COMPARISON OF NEPALI AND INDIAN VALUE CHAINS FOR KEY CEREALS IN THE NEPAL MARKET

ACRONYMS

APEDA	Agricultural Processes Exports Development Authority
DADO	District Agriculture Development Office
DCA	Development Credit Authority
GDP	Gross Domestic Product
GoN	Government of Nepal
Ha	Hectare
HDPE	High Density Polyethylene
INR	Indian Rupee
Kg	Kilogram
KISAN	Knowledge based Integrated Sustainable Agriculture and Nutrition Project
Lt	Liter
Mn	Million
MoAD	Ministry of Agricultural Development
MT	Metric ton
NR	Nepali Rupee
QTY	Quantity
SAARC	South Asian Association for Regional Cooperation
SEAN	Seed Entrepreneurs Association of Nepal
SISI	Small Industries Service Institute
SN	Serial Number
SRR	Seed Replacement Rate
TOR	Terms of Reference
UNIDO	United Nations Industrial Development Organization
UP	Uttar Pradesh
USD	United States Dollar

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1. MOTIVATION AND PURPOSE OF THE STUDY

With urbanization, a high volume of foreign worker remittances, and increased incomes in Nepal, demand has increased significantly for both higher quality rice (food) and animal protein (feed for animals). There are anecdotal reports that the consumption of fine varieties of rice is increasing, and the demand for these varieties is being met through imports, since the domestic production is primarily focused on coarse varieties. Considering the increasing imports of finer varieties, there is an opportunity for rice mills in Nepal to re-tool, so that they can process and polish high value fine variety products (improved aggregation strategies as well as increased and regular power supply are crucial enabling factors). Some rice millers and feed processors in Nepal are interested in investing in farmers and improving their production systems so as to enhance the quality, and increase availability of locally produced higher value rice and maize. Nepali rice millers and feed processors believe that their investments in farmers will pay off for all parties and will motivate farmers to supply the required quality and quantity of produce to them.

While millers and processors have made their investment decisions based on local market knowledge and instinct after working for decades in their industries, agri-business developments in India (and sufficient capital for implementation) are contributing to an increased commodity imports from, and reliance on, the southern neighbor. The KISAN Project commissioned this study to get a better understanding of the dynamics that affect self-sufficiency in the rice and maize domestic industries as well as value chain opportunities in the rice, maize and wheat industries. No analysis of domestic self-sufficiency can be undertaken without also considering the enormous role India plays in exporting key commodities to Nepal affecting the supply chain of agricultural products, services and inputs. Thus the main objectives of this study include:

1. Analysis of the unit level[1] economics of production, processing and trading at both the farmer and processor level in Nepal and India;
2. Assessment of price differentials and margins in both Nepal and India for farmers and processors; and
3. Determination of the competitiveness of Nepali rice and maize industries to meet current and future market requirements.

In essence, the study aimed to identify the key value chain links, with a view to improve the competitiveness of Nepal's domestic rice and maize industries (*refer to the detailed TOR in Annex 1*).

[1] For farmers - unit level refers to hectare while at the industry level unit pertains to metric ton (MT).

2. BACKDROP

Agriculture is an essential component of Nepal's economy providing employment opportunities to 66% of the total population and contributing nearly 35% to the GDP.[2] Nepal's landscape and agricultural production is defined by three contrasting climatic zones, running in parallel from east to west. The sub-tropical lowlands of the Terai, bordering India, have the best agricultural potential. Rice is the main crop but additional commodities like pulses, wheat, barley and oilseeds are also grown here. In the densely populated temperate hill regions, rice and maize are grown in the summer season, while wheat, barley and vegetables are grown in winter. Mustard, grown for its oil and used in cooking is another important crop. Higher still, in the mountains of the sparsely populated north, crops are limited to potatoes, barley and buckwheat.

Agriculture in Nepal has long been based on subsistence farming, where farmers derive their living from cultivating fragmented plots of land in difficult conditions. Government programs to introduce irrigation facilities and fertilizers have proven inadequate. Population increases and environmental degradation have ensured that the minimal gains in agricultural production, resulting more from the extension of arable land than to improvements in farming practices, have been cancelled out. About 40% of the total population in Nepal is reported to be moderately to severely food insecure, 28% of children under the age of 5 are underweight, and 43% of these children are severely malnourished[3]. Clearly, there is a need for increased domestic production of key crops to address food insecurity, reduce the agriculture import bill (reportedly likely to reach NRs. 150 billion, or about $1.4 billion, in the 2015-16 fiscal year[4]), and promote agriculture self-sufficiency which is directly tied to the country's economic health.

Despite the altered needs, the area under production of rice, maize and wheat in Nepal from 2007-2012 has remained stagnant (*see Figures 1-3 below on page 6*).[5]

As a result of flat production and rising demand, the import of rice, maize and wheat from India has increased considerably in the past five years, with a notable escalation starting in 2012 (*see Figures 4-6 on page 7*).[6] Media reports also highlight the trend. For example, this past April Kantipur, citing data from Nepal Rastra Bank, reported on rice imports from India jumping to NRs. 13.43 billion (c. $127.9 million) in the first two thirds of the 2015-2016 fiscal year[7]. The article goes on to say that, 'In the same period last year, rice and paddy import bills stood at NRs. 9.91 billion. Agro experts said the figures represents a significant imbalance in what Nepal grows and eats".

