitude range from 1,300-1,800 metres above the sea level. The Gewog is divided by the famous Mo Chu river as well as the Punakha-Gasa national highway that runs alongside the river. There are 264 registered households in the Gewog with a population of 2,570 persons. The Gewog comprises of five Chiwogs and has five *Tshogpas*.

Settlements in Kabjisa *Gewog* are mostly concentrated on the right bank of the Mo Chu where the land is fertile and suitable for all varieties of cereals. The landscape and river current also opened Kabjisa as an adventurous tourists' destination for sports related to river rafting and canoeing. Because of this very reason, international hotel chains like the Aman and Uma by Como have also been established in the Gewog. Aman's Amankora is located on the left bank of the Mo Chu at Lakhu and Uma's resort is located at Kabjisa.

Cash crops such as sweet potato and oranges are found in abundance in the region. The sub-tropical climate and favorable terrain offer tremendous opportunity for farm mechanization. The Gewog is accessible by motor able road and now connects even the far flung villages of Rangrikha, Tongshuna and Hokatsho.

Figure 23: Kabjisa Gewog Map



2. Infrastructure and Facilities

Kabjisa Gewog comprise of five Chiwogs– Chhoeten Nyingpo-Uesarkha, Heyloog-Tongzhoongnang, Agonang-Zarbisa, Peltari and Sirigang-Wakoo Damchi. The *Gewog* has one Basic Health Unit (BHU) and a Middle Secondary School in Chhoeten Nyingpo-Uesarkha Chiwog. The Gewog also has an RNR Center, an Out Reach Clinic, a multipurpose hall and a community center. All the five Chiwogs are connected with farm roads and all the households in the Gewogs are electrified. There are six *lhakhangs* in the Gewog.

All most whole of the Gewog is electrified except for Balana village under Zhengosa Chiwog. There are 18 villages spread under five Chiwogs and with a total of 281 households as shown in Table below.

Table 19: Chiwog Level Profile

Sl. No.	Name of Chiwog	No. of Villages	Total Household	Population	Road (Yes/No)
1	Agonang_Zarbisa	5	55	700	Yes
2	Chhoeten	5	75	770	Yes

	Nyingpo_Ueserkha				
3	Peltari	1	40	400	Yes
4	Serigang_Wakoo Damchhi	3	70	500	Yes
5	Heyloog_Tongzhoognang	4	24	200	Yes
Total		18	264	2570	

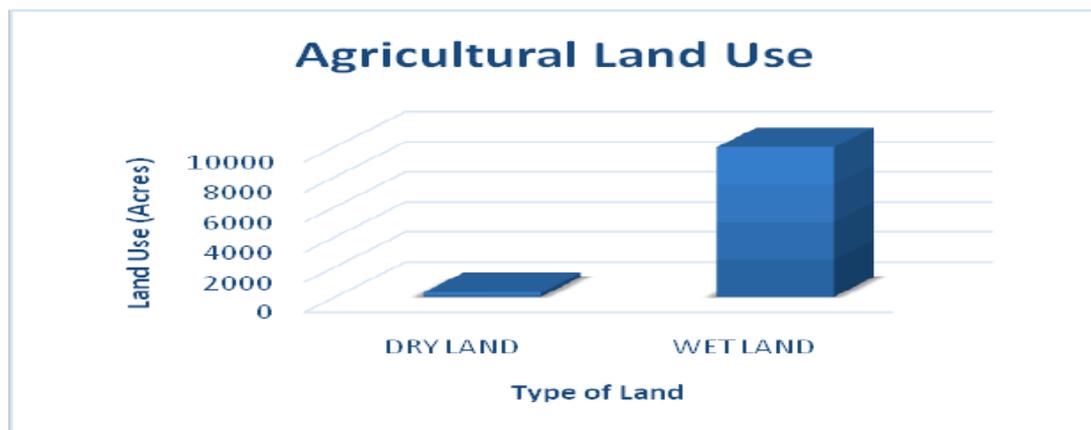
Source: Gewog Office

3. Existing Resource Inventory

Agriculture, Livestock and Forestry Sectors

Almost every cereal can be cultivated in Kabji Gewog, however paddy and wheat top as priority crops to the farmers. After the harvest of paddy, the fields are used to cultivate mustard and wheat. Nevertheless, a wide range of vegetables and fruits are also grown in the Gewog. Fruits such as oranges and guavas, and assorted vegetables are grown for consumption and any excess produce is sold in the market Khuruthang. Some farmers also take their produce to as far as Thimphu during the weekend markets. Chillies, beans, cucumbers, and potatoes are some of the major vegetables sold for cash to the farmers.

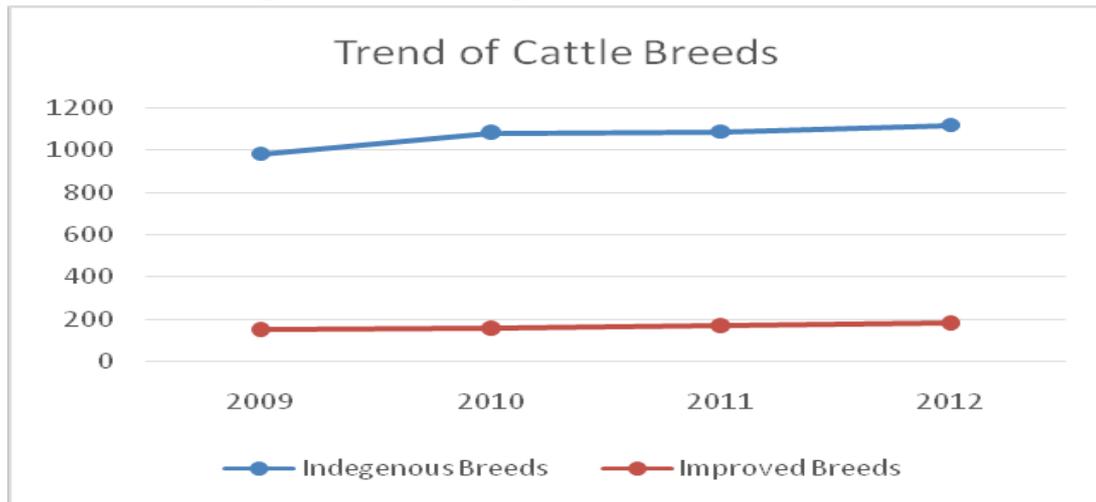
Figure 24: Agriculture Land Use



Source: (Gewog Office)

Commercial rearing of cattle for dairy products is not popular in the Gewog although the Gewog Livestock office has put in clear efforts to promote the livestock activities. As shown in Figure 25 below, the number of indigenous cattle breeds such as *doeb*, *doebum*, *doethra*, *thrabum*, *jatsha*, *jatsham*, *yangku*, and *yangkum* are much higher compared to the improved breeds such as jersey and brown Swiss. Rearing of improved breed of cattle has posed difficulty to the farmers due to the geographical and climatic conditions of our Gewog.

Figure 25: Trend Population for Cattle Breeds



Source: PPD, MOAF; 2009-2012

In addition to the farm produce, people of Kabjisa Gewog also gather wild vegetables such as *nakey* (fiddleheads), *paatsha* (*calamus spp.*), *damroo* (*elastostema spp.*), and wild mushrooms for consumption as well as for sale in the nearby markets. The income generated from the wild produce help the farmers uplifts the local economy.

4. Business Ideas Generated from Gewog Profile, Focus Group Discussion and Key Informant Interview (KI)

The FGD was participated by the *Gup*, *Gewog* Administrative officer, *Mangmi*, *Tshogpas*, *Gewog* RNR extension officers and representatives from each *Chiwog*. The discussion mainly focussed in the four areas of agriculture, livestock, non-wood forestry products, and arts and crafts.

All the *Chiwogs* cultivate most of the cereals but more importance is given to the cultivation of paddy and wheat as they are staple diet of the people. Similarly, chilli, onion, radish and leafy vegetables are mostly grown vegetables. Mandarin, peach and pear are also popular fruits grown in the *Gewog*.

Table 20: Business Ideas Generated from FGD and KI

Chiwogs	Agriculture	Livestock	Forestry	Arts & Crafts
Agonang_Zarbisa	Paddy*, Chilli* Cabbage	Dairy farming* Poultry, Fishery Bee Keeping*	Wild mushroom Fern, <i>Paatsha</i> <i>Damroo</i>	Manufacturing of Nga (Drum used in rituals) is feasible due to availability of Ngashing (Primary raw material) in the nearby Gewog (Goen Shari) and there is skilled people in KabjisaGewog,
Chhoeten Nyingpo_U eserkha	Paddy* <i>Pangtse</i> Seed Hazel Nut Tree Tomato Green vegetables	Dairy farming* Piggery	Wild mushroom Fern, <i>Paatsha</i> <i>Damroo</i>	
Peltari	Paddy* Passion Fruits Mushroom Carrot	Dairy farming* Poultry Bee keeping	Wild mushroom Fern, <i>Paatsha</i> <i>Damroo</i>	
Serigang_Wakoo Damchhi	Paddy* Chilli* Egg Plant Cabbage	Dairy farming*	Wild mushroom Fern, <i>Patsa</i> <i>Damroo</i> , Orchids	
Heyloog_Tongzh oognang	Paddy* <i>Pangtse</i> , Seed*	Dairy farming*	Wild mushroom Fern	

Table 21: Attractiveness Matrix

Potential for production	High			Paddy*
	Medium		Wheat <i>Pangtse</i> (Potential) Seed	
	Low			
		Low	Medium	High
	Potential Demand			

***Priority & potential**

The above table reveals that paddy has highly proportionate demand and production potential in the *Gewog Pangtse*. *Pangtse* oil was traditionally well known and most sought for, however, its usage and demand has now dropped drastically. Nevertheless, proper research in *Pangtse* tree plantation and up-grading the state of art of oil extraction technology would certainly help increase the production and also create market demand.

5. Trend Analysis of the major existing resources

5.1 Cereals

Figure 26: Comparative Yield for Paddy, Wheat and Buckwheat

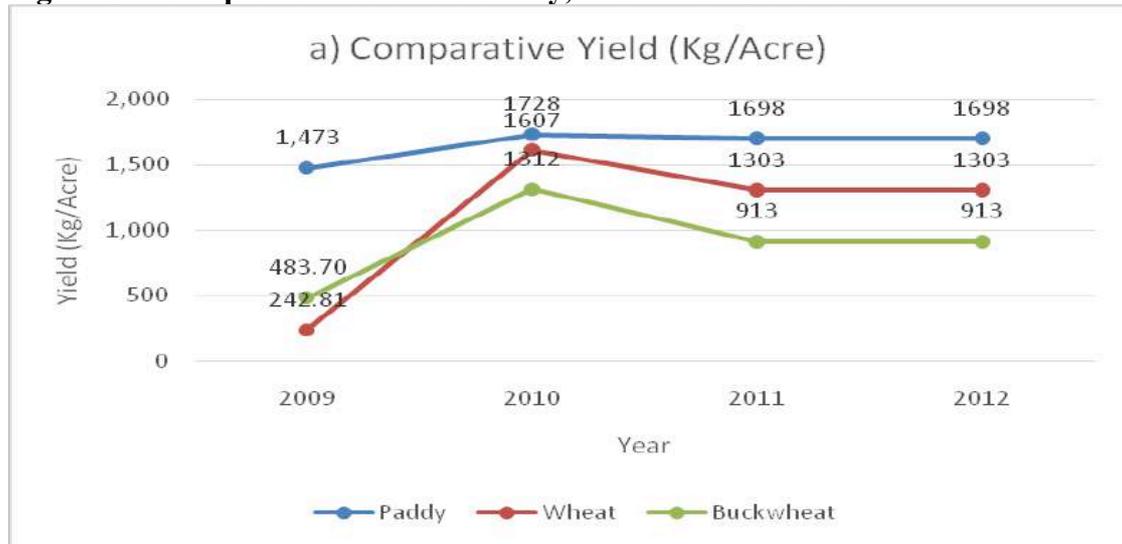
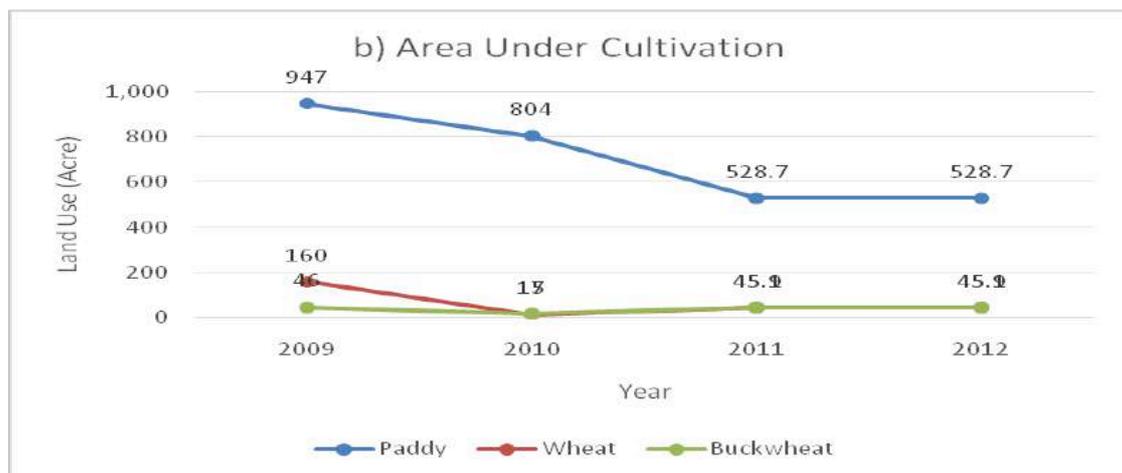


Figure 27: Trend for Area under Cultivation of Paddy, Wheat and Buckwheat



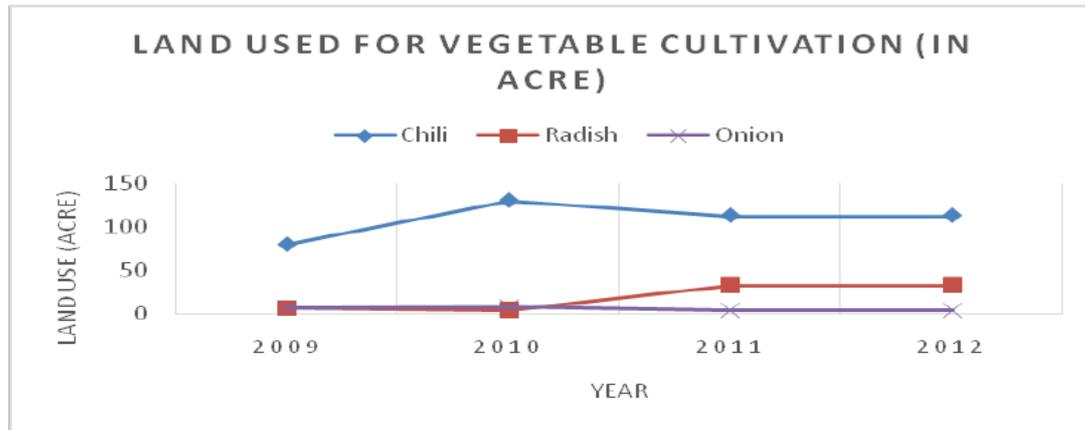
Source: PPD, MOAF; 2009-2012

In Kabjisa Gewog, the most popular and major cereals are paddy, wheat and buckwheat. Although the yield of paddy has increased from 2009 to 2011, the land use has reduced during the same period. Similarly the land used for wheat and

buckwheat have also reduced in 2010 compared to 2009 but increased significantly in 2011 as opposed to the yield in kilograms per acre.

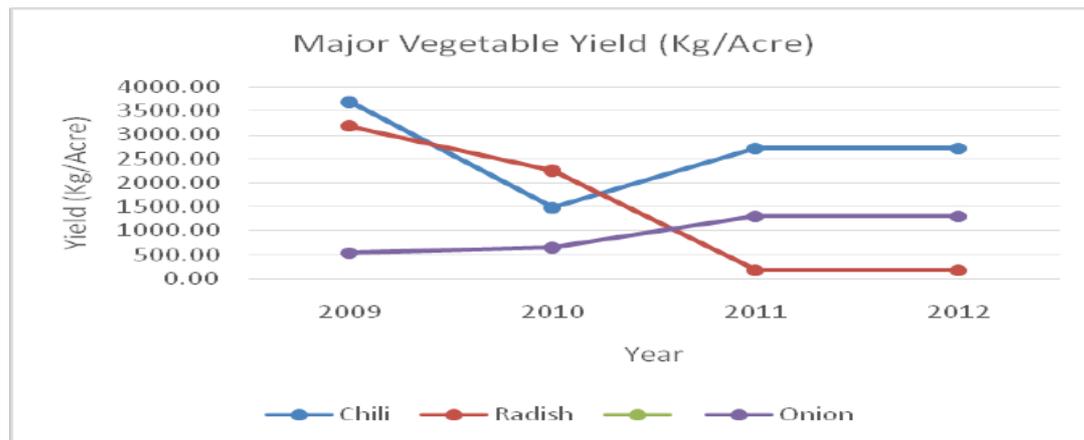
5.2 Vegetables

Figure 28: Land Use for Vegetable Cultivation in Acres



Source: RNR Statistics (2009-2012)

Figure 29: Trend for yield of major vegetables



Source: PPD, MOAF; 2009-2012

While most of the vegetables are grown for self-consumption in this Gewog, the three major vegetables grown for commercial purpose include chilli, radish and onion. The area cultivated as well as the production is largest for these vegetables and the villagers usually sell the surplus in the nearby towns or take them to the capital market in Thimphu.

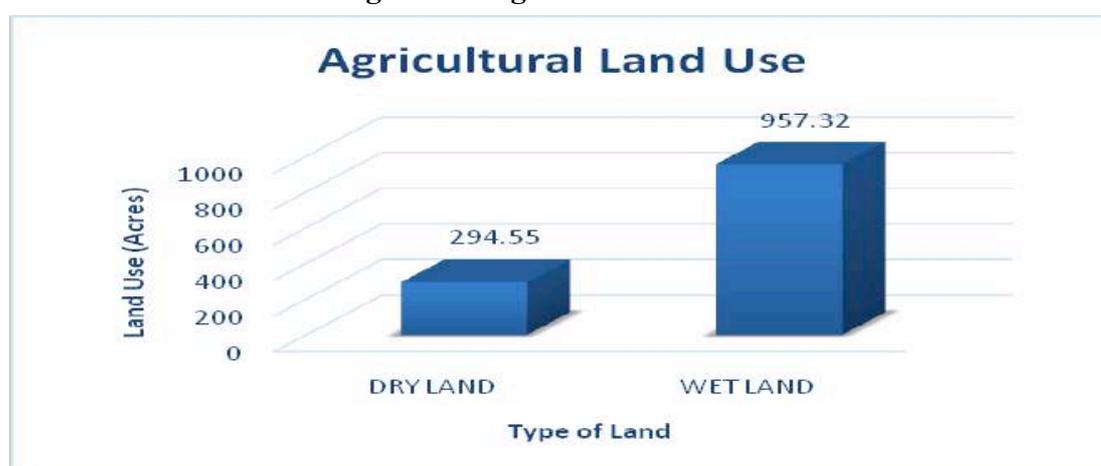
6. Business Opportunity Scanning and Validation.

6.1 Paddy

Production Volume

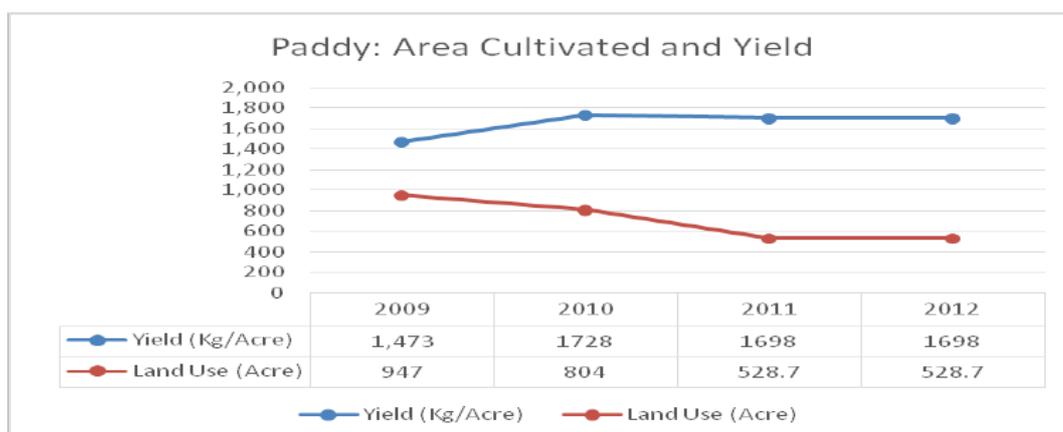
Paddy is cultivated abundantly in almost all Gewogs of Punakha Dzongkhag, including Kabjisa Gewog. Both the red and white varieties of paddy are grown in Kabjisa Gewog. The Gewog has almost 1,000 acres of wet land when compared to the meagre 300 acres of dry land, and the main use of the wet land is to cultivate paddy.

Figure 30: Agriculture Land Use



Although almost 1,000 acres of arable land is wet land, only about 600 acres has been used in 2012.

Figure 31: Trend for Area and Yield for Paddy



Source: PPD, MOAF; 2009-2012

Table 22: Import and Export of Rice

SL. No.	Particulars	Imports		Exports		Trade Gap	
		QTY (KG)	Value (Mil. NU)	QTY (KG)	Value (NU)	QTY (KG)	Value (Mil. NU)
1	Rice in husk	286,261	5.42	1,200	3,500	(-)285,061	(-) 54.12
2	Husked (Brown) rice	46,438,003	1,061.33	0	0	(-)46,438,003	(-)1,061.33
3	Red rice	3,250	0.94	0	0	(-) 3,250	(-) 0.94
4	Semi and wholly milled	23,447,258	460.47	0	0	(-) 23.45	(-) 460.47
5	Broken rice	2,414,184	33.89	0	0	(-) 2.41	(-) 3333.89
Total		72,588,956	1,561.200	1,200	3,500	(-) 72.59	(-) 1,561.20

Source: DRC, MOF; 2013

Market

It is clear from Figure 31 that the *Gewog* has potential in producing over 1,500 kilograms per acre every year. Rice is the top most staple food for Bhutanese. Considering the trade deficit, there is a huge potential for commercialisation and marketing of domestic paddy and production of rice.

Opportunities associated with paddy cultivation

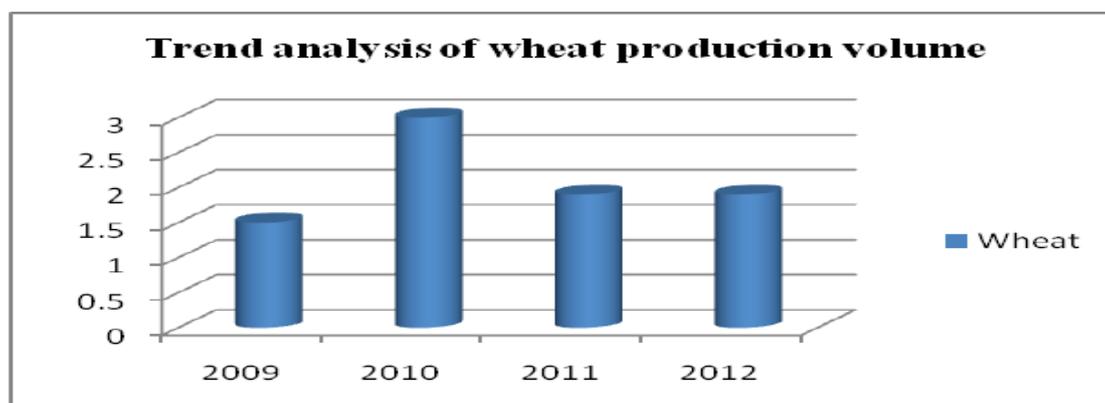
Note: Please refer the report for Goenshari Gewog for description of the opportunities associated with paddy cultivation.

6.2 Wheat

Production Volume

Wheat is also a primary cereal next to paddy for the people of Kabjisa Gewog. The following figure depicts the production volume trend of wheat in the past four years.

Table 23: Trend analysis of Wheat Production Volume



Source: PPD, MOAF; 2009-2012

The Gewog produced 3 metric tons of wheat in 2010. However, the production dropped to about 2 metric tons in 2011 and 2012 owing to reasons such as the lack of manpower, human-wildlife conflict, lack of organised market and transport services (as informed by FGD). Nevertheless, the Gewog has potential to scale up the production if these challenges are adequately addressed.

Market

Table 24: Import statistics of Wheat and Meslin

S L . N o.	Particulars	Imports		Exports		Trade Gap	
		QTY (KG)	Value (Mil. NU)	QTY (KG)	Value (Mil. NU)	QTY (KG)	Value (. Mil. NU)
1	Seed	45,075	1.13	N/A	N/A	N/A	N/A
2	Other	638	213.59	N/A	N/A	N/A	N/A
3	Other	687,556	11.26	N/A	N/A	N/A	N/A
Total		13,631,269	225.98	246,918	4.49	-13,384,351	- 221.49

Source: DRC, MOF; 2013

Given the the current trade deficit of Nu. 221,487016 as shown in the above table, there is potential demand for wheat in the market.

Opportunities associated with wheat cultivation

Note: Please refer the report for Shenga-Bjemi Gewog for details about the Pangtse tree, seed production volume, market and business opportunities associated with Pangtse trees and oil seeds.

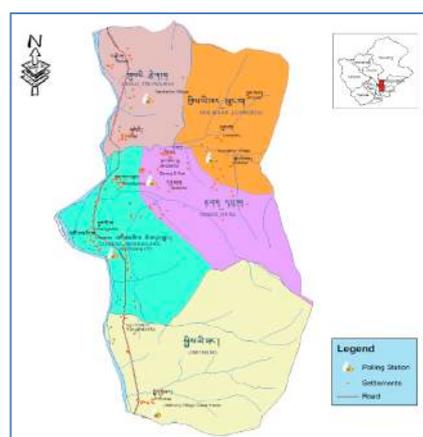
DZOMI GEWOG



1. Gewog Profile

Dzomi Gewog stretches over an area of 21.92 sq. km. (LMCP 2010) and it lies between Shengana and Lingmukha Gewogs. The altitudes of the Chiwogs in Dzomi range from 1,200 to 2,400 metres above the sea level. There are about 2,000 people dwelling in 313 households in the Gewog spread across the five Chiwogs. The Gewog's proximity to Khuruthang and Wangdiphodrang provide opportunity for farmers to market the produce.

Figure 32: Dzomi Gewog Map



2. Infrastructure and Facilities

The Gewog has one RNR centre, one Non Formal Education (NFE) centre, one extended classroom, one Primary School and one Higher Secondary School. The Gewog is also very close to the district administration office, district hospital and the district veterinary hospital. Thus, the services of the Livestock Sector to the farmers are being catered by the district veterinary hospital. About 93% of the households have access to clean drinking water supply and the Gewog has five *lhakhangs*.

Table 25: Chiwog level statistics, 2014

Sl. No.	Name of Chiwog	No. of Villages	Total Household	Total Population	Road (Yes/No)
1	Khilikha Loongkha	2	49	436	Yes
2	Tanag Uesa	2	41	400	Yes
3	Dzomisa Mendagang	2	54	452	Yes
4	Gubji Tseykakha	3	48	632	Yes
5	Jimithang	1	32	350	Yes
Total		10	313	2,245	

Source: (Gewog Office)

3. Existing Resource Inventory

3.1 Agriculture, Livestock and Forestry Sectors

All the Gewogs under Punakha dzongkhag have similar cropping pattern and practices. Dzomi Gewog cultivates more paddy and wheat followed by maize in terms of the cultivation of cereals. Seasonal vegetables are also grown in the Gewog for self-consumption as well as to sell the extra produce in the nearby market at Khuruthang.

The people of Dzomi Gewog also rear local breed and improved breed livestock like jersey, and mithun cross. Hybrids of poultry and piggery are supplied to the farmers by the district Livestock office in Punakha. The improved breeds are integrated with the local breeds to improve the produce. The immediate vicinity of Khuruthang town

makes it easy for the farmers to sell their agricultural and livestock products to the mentioned township. As per the RNR statistics of 2013, there are over 1,000 cattle in Dzomi Gewog, however there is no data regarding other livestock like poultry and piggery.