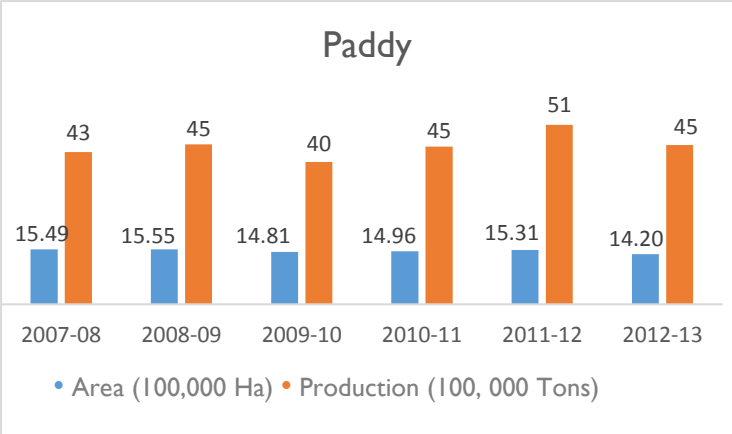
[2] http://www.doanepal.gov.np/index.php
[3] Nepal Demographic and Health Survey, 2011
[4] http://kathmandupost.ekantipur.com/news/2016-07-22/feeding-ourselves.html
[5] http://www.moad.gov.np/uploads/files/YearBook%202013.pdf
[6] Agricultural Processes Exports Development Authority (APEDA), India: http://agriexchange.apeda.gov.in/indexp/Country_description.aspx?ctry=10273
[7] http://kathmandupost.ekantipur.com/news/2016-04-24/rice-imports-from-india-jump-to-rs1343-billion.html

Imports of high value, fine varieties of rice have soared because the vast majority of rice produced and processed in Nepal is of low value coarse rice and consumer tastes are changing. *Jeera Masino* is a good example of the type of fine rice increasingly being consumed in Nepal. Although this name doesn't refer to a specific variety of rice, the brand reportedly accounts for 85% of rice imports from India.[8]

Similarly, Nepal also regularly imports maize for animal feed from India; demand is rising along with increased meat consumption which is, in part, related to the developing domestic poultry industry. Nepal imports of rice, maize and wheat from India in 2014/15 accounted for 629,310 metric tons (MT), 243,947 MT and 111,256 MT respectively[9]. These figures represent enormous increases as evidenced by baseline levels just five years back of 28,000 MT, 100,000 MT, and 0 MT respectively[10].

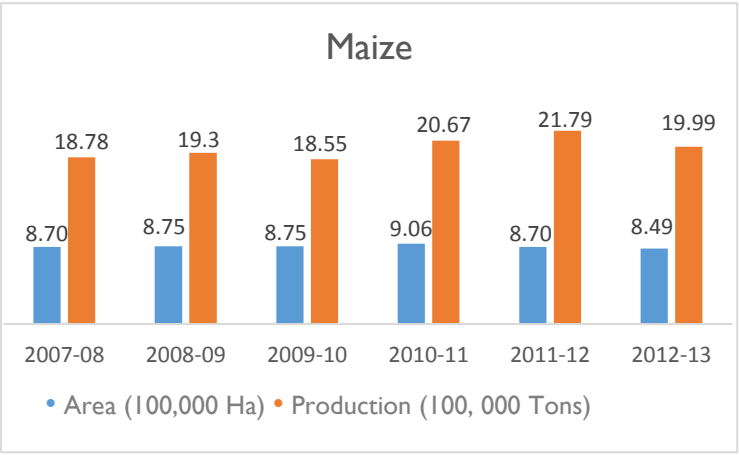
[8] Field Interview with President of the Rice Traders Association (Nepal)
[9] APEDA: http://agriexchange.apeda.gov.in/indexp/Country_description.aspx?ctry=10273
[10] Ibid

Figure 1: Paddy Production Area and Volume [11]



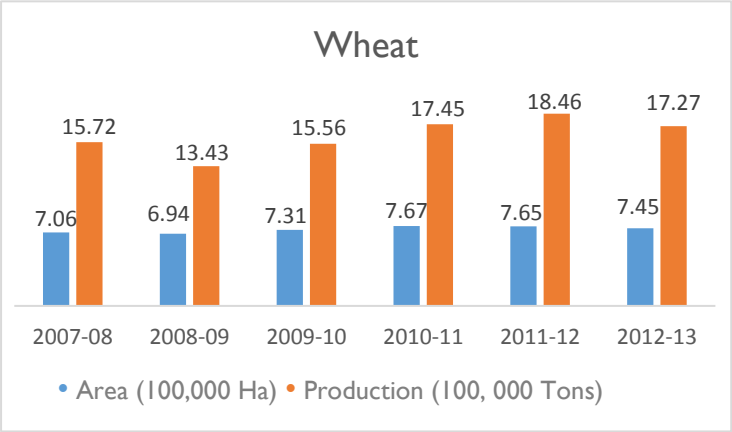
The cultivation area of paddy in Nepal is stable around ~ 1.5 million ha per annum. The production averages around 4.5 to 5 million MT per annum with an average productivity of 2.94 MT per ha.

Figure 2: Maize Production Area and Volume



The cultivation area of maize in Nepal is stable around ~ 870,000 ha per annum. The production averages around 1.9 to 2 million MT per annum with an average productivity of 2.25 MT per ha.

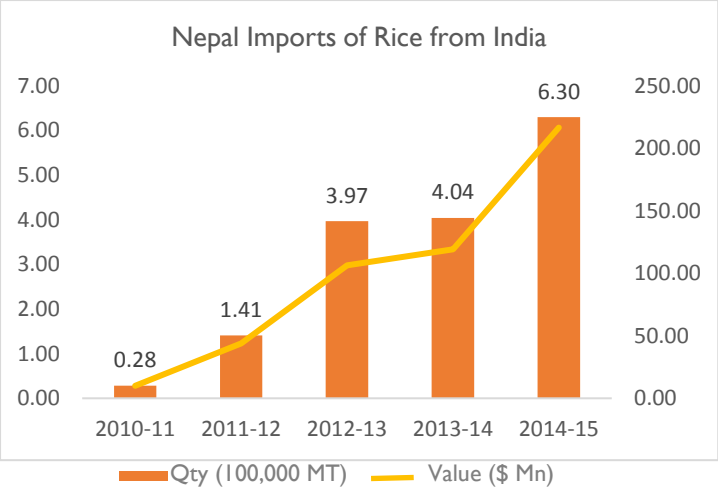
Figure 3: Wheat Production Area and Volume



The cultivation area of wheat in Nepal is stable around ~ 750,000 ha per annum. The production has considerable variation ranging from 1,350,000 to 1,850,000 MT per annum with an average productivity of 2.2 MT per ha.

[11] Source for Figures 1-3: http://www.moad.gov.np/uploads/files/YearBook%202013.pdf

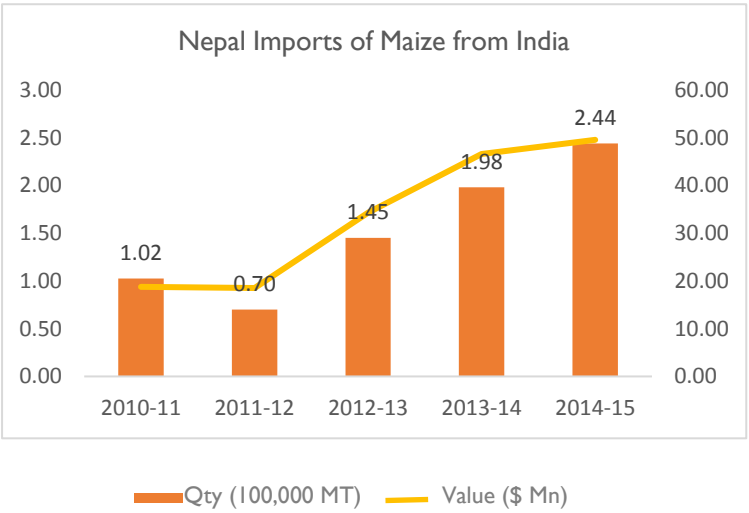
Figure 4: Rice Imports[12]



Nepal imports of rice (non-basmati) from India have increased 22 times in volume from 2010 to 2015.

Nepal was the seventh largest importer of Rice from India and accounted for 4% of Indian rice exports.

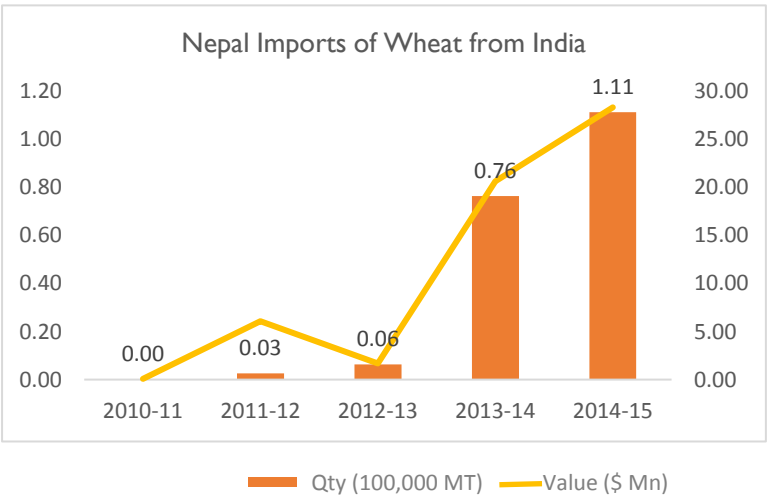
Figure 5: Maize Imports



Nepal imports of maize from India have increased 2.5 times in volume from 2010 to 2015.

Nepal was the fifth largest importer of maize from India and accounted for 18% of Indian maize exports.

Figure 6: Wheat Imports



Wheat imports from India have increased from an almost negligible level to 110,000 MT over the last five years.

Nepal was the sixth largest importer of wheat from India and accounted for 4.5% of Indian wheat exports.

[12] Source for Figures 4-6: http://agriexchange.apeda.gov.in/indexp/Country_description.aspx?ctry=10273

Rice, maize and wheat have evidenced relatively stable production levels in recent years in Nepal when monsoon rainfall was good. However, when the monsoon season was not as beneficial, notably in 2014/15, the domestic production declined for rice and maize (though interestingly it increased slightly for wheat)[13]. From the production and import data detailed in Figures 4-6 above, it appears that there is an increased demand for food and animal feed in Nepal, thus the increasing imports. Rice imports surged over six fold between 2010 and 2014 which has had an impact on local millers. Several reports indicate that, in recent years, over 80% of rice mills in the eastern part of Nepal have shut down due to their inability to compete with the influx of rice from India[14]; this has especially affected the larger mills but also forced smaller ones into diversifying their business to include trading, as opposed to solely producing.