Table 26: Agriculture Land Use

Wet Land	Dry Land
839.86 Acres	134.40 Acres

Source: (Gewog Office)

4. Business Ideas Generated from Gewog Profile, Focus Group Discussion and Key Informant Interview (KII)

The FGD for the Gewog was conducted by meeting the Gewog Administrative officer, *Mangmi, Tshogpas*, Gewog RNR Extension officers and one to two representatives from each Chiwog. The discussion mainly focussed in the four primary areas of agriculture, livestock, non-wood forestry products, and arts and crafts.

All the Chiwogs cultivate most of the cereals but more focus is given to the cultivation of paddy and wheat, and they also reveal potential for better production. Similarly, the focus in terms of vegetables is given to production of chilli. While generating business ideas during the FGD, the focal persons believed that new ventures such as dairy farming could also turn into a lucrative business. People of the Gewog also expressed that if they were able to start dairy farms then they will also be able to use the animal faeces to start up biogas plants and work towards promotion of green energy.

However, due to lack of adequate forest coverage, the FGD found out that non-wood forestry products, and arts and crafts are not really possible in the Gewog. It also meant that the Gewog suffers from acute shortage of timber for construction and firewood and explains the interest of the farmers in the harness of biogas. The Gewog does not have any speciality in terms of arts and crafts other than simple carpentry skills.

Table 27: Business ideas generated from FGD and KI

Chiwogs	Agriculture	Livestock	Forestry	Arts & Crafts
Khilikha_Loongkha	Paddy* Wheat Mustard	Dairy farming Biogas	-	The Gewog has no speciality in terms of arts and crafts
Tanag_Uesa	Paddy* Wheat Mustard	Dairy farming Biogas	-	

Dzomisa_Mendagang	Paddy* Wheat Mustard Chilli	Dairy farming Biogas	-	
Gubji_Tseykakha	Paddy* Wheat Mustard Chilli	Dairy farming Biogas	-	
Jimithang	Paddy* Wheat	Dairy farming Biogas	-	

*Priority & potential

Source: FGD

Table 28: Attractiveness Matrix

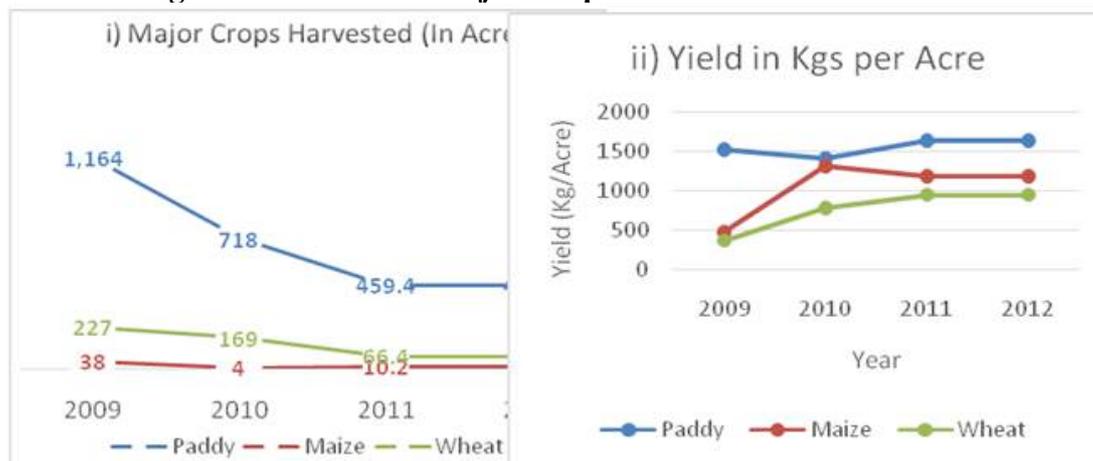
Potential for production	High			Paddy*
	Medium			Wheat Chilli Mustard
	Low			Dairy farming
		Low	Medium	High
	Potential Demand			

Paddy cultivation is the most attractive in terms of both potential demand and production capacity of the Gewog because our country's trade deficit for rice is over Nu. 1.5 billion. Nevertheless, wheat, chilli and mustard have also huge potential demand but moderate production capacity. This is because chilli and mustard are the two crops that are greatly affected by climatic conditions. Dairy farming is also an attractive business in the Gewog because the flat lands of Dzomi Gewog are favourable for improved breeds and the closeness of the Gewog to the Dzongkhag Administration and Khuruthang town makes it easy for the farmers to sell their produces.

5. Trend Analysis of the major existing resources

5.1 Cereal crops

Figure 33: Trend for Major Crops' Harvested Area and Yield



Source: PPD, MOAF; 2009-2012

Figure 33 (i) and (ii) show the land use and yielding trends of paddy, wheat and maize in Dzomi Gewog. It is interesting to observe that the land use for paddy cultivation shows a decreasing trend while the yield has increased. Similarly, the land use for wheat cultivation also has reduced slightly but the yield shows an increasing trend. Paradoxically, the land use for maize cultivation in 2010 is only 4 acres but the yield during that year is the highest at 1,314 kg/acre whilst in 2009, the land use for maize is the highest at 38 acres but the yield is only 478 kg per acre. Nevertheless, the cultivation of paddy tops the list both in terms of area under cultivation and the yield in kilogram per acre.

5.2 Mustard.



5.3 Figure 34: Production Trend of Mustard

Source: PPD, MOAF; 2009-2012

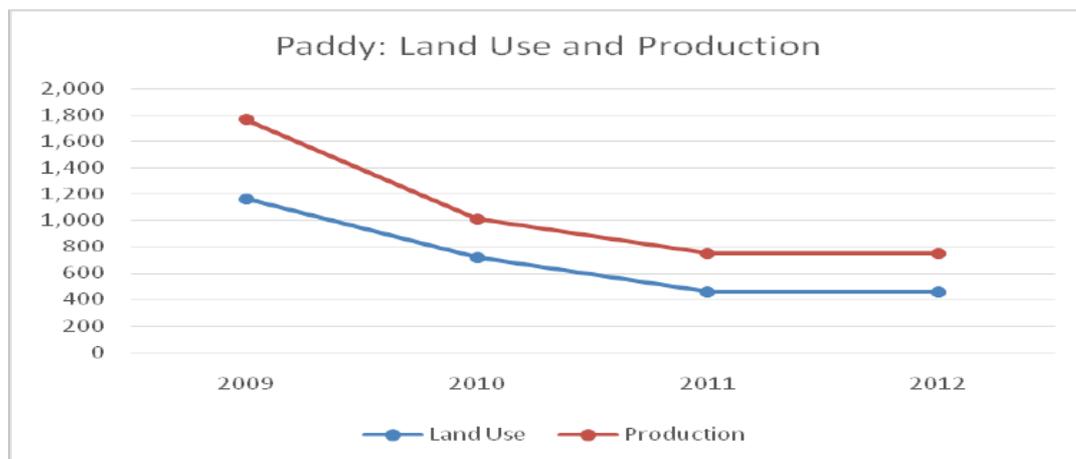
Although the land used for cultivation of mustard has not been recorded in the RNR statistics, the production in metric tonnes is mentioned in the data available from 2009-2012. Figure 2 shows that Dzomi Gewog alone has been producing over 15,000 kgs of mustard every year. The favourable climate and abundant wetland make is favourable for cultivation of mustard and the Gewog has huge potential for mustard plantation besides the cultivation of paddy.

6. Business Opportunity Scanning and Validation.

6.1 Paddy

Production Volume

Figure 35: Land use and Production of Paddy



Source: PPD, MOAF; 2009-2012

The most cultivated crop in the Gewog is paddy as shown in Figure 35. Although both the area cultivated in acres and production in metric tonnes show a decreasing trend (Figure 35), the cultivation of paddy still rules as the major crop in Dzomi Gewog. This signifies that the Gewog can continue to be a major producer of paddy and paddy related products.

Market

Although Bhutan produces a lot of paddy, the demand is not being met and rice being the staple food for every Bhutanese household, the market for rice seems to be assured.

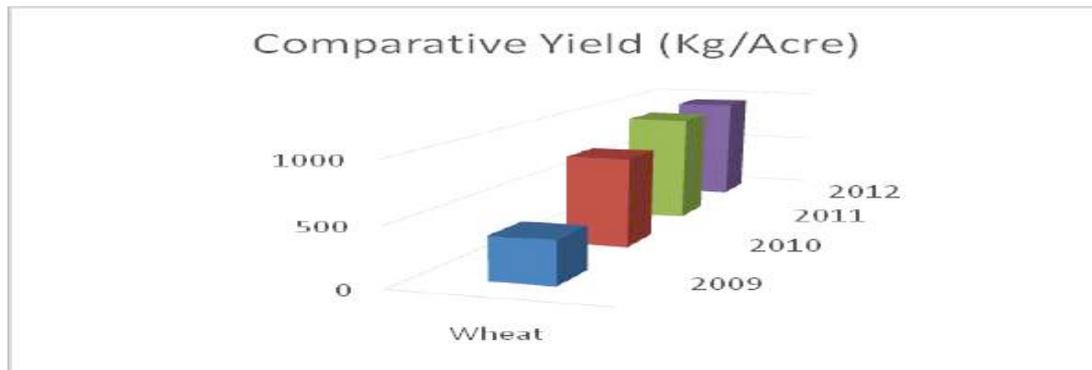
Opportunities associated with paddy cultivation

Note: Please refer the report for Goenshari Gewog for description of the opportunities associated with paddy cultivation.

6.2 Wheat

Production Volume

Figure 36: Comparative Yield of Wheat



Source: PPD, MOAF; 2009-2012

The total yield of wheat in the Gewog has consistently increased from 371.45 kg per acre in 2009 to 947 kg per acre in 2012. Wheat is also grown as a second staple food in the Gewog. It is also used for other purposes, including, to feed cattle, brew *ara* (local alcohol), and prepare various flours. In addition, wheat is even sold to the Food Corporation of Bhutan Limited.

Market

Bhutan also imports wheat and wheat products from India and other countries. During 2013, wheat and meslin trade with India amounted to trade deficit of Nu. 221.48 million.

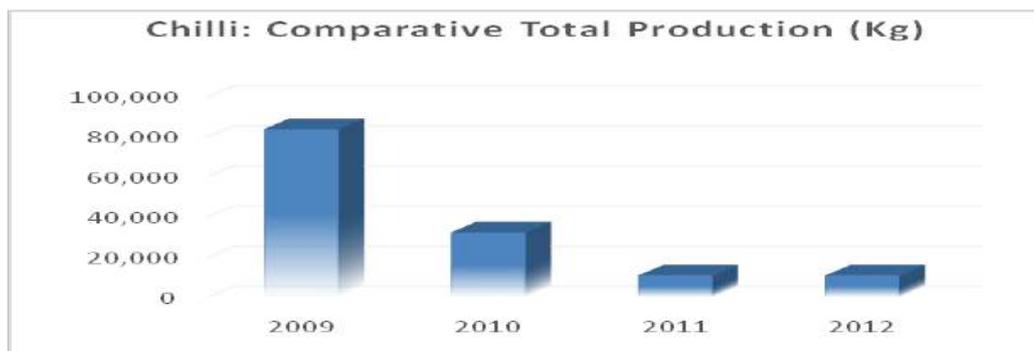
Opportunities associated with Wheat cultivation

Note: Please refer the report for Goenshari Gewog for description of the opportunities associated with paddy cultivation.

6.3 Chilli

Production Volume

Figure 37: Comparative Production of Chilli



Source: MoAF 1

Although the Gewog produced 83 metric tons of chilli in 2009, the production drastically declined in the recent years, and the cause of this decrease in produce is attributed to a chilli blight which has affected chilli production in many regions of Bhutan.

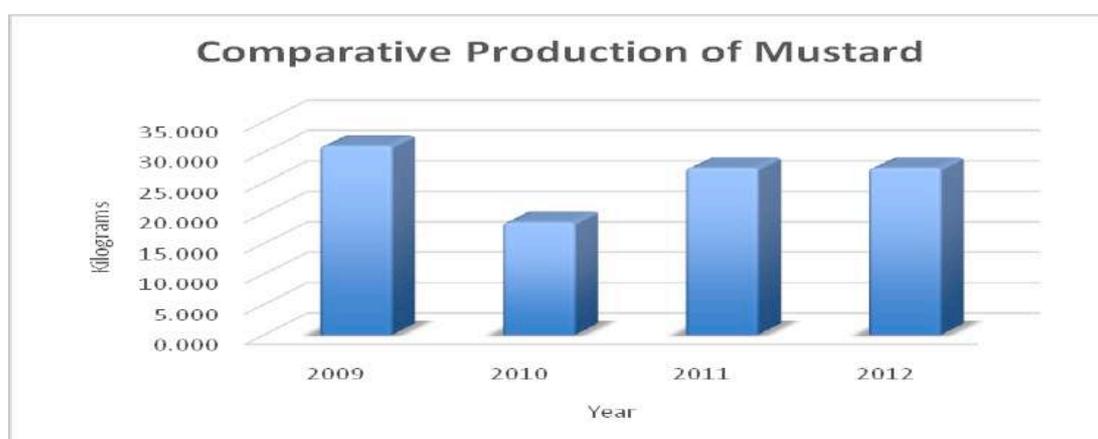
Market

Despite the production capacity of the Gewog, there is a huge scope for chilli business in Bhutan as it currently imports a substantial amount of chilli every year.

6.4 Mustard

Production Volume

Figure 38: Comparative Production of Mustard



Source: PPD, MOAF; 2009-2012

Figure 38 shows that the Gewog has been harvesting over 20,000 kilograms of mustards every year until 2012 and the harvest should be similar for 2013 onwards. This is because mustard is a winter crop and it can be sowed after the harvest of paddy. However, wheat and mustard need to be planted alternatively since they are planted in the same season. Nevertheless, there is an increasing demand for mustard as the plant can be eaten as greens when tender, while the seed can be used in culinary dishes and also to extract mustard oil.