In the case of maize, the imports have also increased nearly 60% from 145,000 MT in 2012-13 to 243,947 MT in 2014/15. Despite the fact that poultry feed millers reported improved production of maize in recent years in Nepal due to good monsoons, they ended up importing from India for two main reasons - better quality and ease of procurement; specific qualities can be ordered from India and made available quickly and in bulk whereas in Nepal accessing quality maize in large orders is challenging. Similarly, in the case of wheat, imports increased significantly from 2013/14 onwards because of poor monsoons in Nepal after this period.[15] Even though there are significant, and increasing, wheat imports from India, production of this commodity in Nepal is notably more self-reliant compared to rice and maize. For example, in 2014 wheat imports from India accounted for about 5.6% of the production in Nepal whereas rice in the same time period accounted for 13% and maize represented 11.4% respectively[16]; in 2015, as production declined for all three commodities in Nepal, the proportion of imports to domestic production changed slightly with rice comprising 11%, maize 15% and wheat 6%.

While the reasons for increase in imports need to be further investigated, it is evident that Indian farmers have an advantage over Nepali farmers because of the following factors:

1. Access to subsidies for seeds, irrigation, electricity, and storage;
2. Better access to higher quality inputs;
3. Commercial production in India is more often mechanized in comparison to Nepal (and mechanized equipment is more sophisticated);
4. Economies of scale in India (versus Nepali fragmentation).

Cumulatively these factors reduce the cost of production in India. Although the rules, regulations and practices of transporting rice and maize over the border between India and

[13] http://www.moad.gov.np/uploads/files/yearbook2015.pdf
[14] Sources include trade interviews as well as http://kathmandupost.ekantipur.com/news/2014-04-03/mills-shut-as-imported-rice-floods-market.html and http://flar.org/en/nepal-rice-imports-hurt-domestic-mills/
[15] Imports to Nepal represent a small percentage of Indian production so even though both countries were affected by the same weak monsoon, India's surplus production easily allowed for exports to Nepal.
[16] Calculations derived from comparing data from the following sources: 1) http://www.indexmundi.com/agriculture/?country=np&commodity=wheat&graph=production; 2) http://agriexchange.apeda.gov.in/indexp/Country_description.aspx?ctry=10273; 3) http://www.moad.gov.np/uploads/files/YearBook%202013.pdf; 4) http://www.fao.org/fileadmin/templates/est/COMM_MARKETS_MONITORING/Rice/Images/RMM/RMM_DEC15_H.pdf; and 5) http://www.moad.gov.np/uploads/files/yearbook2015.pdf

Nepal are quite clearly documented and import duties are in place, imports are quite unregulated and there are also instances of trade through informal channels, which creates an unfair advantage for Indian producers (e.g. lack of customs duty makes Indian produced commodities even more competitive).

3. RESEARCH METHODOLOGY & DATA SOURCES

Two key study phases created actionable insights. The first phase involved secondary data analysis, which provided a good understanding of the broad patterns in production and marketing of rice and maize. Secondary data was collected from the State Agriculture Universities in Uttrakhand, Department of Agriculture in Uttar Pradesh and from the Agricultural Processes Exports Development Authority (APEDA) in India. In the case of Nepal, secondary data was sourced from the Ministry of Agricultural Development and Department of Agriculture data, and some of the information that was collated by the KISAN team was shared to analyze and ascertain the following:

1. Area and Production of rice, maize and wheat
2. Cost of production and profitability for farmers in Nepal and India for the crops under discussion
3. Imports of the identified commodities over the last five years coming into Nepal from India.

In the second phase, primary data was collected, from more than 40 sources including multiple farmer groups, through in-depth interviews with various stakeholders including farmers, traders, village level aggregators, processors, rice millers, exporters and transporters (*see Annex 11*). Field visits targeted KISAN districts (Banke, Kapilvastu) as well as key production and trade centers (Bhairawa, Chitwan, Kathmandu) and major markets in India which are adjacent to Nepal. A snowball sampling methodology was utilized for the study.

The interviews focused on issues that are of relevance to the various stakeholders, with the aim of reflecting upon their current practices. Rice millers and feed processors on both sides of the Nepal-India border were interviewed and conclusions for the potential for successful commercialization of fine rice and maize in Nepal were drawn. In cases where the product is cheaper coming from India, motivations behind investing in the Nepali farmer were studied and processors views on opportunities and potential trends in imports over the next five years were sought.

One of the study's limitations was in its approach to evaluate commodity competitiveness based on the cost of production between the two countries. While some costs were captured, the numbers are quite variable from the different published sources. The figures used in this report are based on qualitative interviews with seed company representatives, farmers and the processors who are buying from the farmers. For cost of cultivation details from various sources, please refer to Annexes 2 through 8.

4. FINDINGS AND DISCUSSION

A. Comparison – Nepali vs. Indian Rice:

Just over 5 million MT of rice was produced in Nepal in 2013/14[17] though stocks declined the following year to 4.78 million MT[18] and reportedly decreased even further - to 4.3 million MT - in 2015/16[19]. It's important to note that the most recent production year was also affected by the Indian embargo which caused massive fuel shortages impacting harvest, transportation and processing. According to GoN authorities, declines were due to unfavorable weather conditions (other than the political factor in 2015/16), while local farmers blamed high production costs for this decline (e.g. inflation driving input costs high - a reasonable assumption as Nepal has the highest inflation in South Asia[20]). According to Ministry of Agricultural Development (MoAD) statistics, the highest paddy production in 2014/15 was generated by the Central region (accounting for 1.31 million MT), followed by the Eastern and Western Regions respectively (1.23 million MT and 1.10 million MT[21]); the Midwest and Far West together accounted for another 1.12 million MT.[22]

As a part of the study, the value chain details and costs of Nepali and Indian rice were collected from secondary sources along with field visits, and were then validated with experts (*refer to Table 1 below on page 11*).

[17] http://www.moad.gov.np/uploads/files/yearbook2015.pdf
[18] Ibid
[19] http://www.fao.org/fileadmin/templates/est/COMM_MARKETS_MONITORING/Rice/Images/RMM/RMM_DEC15_H.pdf
[20] http://www.myrepublica.com/news/2273
[21] http://www.moad.gov.np/uploads/files/yearbook2015.pdf
[22] Ibid

Table 1: Cost Comparison of Nepali and Indian Fine Paddy

	Particulars	Unit	Indian Paddy			Nepali Paddy		
SN			INR	NR	USD	INR	NR	USD
1.	Farmer Cost of Production	Ha	34,216.00	54,745.60	547.46	43,750.00	70,000.00	700.00
2.	Farm Yield	Mt/Ha	5.00	5.00	5.00	4.00	4.00	4.00
3.	Avg. Selling Price	Mt	13,000.00	20,800.00	208.00	13,750.00	22,000.00	220.00
4.	Gross Income from Paddy	Ha	65,000.00	104,000.00	1,040.00	55,000.00	88,000.00	880.00
5.	Income from by Products – straw	Ha	2,000.00	3,200.00	32.00	2,500.00	4,000.00	40.00
6.	Cost of Marketing	Mt	1,000.00	1,600.00	16.00	1,250.00	2,000.00	20.00
7.	Net Profit to Farmer	Ha	31,784.00	50,854.40	508.54	12,500.00	20,000.00	200.00
8.	Margin in the Trader Zone	Mt	1,000.00	1,600.00	16.00	625.00	1,000.00	10.00
9.	Net Buying Price for Paddy for Rice Miller	Mt	14,000.00	22,400.00	224.00	14,375.00	23,000.00	230.00
10.	Cost of Conversion@1.5 times	Mt	21,000.00	33,600.00	336.00	2,1562.50	34,500.00	345.00
11.	Miller Wholesale Factory Price including his Margins	Mt	26,500.00	42,400.00	424.00	24,375.00	39,000.00	390.00
12.	Transport Cost to Border for Indian Miller and for Nepali Miller to Kathmandu	Mt	500.00	800.00	8.00	0.00	0.00	0.00
13.	Custom Duty (7% on NR 5,440)	Mt	2,380.00	3,808.00	38.08	0.00	0.00	0.00
14.	Miscellaneous Expenses	Mt	300.00	480.00	4.80	0.00	0.00	0.00
15.	Packing, Unloading & Transportation /Broker Cost to Kathmandu for India and to Local Market for Nepal Miller	Mt	5,000.00	8,000.00	80.00	2,500.00	4,000.00	40.00
16.	Landing Price at Kathmandu Market	Mt	34,680.00	55,488.00	554.88	26,875.00	43,000.00	430.00
17.	Wholesaler Margin	Mt	1,734.00	2,774.40	27.74	1,343.75	2,150.00	21.50
18.	Wholesale Price at Kathmandu	Mt	36,414.00	58,262.40	582.62	28,218.75	45,150.00	451.50
19.	Retailers' Margin	Mt	3,641.40	5,826.24	58.26	2,821.88	4,515.00	45.15
20.	Retail Price in Kathmandu	Mt	40,055.40	64,088.64	640.89	31,040.63	49,665.00	496.65

Exchange rates: 1.6 NRs to 1 INR; 100 NRs = $1USD

The following inferences can be drawn from the above data and analysis:

- The profitability of an Indian rice farmer is almost 60% more than that realized by his Nepali counterpart even though the Nepali farmer gets a higher price per MT compared to the Indian rice farmer. The lower profitability of Nepali rice farmers can be attributed to lower productivity.

- Rice production cost for Nepali farmers is about 22% higher than Indian farmers while productivity of Nepali rice is significantly lower - about 20% - as compared to Indian rice. One possible reason for lower productivity may be the total volume of agri-inputs, such as fertilizers and pesticides, that a Nepali farmer can buy for the same amount of money is less than that of the Indian farmer (due to government subsidies in India). According to

experts, this lower productivity is also attributed to the quality of seeds, irrigation and soil types, and actual `on-farm' use of fertilizers by the Nepali farmers[23]. It is not only the high cost of fertilizer that is a deterrent for farmers in Nepal, but they also face shortages/ issues with availability during the growing season.

- The cost of conversion of paddy to rice is higher for a Nepali miller in comparison to an Indian miller. Better technology in Indian rice mills (e.g. size of plants, availability of electricity, superior machinery) as compared to Nepali rice mills as well as economy of scale are key reasons for lower conversion cost in India. According to interviews with millers in India and Nepal, recovery of rice is 10-15% higher in Indian rice mills compared to Nepali rice mills.

Figure 7. Nepali Rice Mills Background

- ✓ *There are two large mills in Nepal on the Bhairawa border with a capacity of 4 MTs/hour and only one of them has a steam paddy processing facility. There are around 10 mills with capacity of 2 MTs/hour and several mills at the village level with 0.5 MT/hour processing capacity in Kapilvastu and Rupandehi districts. Most rice mills import rice from India and sell under their own brand.*
- ✓ *The small time millers are also traders. They sell the highly broken and less polished grain through aggregators to the large mills in Bhairawa because they have better machinery to reprocess, pack and brand them. During the survey, the team met with a large miller whose business model is to buy highly broken rice, and then segregate, polish and sell in the local market.*
- ✓ *Even in the interior away from the border, where there are small rice millers, they mainly do custom processing, i.e. farmers bring paddy to the small village mill and the miller processes it and gives the rice back to the farmers. As a processing cost the millers keep the rice bran and husk for themselves. The small farmers bring back their rice and sell it later when they need the money.*

- The net income for an Indian rice miller is also higher than for the Nepali rice miller because of economies of scale, lower cost of conversion and lower capital and operating costs. From the data, though, this difference is not as evident, as the information in *Table 1* is generated with an assumption that the production capacity of mills in both countries is similar; there are only two mills in Nepal which have 4 MT capacity (see *Figure 7 at left*). This conversion rate will be less favorable for the smaller mills (e.g. 0.5 MT capacity) which are more prevalent in Nepal.