Market

Bhutanese mustard oil lost its popularity due to easy availability of various edible oils from India and nearby countries. Despite negligible cultivation of mustard there is a huge demand for mustard and mustard oil business as Bhutan currently imports substantial amount of mustard and mustard oil every year. The by-product of mustard oil extraction called mustard oilcake is used as animal feed to increase the productivity of the animals, especially of the milking cows.

According to the agricultural marketing resource centre, Asia is the major market for oriental mustard which is used in cooking and as condiments, North America is major market for yellow mustard for use as condiment and Europe is the major market for brown mustard. Therefore, as long as the aforementioned mustards are grown, it will not be difficult to find markets for the mustard seeds. Plus, the mustard seeds are not easily perishable.

Opportunities associated with mustard cultivation

The following are some of the business opportunities connected with the production of mustard:

(a) Commercial Farming of Mustard

Mustard plant has been cultivated in smaller scales for extraction of mustard oil, for consumption as vegetable, and as cattle feed. However, mustard could be grown on larger scales to meet the domestic demand and address the trade deficit quantity of -11,078 kilograms.

Table 29: Import and Export of Mustard Seeds

Particulars	Imports		Exports		Trade Gap	
	QTY (KG)	Value (NU)	QTY (KG)	Value (NU)	QTY (KG)	Value (NU)
Mustard Seed	20,527.90	830,991	9,450	234,050	-11,077.9	-596,941

(b) Extraction of Mustard Oil

There is scope for setting up small scale mustard oil extraction facilities which can reduce the country's dependence on imported edible oils.

(c) Manufacture of Mustard Condiments

Mustard seeds are also used as condiments which are widely used in South Asian and Continental cuisines. Bhutan can also start to produce mustard seed that could also brand itself as organic condiments.

(d) Processing of Mustard oilcake

The by-product (mustard oilcake) from the extraction of mustard oil can be used as cattle feed to increase the milk productivity of the cattle.

TOEWANG GEWOG



1. Gewog Profile

Toewang Gewog stretches over an area of 415.65 sq. km (LCMP 2010) with an altitude range from 1250 to 3700 meters above the sea level. There are 313 registered households in the Gewog and the total population is 2,245 persons. The Gewog comprise of five Chiwogs. Similar to Goenshari, Toewang Gewog is also well known for a hot spring (Chubu Tshachu) which attracts huge crowd during the winter seasons. The Gewog experiences cool winters with warm and humid summers.

2. Infrastructure and Facilities

Toewang Gewog has one Lower Secondary School, one Primary School, one Basic Health Unit (BHU), one Out Reach Clinic, one RNR Centre, one multipurpose hall, and one community centre. All the households are electrified and 91% of the households have access to clean drinking water. The cooking oil *Pangtse Makhu* is also produced in this Gewog and people earn income from the sale of oil as well as rice. In terms of accessibility and communication, the Gewog has 42.9 kms of farm road and one suspension bridge. Some of the remotest villages in Toedwang Gewog are Tami Damchu, Neptengkha, Chhubu Tsachhu, Kewana and Tsachhu phu. The Gewog has a total of seven *lhakhangs*.

Table 30: Chiwog Level Profile, 2014

Sl. No.	Name of Chiwog	No. of Villages	Total Household	Total Population	Road (Yes/No)
1	Dawakha	4	56	446	Yes
2	Jibjo Yuesakha	4	95	598	Yes
3	Kawanang Tshachuphu	3	44	389	NO
4	Tamigdamchu Thangbji	4	68	482	Yes
5	Tsephug Khawakha	4	50	330	Yes
Total			313	2,245	

Source: Gewog Office

3. Existing Resource Inventory

Agriculture, Livestock and Forestry Sectors

All the Gewogs under Punakha dzongkhag have similar cropping pattern and practices. Toewang Gewog cultivates more paddy and wheat in terms of cereal production. Little of every seasonal vegetable is grown in the Gewog and is used for self consumption. But the people focus more on chilli cultivation. However, the yield of chilli has dropped in the recent years. The Gewog is also rich in terms of availability of *Pangtse* trees which are commonly used for extraction of the cooking oil. The Gewog seems to have over 3,000 *Pangtse* trees. The Department of Forest

and Park Services sponsored an oil extraction mill to the Gewog which is used to extract mustard oil.

The people in the Gewog also depend on livestock for living. They largely raise indigenous breed of cattle owing to the geographic and climatic conditions. As per the RNR Statistics 2012, the Gewog has over 1,400 cattle. However, there is no official data available for dairy, meat and poultry products. The forest in Toewang Gewog is also rich in flora and fauna. It has few species of orchids, fern, *damroo* and wild mushrooms and such non-wood forest products have helped to contribute in uplifting the socio economic standards of the farmer as revealed through the FGD.

Table 31: Agriculture Land Use

Wet Land	Dry Land
1,064.7 Acres	242.30 Acres

Source: *Gewog Office*

4. Business Ideas Generated from *Gewog Profile*, Focus Group Discussion and Key Informant Interview (KII)

The Gewog Administrative officer, *Mangmi, Tshogpas*, Gewog RNR Extension officers and one to two representatives from each Chiwog participated in FGD. The discussion was mainly focussed in the four primary areas of agriculture, livestock, non-wood forestry products, and arts and crafts.

All the Chiwogs cultivate most of the cereals but more focus is given to the cultivation of paddy and wheat. Similarly, the production of chilli is given more focus from the many vegetables grown in the region. The Gewog is also known for its potential in producing *Pangtse* oil like the other Gewogs in Punakha.

Table 32: Business Ideas Generated from FGD and KI

Chiwogs	Agriculture	Livestock	Forestry	Arts & Crafts
Dawakha	Paddy* Wheat Chilli Mustard	Dairy farming Fishery	Fern Wild mushrooms	The Gewog has no specialty in terms of arts and crafts except for
Jibjo Yuesakha	Paddy* Chilli	Dairy farming Fishery Poultry	-	
Kawanang Tshachuphu	<i>Pangtse</i> Seeds* Paddy* Chilli	Dairy farming Fishery	Orchids Wild mushrooms Fern <i>Damroo</i>	

Tamigdamchu Thangbji	Paddy* Wheat Chilli Mustard	Fishery	Orchids Wild mushrooms Fern <i>Damroo</i>	
Tsephug Khawakha	Paddy* Chilli	Fishery	-	

*Priority & potential

Source: FGD

Table 33: Attractiveness Matrix

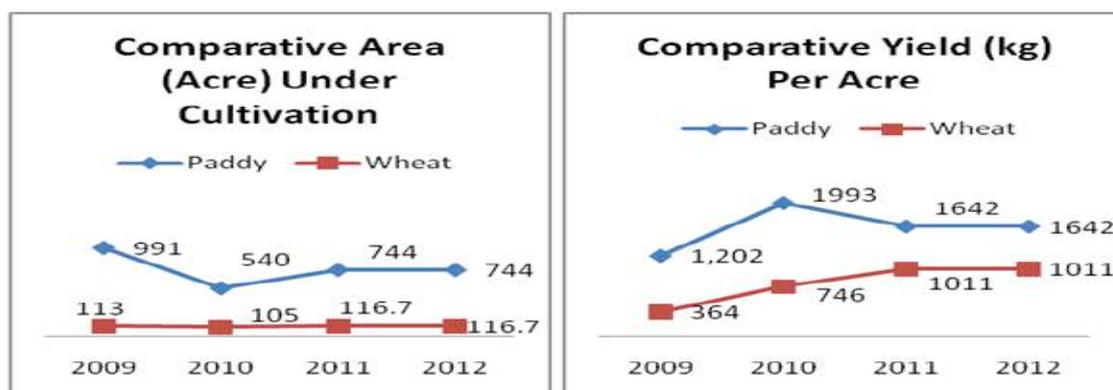
Potential for production	High			Paddy* <i>Pangtse</i> Seeds*
	Medium			Wheat Chilli
	Low			
		Low	Medium	High
	Potential Demand			

Paddy and *Pangtse* seeds are the most attractive in terms of potential demand and production capacity of the Gewog while wheat and chilli have huge potential demand but moderate production capacity.

6. Trend

The figure below shows the land use and yielding trends of paddy and wheat in Toewang Gewog. The land used for wheat has slightly increased between 2009 and 2012 while the yield per acre for the same has risen from 364 kg in 2009 to 1011 kg in 2012. The land used for paddy declined by considerable acres between 2009 and 2012 while the yield per acre has paradoxically increased from 1,202 kg in 2009 to 1,642 kg in 2012. This indicates that the Gewog has more potential in terms of productivity of paddy.

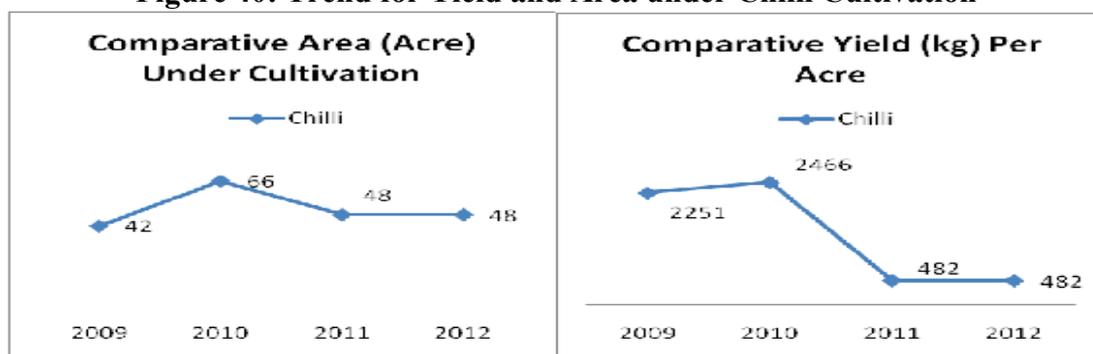
Figure 39: Trend for Yield and Area under Cultivation of Paddy and Wheat



Source: PPD, MOAF; 2009-2012

5.2 Chili

Figure 40: Trend for Yield and Area under Chilli Cultivation



Source: PPD, MOAF; 2009-2012

The land used for chili cultivation has slightly increased from 42 acres to 48 acres between 2009 and 2012. However, the Gewog has experienced drastic drop in yield per acre from 2,252 kg in 2009 to 482 kg in 2012, and this decline in yield has been attributed to chilli blight.

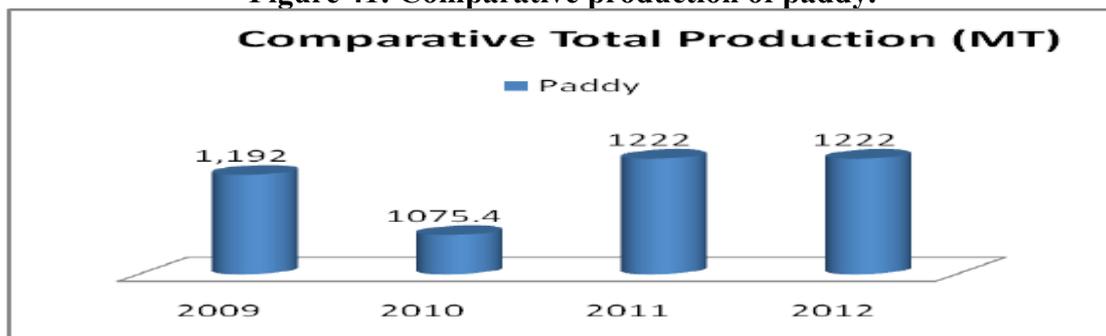
6. Business Opportunity Scanning and Validation.

6.1 Paddy

Production Volume

The Gewog has close to 1,065 acres of wet land which are mostly used for cultivation of paddy. In 2012, Toewang Gewog produced 1,222 metric tons of paddy, signifying the Gewog's potential to produce paddy and paddy related products.

Figure 41: Comparative production of paddy.



Source: PPD, MOAF; 2009-2012

Market

Bhutanese rice has huge local and national market. Although Bhutan produces a lot of paddy, the demand is not being met and rice being the staple food for every Bhutanese household, the market for rice seems to be assured.

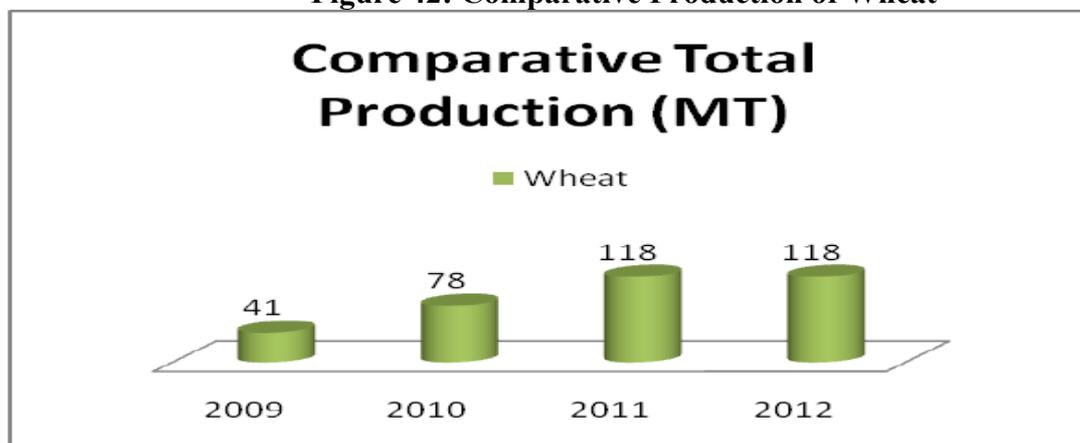
Opportunities associated with paddy cultivation

Note: Please refer the report for Goenshari Gewog for description of the opportunities associated with paddy cultivation.

6.3 Wheat

Production Volume

Figure 42: Comparative Production of Wheat



Source: PPD, MOAF; 2009-2012

The total production of wheat in Gewog has consistently increased from 41 metric tons in 2009 to 118 tons in 2012.

Market

Bhutan also imports wheat and wheat products from India and other countries. Bhutan also imports wheat and wheat products from India and other countries. During 2013, wheat and meslin trade with India amounted to trade deficit of Nu. 221.48 million.