- Indian mills produce steamed rice, while in Nepal all of the operators (except one of the large mills) do not possess this facility. Steam technology makes the current year paddy look and taste the same as rice that has aged for one year. As South Asians prefer aged rice, this approach represents a considerable savings on storage and working capital costs.

- The other factor which emerged during discussions with farmers is that most of them sow only a small percentage of fine rice, which they get milled from a local small miller and keep mostly for their own consumption, or sell when they need money. Consequently, even

[23] Field interviews.

though there is a big mill with steam technology in Bhairawa, it is difficult to get fine rice paddy from within Nepal during the season. In the absence of market yards and large scale aggregators there is no organized procurement of fine rice in Nepal which makes it is difficult to cater to bigger capacity mill requirements.

- Because of small land holdings in Nepal, farmers are more risk averse, and hence they are comfortable growing coarse paddy as they are sure of a return. Also, price discovery is not an issue in coarse rice as this remains constant over the years and uniform across the growing areas. However, fine rice prices fluctuate from year to year and from geographical area to area.

- Most of the rice which is processed by small millers doesn't reach the Kathmandu market. The farmers/millers hold onto fine rice as insurance for difficult times; as a result, it gets sold only during emergencies. Moreover, as Kathmandu is geographically distant for the small millers, their (local) rice gets sold in adjacent areas and in the hill markets. Even if it reaches Kathmandu, the selling price is lower than that of the available Indian rice, as the latter is considered superior in terms of both taste and keeping quality.

- Although the price of steamed Indian rice in the Kathmandu market is higher than the local Nepali rice, the former is more accepted and is actually compared with the equivalent quality of one-year-old processed Nepali rice (the latter is not available in sufficient quantities as millers don't have the working capital and storage capacity). The Indian steamed rice is competitive despite the additional transportation cost from India to Nepal and the 7% import duty.

- The competitiveness of Nepali rice, compared to Indian rice, is lost primarily because of the high cost of procuring paddy and is further compounded by the higher cost of conversion as well as capital costs for the Nepali rice millers. Another major factor is the absence of steam technology in Nepali mills (only one rice mill in the Western Terai has this capacity). This technology not only ensures better quality but also saves almost one year's cost of ageing, storage and working capital requirements.

- Nepali buyers are able to procure better quality rice at a lower price from Indian sources. The increased availability of Indian rice is likely to affect further demand. Although the import figures are influenced by policy decisions, such as the Indian government allowing rice exports to resume to SAARC countries in 2011[24] (as a result of increased production there), the data also indicates that the Nepali mill system is not running effectively.

- Lowering the procurement price of paddy is not a solution, since the Nepali rice farmers' profitability is already far lower than that of his Indian counterpart. Any further decrease in procurement prices will start a vicious cycle of even lower production by farmers and increase in imports from India, leading to loss of investments in Nepal's rice ecosystem.

[24] http://kathmandupost.ekantipur.com/news/2014-04-03/mills-shut-as-imported-rice-floods-market.html

- Investment in systematic rice mill upgrades is a pressing need for Nepal. Until about 15 years ago, the situation in India was not so different. Realizing the benefits of upgrading rice mills, however, the Government of India intervened and initiated rice milling machine quality improvements. One such successful example is detailed in *Figure 8* below which highlights the situation in the Karnal area of Haryana District of India, where previously there were many small rice mills with non-standardized machinery. Over the last decade plus the scenario has changed with the upgrades, and the Karnal area is now recognized as one of the hubs of superior, export quality rice milling.

Figure 8. Karnal, Haryana/India Rice Mills Improvement Profile

The Small Industries Service Institute (SISI), Karnal, Haryana, India, has prepared a cluster development program for the modernization of rice mills in terms of technology upgrading, infrastructure development, market development and capacity building of the owners of rice mills in Karnal and Kurukshetra districts.

The United Nations Industrial Development Organization (Unido), in association with the National Institute of Small Industries and Extension Training, facilitated the preparation and further implementation of this cluster development program.

Revealing this to The Tribune here today, Mr. B.N. Kapur, cluster development executive of the SISI said, "I have already drafted the action plan after a diagnostic study of all rice mills located in these two districts that had been approved by Unido for implementation".

He said the basic problem faced by rice millers in Karnal and Kurukshetra was the non-standardized machinery resulting in higher broken percentage of rice, high consumption of power, unnecessary expenditure on extra manpower, non-utilization of machinery and manpower for more than six months in a year and more pollution.

It was also found that there was lack of technological knowhow, professionalism and knowledge of the latest trends in milling technology and management system among the rice millers, he said.

There are 221 rice mills in running condition and around 90 dead or non-performing rice mills in Karnal district. But, only 19 out of them meet the standards and export rice to countries like Japan, Korea and Australia. The other mills in Karnal district are in need of an improvement in parboiling technology; rice curing, storage and drying techniques to gain more profits through export of basmati as well as non-basmati varieties of rice.