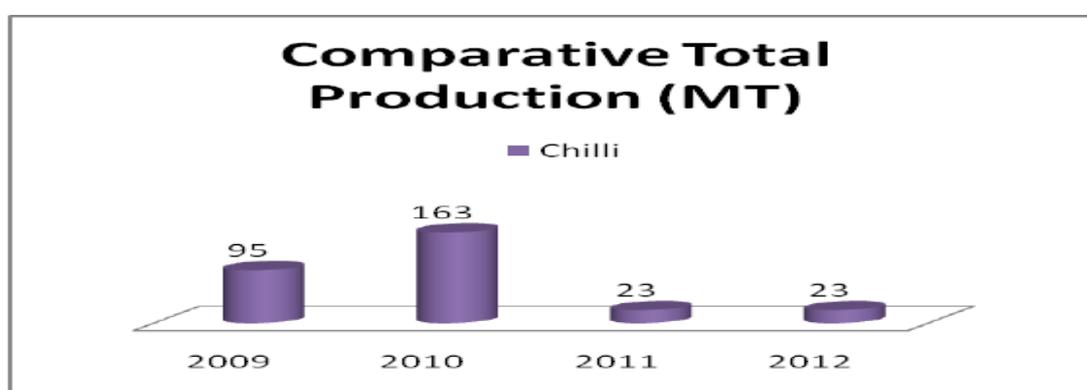
Opportunities associated with wheat cultivation

Note: Please refer the report for Goenshari Gewog for description of the opportunities associated with paddy cultivation.

6.4 Chilli

Production Volume

Figure 43: Comparative production of chilli



Source: PPD, MOAF; 2009-2012

Although the Gewog produced 163 metric tons of chilli in 2010, the production drastically declined in the recent years.

Market

Despite the production capacity of the Gewog there is a huge scope for cultivation of chilli as Bhutan currently imports substantial amount of chilli every year (see Appendix 3).

Opportunities associated with chilli cultivation Following are some of the business opportunities connected with chilli production:

- (a) Commercial farming of chillies
- (b) Manufacture of chilli pickles
- (c) Packaging and branding of dried chillies

(d) Processing chilli powder and spices

6.5 Pangtse Tree and Oil Seeds

Note: Please refer the report for Shenga-Bjemi Gewog for details about the Pangtse tree, seed production volume, market and business opportunities associated with Pangtse trees and oil seeds.

BARP GEWOG



1. Gewog Profile

Barp Gewog is located about 12 km away from Punakha town. It covers an approximate area of about 24.65 sq. km with elevations ranging from 1400-1800 meters above the sea level. The Gewog experiences an annual rainfall of about 500–1500 mm approximately with temperature ranging from 5⁰ Celsius to 30⁰ Celsius. The Gewog lies in the sub-tropical region and experiences hot and humid summer with heavy rainfall while the winter is moderate. The Gewog is one of the most accessible in terms of road and communication network. Paddy is the main cereal cultivated in the Gewog followed by spring wheat. Most households derive income from the sale of fruits, vegetables and rice. The fertile valley of Lobesa located in the Gewog offers promising opportunity for farm mechanization.

About 502 households are electrified and about 98% of the household have access to clean drinking water supply. However, the shortage of safe drinking water is still a challenge to the Gewog. The population avails health services from Punakha, Wangdiphodrang and Thimphu while the only sub-post at Lobesa renders maternal and child health including primary health care services to its community.

2. Infrastructure and Facilities

The Gewog has 5 Chiwogs. It has a total of 17.5 km of farms roads connecting all the Chiwogs. The Gewog has achieved 100% electrification of its households. Under the education sector, the Gewog has a Higher Secondary school and a Middle Secondary school. The other infrastructure of the Gewog includes a BHU, an RNR extension center and a Community Information Center.

Figure 44: Barp Gewog Map



Table 34: Chiwog Level Profile

Sl. No	Name of Chiwogs	No. of Villages	Total HH	Road Connectivity
1	Chasa	5	11	Yes
2	Yewakha- Sopsokha	7	104	Yes
3	Eusakha	7	51	Yes
4	Tshokona	8	35	Yes
5	Septokha- Gamakha	3	35	Yes

3. Existing Resource Inventory

3.1 Agriculture

The soil fertility and climatic conditions of Barp Gewog is suitable for cultivation of a wide range of crops. Paddy is the main cereal crop cultivated in the Gewog followed by spring wheat and mustard. The Gewog is not only self-sufficient in terms of production of paddy, but is also a major commercial crop for the households contributing to a significant income earnings. All the Chiwogs grow a wide variety of vegetables like beans, onion, chilli, peas, broccoli and any excess production is sold off in the nearby markets.

Table 35: Major Crops Cultivated in the Gewog

Crop	Harvested Area (Acre)	Production (MT)	Yield (MT/ acre)
Paddy	620.00	1,240.00	2.00
Maize	8.00	12.00	1.50
Wheat	28.00	22.40	0.80
Mustard	27.50	8.25	0.30
Onion bulb	7.60	19.00	2.50
Chilli	14.00	39.20	2.80
Beans	10.00	23.00	2.30
Tomato	8.00	24.00	3.00
Broccoli	17.00	51.00	3.00

Source: Source: PPD, MOAF; 2009-2012 and Gewog Agriculture Extension office, 2014

3.2 Livestock Population and Production, 2013

A cattle rearing is the main activity under the livestock sector of the Gewog. The Gewog has two Farmers' Dairy Groups, one at Yewakha Chiwog and the other at Septokha- Gamakha Chiwog. On an average, each dairy group has 40 cattle consisting of a mix of high breed jersey and locally bred cows. Although, dairy farming does exist in other Chiwogs but the production is merely sufficient for household consumption.

Table 36: Livestock Population, 2013

Types	Population
Brown Swiss Cross	2
<i>Doeb/Doebum</i>	75
<i>Doethra/doethrabum</i>	0
<i>Jatsha/Jatsham</i>	0
Jersey cross	351

<i>Nublang/Thrabum</i>	598
<i>Yanku/Yankum</i>	54

Source: DOL, MOAF; 2013

Table 37: Dairy Products, 2013

Production	
Milk (kg)	171,796.00
Butter(kg)	8,331.35
Cheese(kg)	14,835.10

Source: DOL, MOAF; 2013

3.3 Forest Products

Barb Gewog is located at Lobesa and is surrounded by other urban Dzongkhag centers like Wangdue Phodrang and Punakha. Therefore, the availability of non-wood forest products is relatively low.

3.3.4 Land Utilization

Table 38: Agriculture Land Use

Land types	Acres
Wet Land	769.72
Dry Land	46.71
Orchard	2.02
Wet land Fallow	6.50
Dry land Fallow	82.07

4. Business Ideas Generated from Community Profiling, Focus Group Discussion (FGD) and Key Informant Interviews (KI)

Mangmi, Tshogpas and one or two representatives from every Chiwog participated in the FGD conducted at the Gewog center. The FGD mainly focused in the areas of agriculture, livestock, non-wood forestry products, horticulture, and arts and crafts. The Gewog Extension officers were also interviewed to substantiate the discussion arising out of the FGD. Based on the FGD the major products produced in Barb Gewog are listed below in the table with asterisk (*) which indicates priority.

Table 39: Business ideas generated from FGD and KI

Chiwog	Agriculture & Horticulture	Livestock	Forestry
Chasa	Paddy*, Maize*, Sag, Chilli, Brocoli Guava, Mandarin	-Dairy Farm (for self consumption)	CF?
Yewakha- Sopsokha	Paddy*, Wheat*, Chilli, Mustard, Broccoli Guava	Drukpa Kuenley Omgi Tshogpa	

Eusakha-Tshokona	Paddy, Wheat*, Maize Chilli, Beans,	Dairy Farm (for HH consumption)	
Septokha-Gamakha	Paddy*, Wheat*, Onion*, Chilli, Guava	Dairy Farm (for HH consumption)	

5. Attractiveness Matrix

Table 40: Attractiveness Matrix

Potential to produce	High		Paddy	Broccoli and Chilli
	Medium	Wheat		Dairy Products
	Low	Maize		
		Low	Medium	High
	Potential Market Demand			

Based on the FGD, broccoli and chilli are identified as most attractive products with potential to be produced on a commercial scale. The other products identified as attractive includes paddy and wheat based on their potential to be cultivated on a commercial scale even if the market is low at the moment.

6. Business Opportunity Scanning and Validation

6.1 Production Volume of Paddy, Maize, Wheat and Vegetables

Vegetables such as broccoli, chilli and beans are produced in large quantity and also have a high yield per acre when compared to other vegetables. Amongst the cereals, paddy has a higher yield per acre compared to wheat and maize. The cultivation of paddy also offers better opportunity to the farmers as the price of paddy in the market is higher than that of maize and wheat.

6.2 Market

Currently, the vegetables produced in the Gewog are mainly sold at Thimphu through the Farmers' Centenary Market and also in the local markets at Punakha and Wangdiphodrang. Small amount of vegetables are also sold by the farmers by setting up market sheds along the national highways.

6.3 Challenges

Major challenges faced by the people of the Gewog are lack of access to finance needed for preparation of the land, procurement of farm machineries and purchase of

seeds. The other challenges include: the raid of crops by the wildlife, the shrinking farm labor, and escalating labor costs. Nevertheless, with continued assistance from the Ministry of Agriculture and Forests, the people of the Gewog have plans to scale up the production of paddy, wheat and vegetables.

Lack of access to finance to buy improved breed of jersey cows is also one of the challenges encountered by the farmers' in their pursuit to rear high yielding livestock..

7. Opportunities Identified in the production of paddy and vegetables

7.1 Paddy

Under the agriculture sector, the cultivation of paddy is identified as a viable business opportunity due to the following reasons-

- (i) Every Chiwog produces paddy and have access to road and therefore, can easily link the produce to the market, and
- (ii) The fertility of the soil, favourable climatic conditions and access to irrigation infrastructure supports high yield per acre of paddy.

The Trade Statistics, 2013, indicates that Bhutan is a net importer of rice and therefore, any increase in local production of rice would offer to reduce its import and offer business opportunity to the producer(s).

Table 41: Import and export statistics of rice

Items	Imports		Exports		Trade Gap	
	Qty (KG)	Value (Mil. Nu.)	Qty (KG)	Value (Nu.)	Qty (KG)	Value (Mil. Nu.)
Rice in Husk	286,261	5.42	1,200	3,500	-285,061	-5.41
Rice Husked	46,438,003	1,061.33	0	0	-46,438,003	1,061.33
Red rice	3,250	0.093	0	0	-3,250	-0.094
Rice Semi-milled	23,447,259	460.47	0	0	-23,447,259	-460.47
Broken Rice	2,414,184	33.89	0	0	-2,414,184	-33.89

Source: DRC, MOF; 2013

7.2 Vegetables

Barp Gewog is also suitable for production of vegetables such as broccoli, chilli and tomato. Since Bhutan imports huge amount of vegetables, particularly high value vegetables like chilli, tomato and broccoli, promoting local production of the mentioned vegetables presents a viable business opportunity for the farmers to earn

their income while also help the country reduce import and help achieve self-sufficiency.

Table 42: Import and export statistics of vegetables

Imported		Exported	
Types	Value in Nu	Types	Value in Nu.
Potato (seeds and others)	56,791,371.0	Potato(seeds and others)	360,130,981.0
Onion, Garlic and others	76,651,306.0	Onion, Garlic and others	280,000.0
Cauliflower and Broccoli	13,009,508.0	Cauliflower and Broccoli	202,520.0
Cabbages and others	9,518,626.0	Cabbages and others	36,947.0
Carrot, Turnip, Radish and others	1,940,595.0	Carrot, Turnip, Radish and others	9,564,515.0
Peas	1,136,156.0	Peas	8,350,830.0
Beans	6,670,738.0	Beans	465,815.0
Mushroom	229,737.0	Matsutake (<i>sangay shamu</i>)	492,900.0
Chillies	48,049,825.0	Chillies	569,855.0

Source: DRC, MOF; 2013

7.3 Dairy Livestock

The volume of production of dairy products such as milk, butter and cheese produced in the Gewog indicate that dairy farming has the potential to be undertaken on a commercial scale and offer business opportunity to the people. The establishment of small-scale milk processing unit in the Gewog might enhance the business opportunity as it will offer locally packaged dairy products.

LINGBUKHA GEWOG



1. Gewog Profile

Figure 45: Lingbukha Gewog Map

Lingbukha Gewog occupies an area of about 33.8 sq. km (LCMP 2010), and lies at an altitude range from 1200-3000 meters above the sea level. The Gewog has 124 households with the total population of 597 persons.

The Gewog comprise of five Chiwogs and have five Tshogpas. It is located between Shengana Gewog and Wangdiphodrang Dzongkhag. Lingbukha Gewog with its sub-tropical climate experiences cool winter and warm and humid summer. The annual rainfall ranges from 500-1500 mm, while the temperature ranges from 5⁰ Celsius to 30⁰ Celsius. The Gewog has 75% of its land area under forest cover.



Source: Election Commission of Bhutan

Lingbukha Gewog has one RNR centre, one BHU, one Primary school, one NFE centre and one community centre. About 99% of the household have access to safe drinking water and all households are connected to electricity. The Gewog Centre is also connected by the road. The main crops grown in the Gewog are paddy, wheat, mustard and maize.

2. Infrastructure and Facilities

Limbukha Gewog has a total of 28 km of farm road which connects all the five Chiwogs. The Gewog is adequately covered by infrastructural facilities like the RNR, health, schools and communication facilities.

Table 43: Chiwog level profile

Sl.No.	Chiwog	No. of Villages	Total HH	Road Connectivity
1	Dompala	4	30	Yes
2	Lingbukha	5	26	
3	Nabched	4	22	
4	Gumkarmo	4	46	
5	Omtékha	4	33	

3. Existing Resource Inventory

3.1 Agriculture (Cereals)

Paddy, maize, wheat, buckwheat and barley are the major cereals grown in the Gewog. However, paddy is cultivated on a higher scale compared to other cereals. Any surplus left after household consumption is sold in the market. Table 51 indicates that paddy production is the highest in terms of volume followed by maize and wheat.