The thrust area for modernization of these mills calls for using parboiling technologies that require less water and generate less effluents, using husk as a soil conditioner and substituting rubber rollers with HDPE reinforced rubber rollers for reducing the percentage of broken rice.[25]

The example of Karnal, India, highlights a similar opportunity for Nepal. Over the years, Karnal has now emerged as a major export earner for India and contributes to nearly 20% of the country's basmati rice exports[26].

[25] The Tribune, August 20, 2004
[26] http://articles.economictimes.indiatimes.com/2012-10-11/news/34387380_1_rice-export-vijay-setia-basmati-rice

B. Comparison – Nepali vs. Indian Maize:

Maize is the second most important staple food crop in Nepal, however, more recently it is being grown mainly as a cash crop considering its huge demand in the poultry industry. In 2014/15, 2.14 million MT of maize was produced in Nepal with the Eastern region accounting for the biggest percentage of the production (30.49%), followed by the Central region (26.57%), and the Western region (25.79%)[27].

The value chain details and costs of Nepali and Indian maize were collected from secondary sources and field visits, then validated with experts (*refer to Table 2 below*).

Table 2: Cost Comparison of Nepali and Indian Maize

S. N.	Particulars	Unit	Indian Maize			Nepali Maize		
			INR	NR	USD	INR	NR	USD
1.	**Farmer Cost of Production**	Ha	21,000.00	33,600.00	336.00	30,240.00	48,384.00	483.84
2.	**Farm Yield**	Mt/Ha	3.50	3.50	3.50	2.50	2.50	2.50
3.	**Average Selling Price**	Mt/Ha	12,750.00	20,400.00	204.00	14,250.00	22,800.00	228.00
4.	**Gross Income**	Mt/Ha	44,625.00	71,400.00	714.00	35,625.00	57,000.00	570.00
5.	**Cost of Marketing**	Ha	446.25	714.00	7.14	912.00	570.00	5.70
6.	**Net Profit to Farmer**	Mt/Ha	23,178.75	37,086.00	370.86	4,473.00	7,156.80	71.57
7.	**Buying Price for Exporter/ Trader**	Mt	13,196.25	21,114.00	211.14	14,606.25	23,370.00	233.70
8.	**Margin for Exporter/Trader**	Mt	750.00	1,200.00	12.00	500.00	800.00	8.00
9.	**Transportation Cost to Nepal**	Mt	500.00	800.00	8.00	240.00	150.00	1.50
10.	**Custom Duty (1.6% on NR. 2,640)**	Mt	256.00	409.60	4.10	0.00	0.00	0.00
11.	**Miscellaneous Expenses**	Mt	1,000.00	1,600.00	16.00	0.00	0.00	0.00
12.	**Landing cost for Poultry Feed Miller in Nepal**	Mt	15,702.25	25,123.60	251.24	152,00.00	24,320.00	243.20

Exchange rates: 1.6 NRs = 1 INR; 100 NRs = $1USD

Note: The above data is derived from information in the Annex tables.

The following inferences can be drawn from the data in Table 2:

- The profitability of an Indian maize farmer is five times higher than his Nepali counterpart. Lower profitability of the Nepali maize farmer is due to higher cost of production and lower productivity. The situation for Nepali farmers is better in the commercial maize growing areas around Chitwan and Birgunj as they have adapted better seed and growing practices as compared to the Far Western districts of Nepal. If comparing only these areas in the Central region of Nepal with India, then the profitability of Nepali farmers will be around two times less than that of Indian farmers.

[27] http://www.moad.gov.np/uploads/files/yearbook2015.pdf

- The demand for poultry feed is increasing at the rate of 11% annually[28]. There are about 114 poultry feed mills in Nepal and cumulatively they are producing approximately 500 thousand tons of feed every year.[29]

- Possible reasons for lower productivity may be that the total volume of agri-inputs (such as fertilizers and pesticides) that a Nepali farmer can buy is less than what an Indian farmer for the same amount of money, because of subsidies.[30]. Expert opinion is that the quality of seeds, irrigation and soil types may be other key reasons for lower productivity. However, a more detailed study is needed to understand the precise reasons for lower productivity of Nepali maize compared to Indian maize and global leaders.

Figure 9. Maize Seed Details

The National Annual Seed Replacement Rate (SRR) in Nepal for maize is only 14.93% and the national average productivity is 2.43 MT/ha. Maize seed supply from the public sector is less than 1% and adoption of the improved maize varieties is very low.

- From the processing perspective Indian maize is desirable because of the lower moisture content which directly impacts storability. Most of the maize harvested and stored in Nepal has moisture content exceeding 16%, as compared to the desired 12-14% range. According to industry sources, the higher level of moisture is due to Nepali maize growers' poor post-harvest and handling practices. The higher moisture in the grains further deteriorates the quality while in storage. On the contrary, millers from India are sure of getting the moisture within the proper range.

- Although there is a 5% import duty levied on traders, and a separate 1.6% tax for millers in Nepal, imports from India are still quite attractive for the millers because of the better quality and value which outweighs the additional freight cost. The freight cost is also becoming less important as large feed millers on the border are booking a full rake of rail wagons (2,300 MT) saving money on bulk transport.