Table 44: Area and Production of major cereal crops

Crops (2013)	Area (Acre)	Production (MT)
Paddy	368	749.62
Maize	121	109.87
Wheat	37	24.75
Buckwheat	28	14.59
Barley	13	8.20
Mustard	16	2.21
Soya bean	8	0.856

Source: (Gewog Extension Office)

3.2 Spices and oil seed

Mustard and soya bean are popular oil seeds cultivated in the Gewog. However, due to the high human-wildlife conflict and the poor quality of seeds, the yield per acre for these crops is low and does not allow it to be produced on a commercial scale.

3.3 Livestock

Dairy farming is one of the major lifestyle occupations of people in the Gewog. The breed of cattle available in the Gewog consists of a mix of local breed, jersey cross and pure jersey. The surplus dairy products are sold at the retail outlets in Punakha and Wangdiphodrang. The Gewog has a Farmers' Dairy Production and Marketing Group located at Nabchey Chiwog. The FGD revealed that a few people in the Gewog also rear poultry, of which however there are no official data available for such an activity. With assistance from the Gewog Agriculture Extension office, the community has plans to establish poultry farm in the near future.

Table 45: Dairy products

Sl. No.	Cattle Type	Population	Products (g)		
			Milk	Butter	Cheese
1	<i>Jatsha/Jatsham</i>	42	46650	3712	3871
2	Jersey cross	13			
3	Jersey Pure	11			
4	<i>Nublang/Thrabum</i>	426			
5	<i>Yanku/Yankum</i>	49			

Source: Gewog Livestock Statistics (2014)

3.4 Forestry

The Gewog has five community forests. The people of the Gewog harvest non-wood forest products like ferns and mushrooms from the community forests in small quantities for household consumption. The scarcity of non-wood forest products do not allow harvesting on a commercial scale. The wood products from the forests are mainly used for logging, firewood, flag pole and as fencing poles.

Table 46: Community forest in the Gewog

CF Name	Block No.	Sum Of Basal Area (m ² /ha)	Forest Condition	Vegetation -Age	Tree-Density	Record Year
Lumsum	1	14.00	Average	Pole stage	10-50 trees/ha	2005
Lumsum	2	22.10	Very good		10-50 trees/ha	2008
Phenthog	1	10.10	Average	Co-dominant	10-50 trees/ha	2008
Phenthog	2	17.95	Good	Pole stage		2008
Thoenkey	1	0.00	Poor	Plantation	10-50 trees/ha	2008
Thoenkey	2	7.21	Poor	Pole stage	10-50 trees/ha	2008
Wongbaap	1	15.90	Good	Mature	10-50 trees/ha	2008
Wongbaap	2	16.50	Good	Co-dominant	-	2005
Yargay	1	0.00	-	-	-	2005
Yargay	2	0.00	-	-	-	-

Source: Dzongkhag Forest Office, Punakha

3.5 Land Holdings

Table 47: Land holdings in acres

Land Types	Acres
Wet land	406.58
Dry Land	98.58
Orchard	8.97
Total land	514.13

Source: Gewog Office

4. Business Ideas generated from Profiling, Focus Group Discussion (FGD) and Key Informant (KI) interview

The FGD and KI comprised of the *Mangmi*, Forest Extension officer, Agriculture Extension officer, Livestock Extension officer, *Tshogpas* and the village elders of the Gewog. From the discussion, the participants identified the products with potential for

business opportunity in the areas of agriculture, livestock, forestry (non-wood forest products), horticulture, and arts and crafts. From the discussion, business potentials are identified based on the existing resources and on exploring the future prospects for expansion in the Gewog.

Table 48: Business ideas generated from FGD and KI

Chiwog	Agriculture	Livestock	Forestry	Horticulture
Dompola	Paddy, radish, chilli	Dairy Farm	Mushroom	Mandarin
Lingbukha	Paddy, potato, onion		Mushroom	Nil
Nabched	Wheat, maize, potato, mustard, chilli		Ferns, mushroom	Nil
Gumkarmo	Paddy, maize, radish, saag		Mushroom	Nil
Omtékha	Wheat, paddy, mustard, chilli, onion, garlic		Mushroom	Mandarin

Under agriculture, paddy, wheat, buckwheat and maize are found to be more viable for large -scale production based on land available for cultivation and cultivation styles of the mentioned cereals. The community produced around 749.61 metric tons of paddy in 2013 (Gewog Extension Office). At present, paddy is cultivated over 368 acres of wet land and the Gewog still has some more acres of wet land suitable for paddy cultivation that is left fallow at the moment.

The current level of production is sufficient for household consumption and any surplus paddy produced is sold in the neighboring towns in Wangdiphodrang and Bajo RNR.

Lingbukha Gewog has high potential for producing chilli, potato and radish when compared to other vegetables. In 2011, Lingbukha Gewog produced 57.2 metric tons of chilli, 55.3 metric tons of radish and 68.3 metric tons of potatoes (DOA, MOAF (2011)). People in the community consume most of the vegetables produced and any excess produce left is sold in nearby towns like Punakha and Wanggdiphodrang and sometimes even taken to Thimphu to be sold through the weekend retail outlet at the Farmers' Centenary Market.

5. Attractiveness Matrix

Table 49: Attractiveness Matrix

Potential to produce	High		Paddy	Potato, chilli
	Medium	Maize, wheat	Radish,	
	Low			
		Low	Medium	High
	Potential Market Demand			

Based on the current volume of production and the existing market available, paddy, chilli and potato are identified as most attractive commodities with potential to be cultivated on a commercial scale and offer associated business opportunities in its process. The Gewog also produces a brand of chili locally referred to as *Punakha Ema*, which is popular for its taste and is highly productive. This chilli is mainly produced for commercial purpose and is cultivated by almost all the households in the Gewog. Potato is another product widely grown for on a commercial scale and is a major source of income for the people, by selling it through the auction yard at Phuntsholing.

6. Business Opportunity Scanning and Validation

6.1 Paddy Production

In 2013, the Gewog produced 749.6 metric tons of paddy. The yield per acre is also highest for paddy when compared to other cereals grown in the Gewog. The current volume of production is in excess when compared to the requirements of the community. This makes cultivation of paddy a viable crop with business opportunity. Besides, there is also huge scope for expansion of production of paddy production since the Gewog has considerable acres of wetland left fallow.

6.2 Vegetables

Potato, chili and radish are also popularly grown in the Gewog to generate income. While the chilies are sold either in the local market or at Thimphu, potatoes are mainly sold off at Phuntsholing through the FCB auction yard. With the government providing policy support to the farmers in the area of vegetable production, and in its effort towards curb import, farmers see immense opportunities in the production of vegetables..

TALO GEWOG



1. Gewog Profile

Talo Gewog covers an area of 25.51 sq. km (LCMP, 2010) with altitude ranging from 1300-1500 meters above the sea level. There are 368 households in the Gewog with the total population of 1,594 persons. The Gewog comprises of five Chiwogs and concurrently has five *Tshogpas*.

Talo is one of the smallest Gewogs in the Dzongkhag. It shares its borders with Guma Gewog in the north-east and with Thimphu Dzongkhag in the south-west. About 45% of the land in the Gewog is covered by broad-leaved forest and 35% by the coniferous variety.

Figure 46: Talo Gewog Map



Source: Election Commission of Bhutan

2. Infrastructure and Facilities

Talo Gewog has a total of 48.5 km road, out of which 33 km are paved and 16.5 km farm road connecting all the 5 Chiwogs and benefiting 368 households. All the households in the Gewog are electrified. The Gewog has fairly good access to health, education and RNR infrastructures and services, and has two Community Primary schools, two Non-Formal education centers, and a BHU.

Table 50: Chiwog level profile

Sl. No.	Chiwog	No. of villages	Name of villages	Total HH	Road connectivity
1	Lunakha	3	Lunakha	33	Yes
			Patasakha		
			Lungthramo		
2	Nobgang	3	Baemina	31	
			Nobgang		
			Tserigang		
3	Dhongkokha	3	Shongrena	36	
			Zhungkha		
			Dhongkokha		
4	Talo	1	Talo	69	
5	Lapsakha	3	Shongrena	81	
			Lapsakha		
			Gongthramo		

3. Existing Resource Inventory

3.1 Agriculture

The major cereals grown in the Gewog are paddy, maize, wheat and mustard (see table 53). Besides cereals, the Gewog also grows a variety of vegetables like potatoes, beans; radish, peas and tomato (see table 59). The vegetables are mostly grown for commercial purpose. While vegetables like beans, peas, and tomatoes are sold within the local market, potato is mainly sold at Phuntsholing through the auction system.

Table 51: Harvested area, production and yield for cereal crops

Crop (2013)	Harvested Area (Acre)	Production (MT)	Yield (Mt/ acre)
Paddy	51.50	105.38	1.57
Maize	67.00	75.40	1.15
Wheat	65.50	39.20	1.03
Mustard	38.00	3.96	0.10

Table 52: Harvested area, production and yield for major vegetables

Vegetables (2013)	Harvested Area (Acre)	Production (MT)	Yield (kg/ acre)
Radish	16.30	31.60	1.93
Beans	27.00	59.30	2.19
Peas	56.00	30.00	0.53
Tomato	273.00	12.00	0.04
Potato	10.00	45.00	4.50
Chilli	32.50	81.80	2.51

Source: Agriculture Extension Office, Talo Gewog

Under livestock sector, dairy and poultry farming are prominent activities carried out in the Gewog. The Gewog has a Farmers' Dairy Production and Marketing Group. The members of the group supply the milk to the group collection center, who in turn sells milk to the final consumers. The unsold milk is processed into butter and cheese. The dairy products are mainly sold at Khuruthang town and in the nearby areas of Punakha Dzong. The Gewog also has two commercial poultry farms and eggs are mostly sold within Khuruthang.

Table 53: Livestock population and production, 2013

	Breed	Population	Products	Production Total (Kg)
	Cattle	Brown Swiss Cross	0	Milk (kg)
<i>Doeb/Doebum</i>		0	Butter (kg)	9661.54
<i>Jatsha/Jatsham</i>		164	Cheese (kg)	17390.78
Jersey cross		598		
<i>Nublang/Thrabum</i>		716		
<i>Yanku/Yankum</i>		57		
Milch cows	Breed	2013	2013	
	Local	191	Pork (kg)	730.00
	Buffalo	0	Beef (kg)	225.00
	Jersey Cross	163		
	Pure Jersey	0	2013	
			Egg	50,780 numbers

Source: Agriculture Extension Office, Talo Gewog

In Forestry Sector, Gewog has four community forests. These community forests are endowed with diverse non-wood forest products such as orchids, ferns, and mushrooms. However, the amount of such products made available is low and is barely sufficient for self-consumption.

Table 54: Community forest in the Gewog

CF Name	Block No.	Sum Of Basl Ara (m2/ha)	Forest Condition	Vegetation	Trees Density /ha	Record Year
Mangizingka	Block1					2005
Mangizingka	Block2	21.66	Very good	Mature	Oct-50	2005
Mangizingka	Block3	21.55	Very good	Mature	Oct-50	2005
Norbuling	Block1	11.00	Avg	Pole stage	Oct-50	2011
Parikha Norbuling	Block1	14.12	Avg	Mature	Oct-50	2012
Parikha Norbuling	Block2	15.24	Avg	Pole stage/mature	Oct-50	2012
Puensum	-	16.60	Good	Mature	Oct-50	2007
Puensum	Block2	12.30	Avg	Pole stage	Oct-50	2007
Samdrup	Block1	16.00	Good	Pole stage	Oct-50	2011

Source: Agriculture Extension Office, Talo Gewog

4. Business ideas generated

The participants in the focus group discussion consisting of elected members of the local government, community elderly and RNR extension officers shared potential areas in production and manufacturing sector that has good enterprise potential; these prospects are tabulated in table 62.

Table 55: Business ideas generated from FGD and KI

Name of Chiwog	Agriculture	Livestock	Forestry	Horticulture
Lunakha	Paddy	Dairy	Community forest	Mandarin
	Chilli, mustard			
	Wheat, potato			
Nobgang	Paddy	Dairy		
	Beans			
	Wheat, potato, chilli			
Dhongkokha	Paddy	Dairy		
	Maize			
	Chilli, potato			
Talo	Maize, paddy, potato, chilli	Dairy		
Lapsakha	Maize	Dairy		
	Paddy			
	Potato, chilli			

5. Attractiveness Matrix

Prospective business areas pointed out during FGD mapped on the attractiveness matrix based on potential to produce and potential market demand indicates that production of potato, beans and chili has a good prospects.

Table 56: Attractiveness Matrix

Potential to produce	High			Potato, chilli, beans
	Medium		Maize	Dairy
	Low			
		Low	Medium	High
	Potential Market Demand			

6. Business Opportunity Scanning and Validation

6.1 Agriculture: Production of Paddy, Chili, Beans and Potatoes

Participants in FGD shared that they are assured of good yield for paddy and vegetables such as chili, potatoes and beans. Available data (2009-2011, table below) also points out consistency in yield. Despite consistency in yield, scale of cultivation has been relatively smaller with exception of chili cultivation, which shows increase in cultivated area. Irrespective of scale of cultivation and yield, current focus has been on production of such vegetable and little value addition opportunities have been explored by the growers.

Crops	2009			2010			2011		
	Area (acres)	Production (MT)	Yield (Kg/acre)	Area (acres)	Pdn (MT)	Yield (Kg/acre)	Area (acres)	Pdn (MT)	Yield (Kg/acre)
Paddy	312	471	1,509	383	586	1,530	595	1,074	1,805
Potato	20	58	2,841	10	26	2,560	32	86	2,728
Beans	7	15	2,044	23	76	3,288	-	-	-
Chili	16	18	1,084	42	18	430	72	144	1,993

Source: DOA, MOAF (2011, 2010, 2009)

Market

The primary market for vegetables produced by households in the Gewog is the Khuruthang town, where majority of the produce are sold. In few cases, produce are also sold to nearby resorts. Alternatively, households sometimes sell their produce at Bajothang town in Wangdue.

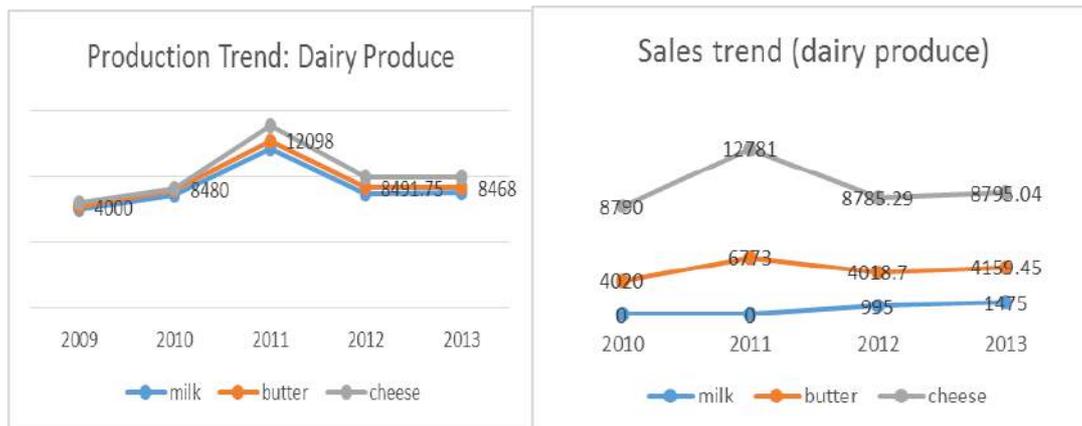
Challenges

Despite ability to produce and sell in the local and regional markets, wildlife intrusion had been perpetual problem for the communities in the Gewog. Post-harvest losses in case of potato production have been also cited as a recurring challenge.

Despite challenges, the households in the Gewog have advantage in access to market and the relative easiness to sell their agriculture produce. The current self-reliant cultivation scale has a good potential to be up scaled and compete in the markets beyond the Dzongkhag.

6.3 Livestock

Almost all the households rear cattle in the Gewog. *Nublang-Thrabum* and *Jersey cross* are common breeds reared by households. Though the Gewog has dairy production and marketing group, the production and marketing happens at individual level. In terms of production trend, production has peaked in the year 2011, otherwise the production capacity of Gewog has remained consistent (see fig. below).



Source: DOA, MOAF (2013, 2012, 2011, 2010, 2009)

Market

Like agriculture produce, the market for dairy produce is also the local market (Khuruthang town and the Dzong area). Until 2011, milk was solely used for processing and from the year 2012, fresh milk has also picked up market. On an average, households are able to sell at least 50% of their produce in the market.

Opportunity

The current dairy farming culture wherein households rear manageable number of cattle has scope for growth and expansion. Participants in focus group discussion also expressed that people in the community has willingness, space and competency to make dairy farming a full time livelihood occupation, currently dairy is secondary to agriculture.

GUMA GEWOG



1. Gewog Profile

Guma Gewog stretches over an area of 37sq.km (LCMP 2010) with altitude ranging from 1200-2200 metres above the sea level. There are 816 households, which currently hold a population of 4,288 persons. The Gewog has five Chiwogs with five *Tshogpas*. The settlements are quite dense in this Gewog due to its proximity to Khuruthang town and Punakha Dzong.

Guma Gewog falls under the sub-tropical zone and the forests are of the chirpine variety at the lower altitude and mixed warm broad leaved variety at the higher levels. Summers are hot in the Gewog with temperature reaching almost as high as 32° Celsius, while the minimum temperature in winter fall as low as 12° Celsius, with daytime temperature soaring to a maximum of 19° Celsius. Almost all varieties of crops are grown in the Gewog, but importance is given to the cultivation of paddy.

Various vegetables and fruits are also grown and the surpluses are sold in the market. Guma Gewog has fairly good access to infrastructure and services. The Gewog has an RNR centre, one Hospital, one ORC, one extended classroom, two Primary schools, one MSS, one HSS, one private school, 3 NFEs, one multipurpose hall and one community centre. Almost all the Chiwogs are connected by farm road and have access to clean drinking water.

2. Infrastructure and Facilities

The Gewog has 5 Chiwogs and the farm road extends to all the Chiwogs with the road totaling to 42 km. The Gewog has a hospital and an outreach clinic. There are two Primary schools; one extended classroom, One Middle Secondary School, one higher Secondary School and one private school and three non-formal education centres. All the settlements are well electrified. Currently, the Gewog office has provided equipment such as rice huller, flourmill, potato chips machine, potato collection shed, oil expeller, and apiculture (bee-rearing) boxes to encourage agricultural activities in the Gewog.

Figure 47: Guma Gewog Map



Table 57: Chiwog level profile

Sl.No	Name of Chiwogs	Name of villages	Total HH
1	Changyul-Loongsilgang	Changyul	200
		Drabenigang	
		Bebchu	
		Dara	
		Semtagangchu	
		Bebgikha	
		Silipang	
		Tharibangchu	
		Chendegang	
2	Phulingsoom	Pemgikha	30
		Wangkha	
		Dawana	
		Drabegang	
		Nabgi	
3	Lakhu	Khemena	50
		Phakha	
		Tshankha	
		Gimju	
		Phaduna	
4	Dochhukha	Dochukha	45
		Menchugang	
		Retsa	
		Tongsana	
5	Guma - Wolakha	Gumakha	70
		Wangdipekha	
		Bamesisi	
		Wolakha	
		Gangsa	
		Khuru	
		Omegangchu	

3. Existing Resources

3.1 Agriculture

Food Crops

Paddy, wheat, mustard and maize are popular crops cultivated across the Chiwogs under Guma Gewog. These crops are cultivated for domestic consumption as well for commercial purpose. Of the cereals cultivated, the households are able to comparatively produce surplus paddy.

Table 58: Harvested area and production for major cereal crops

Crops (2013)	Harvested Area (Acre)	Production (MT)
Paddy	909.62	1,731.00
Wheat	36.50	24.10
Mustard	24.79	7.90
Maize	40.00	16.00

Source: Gewog Extension Office

Table 59: Harvested area and production for major vegetables

Vegetables (2011)	Harvested Area (Acre)	Production (MT)
Chili	76.75	345.27
Bean	18.00	27.00
Tomato	10.50	31.50
Broccoli	11.00	11.00
Bulb Onion	6.00	12.50
Bringal	13.00	7.80
Radish	16.00	48.00
Cabbage	23.00	27.60

Source: PPD, MOAF; 2012

The Chiwogs surrounding the Khuruthang town, Punakha Dzong and hospital are well known for producing and supplying fresh organic vegetable to its the customers in the locality. Popular vegetables grown include chilli, saag, radish, potato, brinjal, cabbage, turnip, onion and carrot. Of the vegetables, tomato, radish, cabbage and chilli are recognized as the best yielding vegetables.

3.2 Horticulture

People in the Chiwogs grow many fruits such as orange, banana, mango, peach, pear and walnut but are grown only for household consumption.

3.3 Livestock population and products

Most of the households in the Gewog rear cattle, jersey cross and *nublang-thrabum* as per the Livestock Census record of 2013-2014. People in the community consume most of the dairy products and sell the extra produce in the market. Few people in the Gewog also rear poultry. With assistance from the Gewog Agriculture Extension Office, the community has plans to establish poultry farm in the near future.

Table 60: Cattle population and dairy products

Sl.No	Type	Population (2013)	Products (2013)		
			Milk(Kg)	Butter(Kg)	Cheese(Kg)
1	Jersey cross	159	75,223.50	3,077.30	5,539.19
2	<i>Nublang/Thrabum</i>	496			

3.4 Forestry

Guma Gewog has three community forests known as the: Lakhu Community Forest, Tashi-Phuentsog-Jong Community Forest and Drachung Norbuling Community Forest. Most of the products from these community forests are used within the community.

Table 61: Community forest in the Gewog

CF_Name	Sum Of Basal Area (m2/ha)	Forest Condition	Vegetation/Age	Regeneration	Trees Density/ Ha	Usage	Record Year
Drachung Norbuling	11.00	Average	Mature	Abundant	Oct-50	timber	2012
Lakhu	9.33	Average					2008
Tashi-Phuentsog-Jong	10.10	Average	Pole stage	Scattered /few		pole, cham, flag pole, fire wood	2006

Source: District Forest Office, 2014

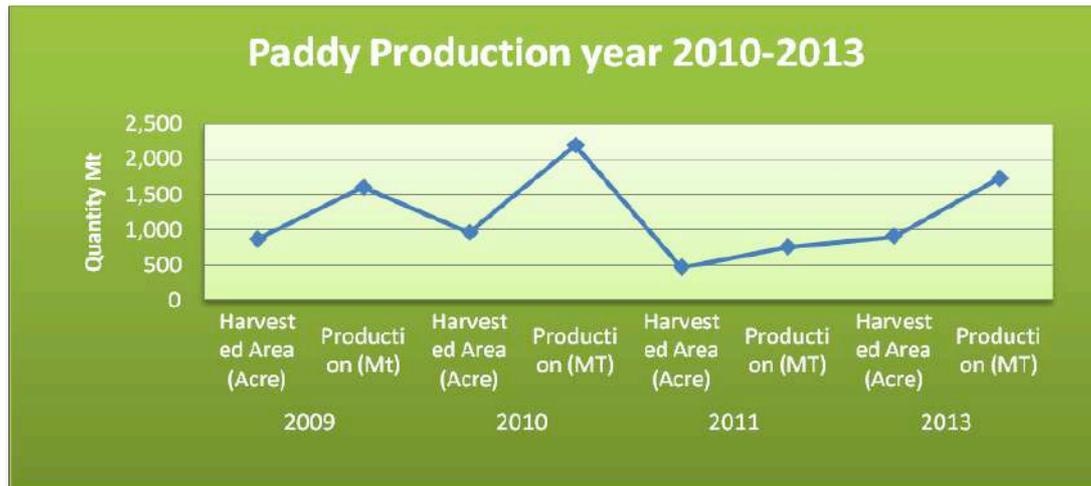
4 Business Ideas generated from Profiling, Focus Group Discussion (FGD) and Key Informant (KI) interview

The FGD and KI comprised of the Gup, Mangmi, Gewog Administration officer, Tshogpas and the village elders of the Gewog. From the discussion, the participants identified products that have potential for business in areas related to agriculture, livestock, forestry (non wood products) horticulture, and arts and crafts. From the discussion, the potential areas identified are as follows:

Under agriculture sector, paddy is found to be more viable for large-scale production based on the availability of land for its cultivation and access to transport. But finding a viable market may be a challenge. The community produced around 755 metric tons of paddy in 2011 (PPD, MOAF; 2012). Most of the paddy produced in the Gewog is sold off in Bajo RNRC with assistance from the Dzongkhag Administration office in

collaboration with the Dzongkhag Agriculture officer. At present, paddy is cultivated over 470 acres of land in the Gewog. The current produce is sufficient for community requirement; however with intervention from the small-scale business ventures, the Gewog has capacity to produce enough paddy to start up a small rice processing unit within the Gewog. This will in the long run help to reduce the dependency on imported rice within and as well as from other neighboring Gewogs. Currently, the Gewog office has assisted the farmers by providing equipment such as rice huller and flour - mill machines.

Figure 48: Paddy production (2009-2013)



Source: PPD, MOAF; 2009-2012

The Gewog has high potential to produce chilli, radish, bean, cabbage and tomato. Currently, chilli, radish, cabbage, bean and tomato are the major vegetables grown in the Gewog on a commercial scale. The Gewog office has assisted by providing equipment's such as rice huller, flourmill, potato chips machine, potato collection shed, oil expeller, and apiculture (bee-rearing) boxes to encourage agricultural activities in the Gewog. Except for the rice huller, all the other machines are unused in the Gewog due to lack of technical knowledge or assistance in the use of the equipments. So an intervention by respective ministry or organizations to assist farmers to use the equipment's is also considered important. The farmers also expressed that a business venture relating to production of potato chips and related products could also go a long way in helping to create employment opportunities to both the old and young people of the community.

Table 62: Business ideas generated from FGD and KI

Chiwog	Agriculture	Livestock	Forestry	Horticulture	Arts and Crafts
Changyul-Loongsilgang	Paddy, chilli, wheat		Community forest		

Zhulingsoom	Paddy	Dairy farm		Orange	
Lakhu	Paddy, wheat, potato, chilli	Dairy farm			
Dochhukha	Paddy, wheat, Mustard, chilli				
Guma - Wolakha	Paddy, wheat			Orange and guava	

Table 63: Attractiveness Matrix

Attractiveness matrix of the business ideas in Guma Gewog				
Potential to produce	High		Paddy, wheat	Radish, chilli and tomato
	Medium		Maize	Cabbage
	Low	Mustard		
		Low	Medium	High
	Potential Market Demand			

Trend Analysis of attractive ideas

From the community profiling, KII, and FGD meetings, it was identified that the cultivation of paddy, maize, potato, chilli, mustard, wheat and tomato have high business potential over other crops. However, it was witnessed that the Gewog grow cereals such as paddy, wheat and maize for household consumption only, while a little portion of the extra produce is sold for income generation. Participants shared that the opportunity cost of production of crops such as paddy, potato, chilli and tomato are now determining factors to drive the production culture.

Figure 49: Crops production, 2013



Opportunity Scanning and Validation

Paddy

Paddy is cultivated in Guma Gewog on a large scale. The cultivation is done on individual households' basis and the produce is sold in Wangdiphodrang. Every season, individual households sell 1 to 2 tons of paddy at the RNR center in Wangdiphodrang.

Chilli

Guma Gewog is renowned for producing *Punakha Ema*. Currently, chilli is planted by almost all the households in the community and the productivity of the crop varies in variations in input, including, watering, weeding, rainfall, richness of the soil, and commitment of the cultivators. An average yield of chilli in a good season is around 400-500 kgs from 80 decimals of land. The cultivation season depends on the altitude of the land and once chillies are cultivated it is harvested for 3-5 times a season.

Market

The market for chilli is in the nearby towns and locality of Khuruthang, Wangdiphodrang and Thimphu. A kilogram of chilli, in its first harvest, fetches around as much as Nu. 250.

Business Opportunities

Potato

In 2011, the area used for cultivation of potato was about 15.9 acres (Bhutan RNR Statistics, 2012). As per the information received from the FGD, the area under potato cultivation in 2014 was roughly about 20 acres). This indicates that people are increasingly turning towards potato cultivation as the main source of income.

Mixed vegetables

In Guma Gewog there are ample of opportunities for farming related to cultivation of bean, cabbage, radish and tomato.

Wheat

Guma Gewog cultivates extensive amounts of wheat in all its Chiwogs. Earnings from production of vegetables complement their livelihood. The Bhutanese market is also heavily dependent on imports of wheat and wheat related products. Bhutanese consumers are deprived of organic, authentic and domestic wheat produce. Heavily dependent on the imports, there is a huge market for wheat products.

Hence, small flour- mills add value and if assisted in their package of wheat flour produce, the community will benefit from such an opportunity. The Gewog office has supplied one flour- mill machine to the community but the people are constrained by lack of a technical person to operate the machine.

Challenges

Although there are economic opportunities present in the Gewog, it is not without constraints and challenges. Some are them are:

- (a) human-wildlife conflict
- (b) shortage of dry land and hence most of the farmers cultivate vegetables on the wet land, and
- (c) shortage of water to cultivate paddy

TOEPISA GEWOG



1. Gewog Profile

Toepisa Gewog was part of Thimphu until it was merged to Punakha Dzongkhag on 15th January 2008. The Gewog has 386 households and 1,363 persons. The total area of the Gewog is approximately 102.8 sq.km (LCMP 2010) with the elevation ranging from 1,709-3,200 metres above the sea level. About 92% of the Gewog is forested with chirpine an broad leaved mixed forest with conifer. Since the Gewog lies in the sub-tropical region, it experiences hot and humid summers and cold winters. During the monsoon, the Gewog receives heavy rainfall. Since the East-West highway passes through the Gewog, people can easily market their produce by setting up several market sheds constructed along the highway.

Some of the far-flung villages in Toepisa Gewog are Begana, Bemsisi, Dra Karpo and Tahogang. Toepisa Gewog is also the second largest Gewog in Punakha.

Figure 50: Toepisa Gewog Map



Source: Election Commission of Bhutan

2. Infrastructural Facilities

There is one RNR centre, one BHU, one ORC, one Middle Secondary School, one Primary School, One Community School, and three NFE centers to effectively deliver services to the community. All the households are electrified and about 96% of the household have access to clean drinking water supply. All Chiwogs are electrified and are accessible with the 28.25 kms farm road.

Table 64: Chiwog level profile

Sl. No.	Name of Chiwog	Name of Village	No. of HH	Road Connectivity
1	Gemkha -Mendrelgang	Gemkha	65	Yes
		Mendrelgang		
		Goemsa		
		Chilikha		
		Siluna		
2	Lemjakha-Thinleygang	Thinleygang	80	Yes
		Tokha		
		Lemjakha		

3	Dochula – Menchuna	Menchuna	47	Yes
		Aachey		
		Phentaykha		
4	Renekha-Damkhi	Chandana	40	Yes
		Sitokha		
5	Bechikha-Yueamo	Yueamo	87	Yes
		Bechekha		
		Bemsisi		

3. Existing Resource Inventory

3.1 Agriculture

Majority of the Chiwogs practices wetland cultivation over dry land cultivation. Paddy is the common staple cereal grown in the Gewog with the maximum harvest acreage, followed by spring wheat, maize, and Barley (see table 67 and 68 below). Other crops like mustard, asparagus and potatoes are also grown in the Gewog. The production of cash crops for commercial reason is limited due to the small size of land holdings of the people in the Gewog. Majority of the famers practice subsistence farming and cultivate cereals like paddy, wheat, barley, maize, mustard, along with the cash crops like beans, cabbage, tomato, radish, apple, persimmon , walnut, pear, peach, plum, guava, and cucumber. The Gewog has some 10 numbers of market sheds spread along the west east highway to sell the farm produce.

Table 65: Harvested area and production for major crops, 2013 & 2014

Cereals crop	Area	Production (MT)	Area	Production (MT)
Paddy	613.00	1,139.90	580.00	1,069.00
Maize	81.00	97.31	81.00	108.26
Wheat	52.70	51.35	52.70	51.35
Barley	4.61	2.45	4.61	2.45
Mustard	13.90	4.86	13.90	4.86
Potato	41.85	120.71	41.85	120.71

Source: Gewog Extension Office

Table 66: Area and production for major vegetables, 2013

Types	Area (acres)	Production (MT)
Beans	52.00	138.50
Cucumber	32.00	200.10
Radish	32.00	124.00
Tomato	6.75	16.96
Pea	22.00	25.40
Cabbage	7.00	23.00
Chilli	44.50	122.00

Garlic	27.50	78.50
	20.00	47.70

Source: Gewog Extension Office

b. Livestock

The common livestock reared in Toepisa Gewog is cattle. However, most of the cattle reared are of local-breed followed by high yielding improved-breeds. People hardly raise pigs on religious ground. As of 2013 to 2014, the people in the Gewog are able to commercialize half of their produce from livestock.

Table 67: Cattle breed and dairy products

Source:
Dzongkhag Livestock Office, Punakha
Dzongkhag

Products	2013	2014
Milk (Kg)	171,796	148,989
Butter (Kg)	8,331	7,074
Cheese (Kg)	14,835	12,734
Eggs (Dz)	8,785	16,908
Beef	340	1,590
Pork (Kg)	480	460
Chicken (Kg)	310	360

c. Forest

The total area covered by *sokshing* is around 9,027 acres. Rich in its diversity, communities have already established community forests to protect their resources. As of 2013 and 2014, there are

Breed	Population	
	2013	2014
Jersey cross	351	346
Jatsha /Jatsham	0	80
Yangku /Yangkum	54	91
Doeb /Doebum	75	146
Nublang/Thrabum	598	601

three community forest groups in the Gewog covering 188.43m² hectares of forest cover (see Table 70).

Table 68: Community forest in the Gewog

CF_Name	Dechenling	Menchu	Samden
BlockNo	Block1	Block 1&2	Block1
Sum of BasalArea (m2/ha)	80.22	50.21	58
Forest Condition	Average	Average	Good
Vegetation-Age	Mature	Pole stage	Mature
Regeneration	Abundant	Abundant	Abundant
Trees_Density	10-50 trees/ha	10-50 trees/ha	10-50 trees/ha

Record Year	2011	2010	2010
<i>Cham</i>	8		4
<i>Drashing</i>		2	13
Firewood	36	4	
<i>Tsim</i>	15		15

Source: Dzongkhag Forest office, Punakha Dzongkhag

Table 69: Land size in acres

Wet land	811.38
Dry land	154.31
Kitchen Garden	46.57
<i>Tshey zhi</i>	27.26
<i>Pang zhi</i>	74.54

Source: Toep Gewog, Punakha Dzongkhag

d. Horticulture

Most of the horticulture cultivated in the Gewog is for self- consumption, and any extra produce is sold on the Thimphu-Wangdiphodrang highway.

Table 70: Production of major fruits

2013-2014				
Fruit Plants	Bearing tree	Prd (MT)	Bearing tree	Prd (MT)
Mandrin	487	14.97	487	14.97
Persimmon	120	4.59	120	4.59
Passion Fruit	77	1.87	77	1.87
Walnut	100	3.93	100	3.93
Peach	66	1.32	66	1.32
pear	129	3.379	129	3.379
Apricot	90	0.12	90	0.12
Plum	60	1.58	60	1.58
Gauva	10	0.22	10	0.22

Source: PPD, MOAF; 2009-2012

4. Business Ideas generated from Profiling, Focus Group Discussion and Key Informant interview

Table 71: Business ideas generated from FGD and KI

Sl. No.	Chiwogs	Agriculture & Horticulture	Livestock	Forestry	Arts and Crafts		
1	Gemkha - Mendrelgang	Paddy, Maize, Beans, Peach	F a r m	Fern, Mushroom	<i>Tsa zo</i> (weave Basket)		
		Radish, Peas		Bamboo shoot			
2	Lemjakha- Thinleygang	Paddy, Wheat, Mustard		Fern, Mushroom			
		Cabbage, Beans		Community Forest			
		Cucumber, Radish		Fern, Mushroom			
3	Dochula - Menchuna	Paddy, Maize*	D a i r y	Fern			
		Mixed Farming		Fern			
4	Renekha- Damkhi	Paddy, Wheat		D a i r y		Fern	
		Beans, Tree Tomato, Orange					
5	Bechikha- Yueamo	Paddy, Maize				D a i r y	
		Beans					

Table 72: Attractiveness Matrix

Attractiveness matrix of the business ideas in Toepisa Gewog				
Potential to produce	High	Wheat	Paddy, Maize	Potatoes, Chilli, Radish
	Medium			Cabbage, Tomato
	Low	Barley		
		Low	Medium	High
	Potential Market Demand			

5. Trend Analysis (critical production volume for commercial purpose)

5.1 Agriculture

Looking at the total area used for harvesting crops and the production trend of popular crops, it indicates that there is increase in cultivation of maize, chilli, radish and tomato, while there is fall in terms of acreage for cultivation of paddy and wheat. All the crops grown in the region are used for both domestic consumption and for commercial purpose. All the extra produce is sold along the 10 market sheds built along the highway by the government to assist the farmers.

Table 73: Harvested area, production and yield for crops

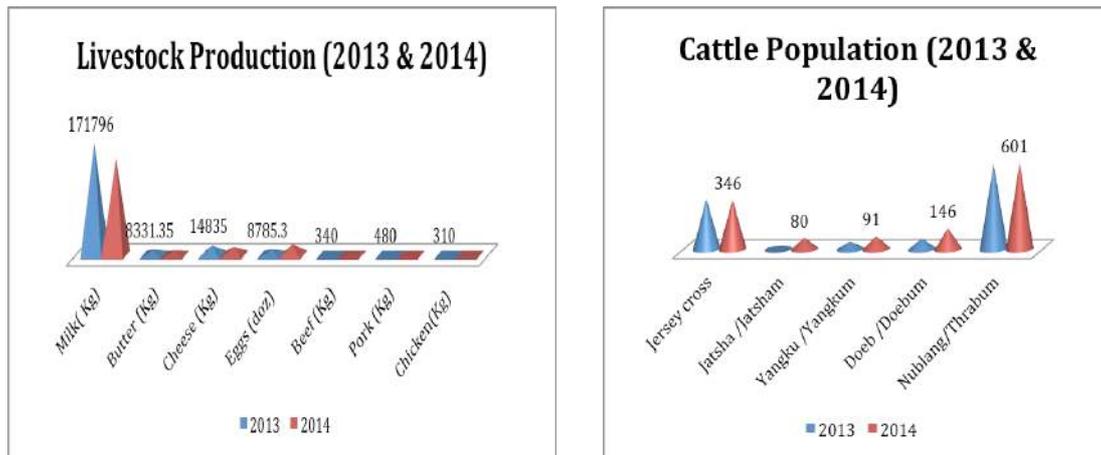
Crop	2009			2010			2011		
	Harvested Area (Acre)	Production (kg)	Yield (kg/ acre)	Harvested Area (Acre)	Production (MT)	Yield (kg/ acre)	Harvested Area (Acre)	Production (MT)	Yield (mt/ acre)
Paddy	757	1,275,089	1,685	600	963,220	1,605.36	356.70	640.00	1.79
Maize	63	68,303	1,091	20	48,830	2,441.50	65.90	91.00	1.38
Wheat	87	71,894	830	10	20,220	2,022.00	42.20	47.00	1.11
Chilli	37	57,855	1,543	39	32,390	830.51	89.36	53.22	0.59
Cabbage	1	735	1,000	9	26,560	2,951.11	4.75	14.11	2.97
Carrot	2	1,050	667	1	1,524	1,524.00	12.95	5.09	0.39
Radish	18	36,330	2,000	18	63,100	3,505.55	72.95	52.01	0.71
Turnip	9	17,378	1,947	10	219,840	21,984.00	35.40	20.37	0.57
Tomato	5	6,930	1,269	3	8,360	2,786.66	6.91	9.66	1.39
Potato	10	20,633	2,113				19.86	60.82	3.06

Source: PPD, MOAF; 2009-2012

5.2 Livestock

Half of the produce produced from the livestock is sold. The fresh milk produced is processed into butter and cheese, while a fraction of the fresh milk is sold. In Toepisa Gewog, there is no shortage of market due to the location of the east-west highway, which passes through the Gewog.

Figure 51: Livestock population and production



Source: Dzongkhag Livestock Office, Punakha Dzongkhag

6. Business Opportunity Scanning and Validation

6.1 Paddy

Paddy is cultivated on a large scale in Toepisa Gewog. However, most of the produce is used for self-consumption, as the commercial market demand for paddy is too low due to higher price of the paddy when compared to the price of imported rice.

6.2 Cucumber and beans

Toepisa Gewog is also very fertile for cultivation of cabbage and beans, with their quality comparable to the imported variety from India. Currently, all the farmers in the Gewog cultivate cabbage and beans.

6.3 Market

The market for beans and cabbage is the nearby Thimphu-Wangdiphodrang highway, the local towns of Thinleygang, Lobesa and the Centenary Farmers' market in Thimphu. A kilogram of beans and cabbages will fetch anywhere from Nu. 30 - 40 during their first harvests. In few Chiwogs of Toepisa, there is a group called the *Tshensay Tshogpa*, established to collect vegetables and sell them in Thimphu.

6.4 Opportunity

Cabbage and beans have the potential to compete with the imported variety from India and the community has land available land to scale up the production by taking care of the crops from the pests.

6.5 Maize

In 2011, the area used to cultivate maize was about 65.9 acres (PPD, MOAF, 2012). As per the information received from the *Tshogpas* during the FGD, while the Gewog

is credited with maximum produce, the crop is produced for self-consumption only. Hence no value addition has been done so far. Maize associated opportunities such as the pellet production opportunity are detected but this will require massive investment in its establishment even if the availability of raw material does not pose as an issue. During the FGD some of the *Tshogpas* argued that pellet production of maize is a very low investment business and therefore is not a viable opportunity for the Gewog. Cottage opportunities that now help farmers generate income are through the roast of fresh maize roast that are sold along the highway. The Gewog is also hoping to get a roasting machine for fresh maize.

6.6 Bamboo plants

Toepisa is also known for its ample bamboos and at the moment the farmers of the area are also exploring its various uses. At present, bamboos are used to roof the cowsheds and fence the farmlands. One of the *Tshogpas* also expressed plans to set up a pickle production business using bamboo shoots.

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