- According to trade sources[31], the primary reason for import of maize into Nepal is non-availability of high quality maize with low moisture content (<12%). The quality of supply that comes from the interior of Nepal (e.g. away from the border area) has poor storage value (primarily because of the higher moisture content in Nepali maize). With the lack of aggregation markets in Nepal, buyers have to work with partners in multiple channels and in the process never get consistent quality of grain. Moreover, it is very difficult to procure large quantities. On the contrary, it is easier to purchase large volumes of maize from India of similar quality. The millers use the freshly harvested domestic stock for about two to three months during which time their purchases of Indian maize are stored across the

[28] http://www.slideshare.net/jmrd-journal/journal-of-maize-research-and-development-201511
[29] Ibid
[30] Sources for data included in *Figure 9* include: 1) SSR statistic: http://www.moad.gov.np/downloadfile/combibed_1374486353.pdf; and 2) productivity figure: http://www.moad.gov.np/uploads/files/yearbook2015.pdf
[31] Field interviews

border and accessed when needed *(refer to discussion of storage facility and working capital costs below on page 18*).

- It is evident from the two photographs below provided by one of the importers (*see Figures 10 and 11*) that the quality of maize that he received in January from India is superior compared to the Nepali batch. The Nepali kernels are less uniform, more chipped and discolored compared to the Indian ones.

Figure 10. Nepal Maize (image taken in January 2016)

Figure 11. Indian Maize (image taken in January 2016)

- The proportion of Indian and Nepali maize used by feed millers based in the border areas of Birgunj and Bhairawa is about 70% / 30% respectively. Feed millers based in Chitwan are using the same maize combination in a 50:50 ratio. The buying price of the feed millers is about the same (*as illustrated in Table 2 above on page 15*), but the millers along the border gain on account of the approximately 2% reduced moisture content from the Indian maize, which results in better storage and better quality of the feed.

- The margin for the feed miller is about NR 1/kg. of the overall feed price. During the season, when the buying price for maize was NR 19.2, poultry feed was selling at around NR. 47.04. Later, because of the bandh and off season, the cost of corn rose to NR. 26 and feed increased to NR. 52. Regardless of price spikes the increases are passed on to the poultry millers who, in turn, pass them on to the consumer.

  In composite feed, maize accounts for about 50% of the ingredients. Nepali feed millers feel competitive on account of feed prices as the other key ingredients, such as soya bean, rice by-products and additives which constitute the remaining 50% of the cost, are available at the same price or cheaper than in India. The additives (medicines), in particular, represent a cost advantage domestically as only 1% import duty is levied in Nepal while in India a much higher customs duty (22%) is applied.[32]

[32] India applies a high tariff on these medicines as a restrictive trade barrier so as to encourage Indian production.

- Imports are further supported by the trade facilities that large scale aggregators across the border in India are offering to the feed millers in Nepal. One of the key services that they provide is purchase on behalf of the Nepali millers during the season (according to buyer requirements) and then storage in climate controlled facilities (e.g. modern storage silos with temperature control that regulates moisture, humidity etc.). The Nepali miller has to pay only a 10% deposit at the time of purchase and the remainder is required upon accessing the stock. In addition, storage charges are levied, along with interest on the working capital (12%), a 1% drying loss fee and 1% service charge. Working capital refers to the value of the stock that has been ordered minus the down payment. This transaction serves as a credit facility which is typically utilized within 3-6 months of the order being made. According to the largest feed miller in Nepal, the value of this service outweigh the charges as they are able procure stock at an inexpensive price during the season, advance only a partial payment and access the order after they process the local (Nepali) maize.

C. Comparison – Nepali vs. Indian Wheat:

In 2015, the total wheat production in Nepal was 1.97 Million MT with about one third of the total (32.5%) coming from the Central region, followed by 20% from the Mid-West and nearly 19% from the Western region respectively[33]. Farmer profitability for wheat, as detailed in Table 3 below, is calculated on optimal yield levels for Nepal so that the cost comparisons with Indian farmers are realistic.

Table 3: Costs of Nepali and Indian Wheat

SN	Particulars	Unit	Indian Wheat			Nepali Wheat		
			INR	NR	USD	INR	NR	USD
1	Farmer Cost of Production	Ha	26,866	42,986	429.86	31,058	49,298	492.98
2	Farm Yield	Mt/Ha	4.6	4.6	4.6	3.3	3.3	3.3
3	Average Selling Price	Mt	14,500	23,200	232.00	12,500	20,000	200.0
4	Gross Income	Mt	66,700	106,720	1,067.20	41,250	66,000	660
5	Cost of Marketing	Mt	500	800	8.00	500	800	8
6	Net Profit to Farmer	Mt	39,334	62,934	629.34	9,939	15,902	159.02

Exchange rates: 1.6 NRs = 1 INR; 100 NRs = $1USD

Note: The data above is derived from information available from the tables provided in Annexes 2-8.

- Based on interaction with farmers, and taking into account expert views, it seems that if proper irrigation facilities are available, farmers are more inclined towards growing wheat than maize. In the Western region, rainfall was erratic during the monsoons and farmers who had irrigation facilities preferred to grow wheat (over maize) owing to the ease of selling it in the market. Wheat is also an easier crop to propagate. On the contrary, in the areas north of Chitwan, where the rainfall pattern is better and there are many feed mills, farmers are more inclined towards maize production as it commands a stabler price.

[33] http://www.moad.gov.np/uploads/files/yearbook2015.pdf

- Wheat millers in Nepal primarily procure from within the country. They typically only buy the grain from India if there is a significant price advantage. Based on interviews and discussions with three large wheat processors, as well as two small units, it is estimated that approximately 90% of Nepal's requirement is met from within the country itself. This figure roughly tallies with data corresponding to proportion of Nepal wheat production that is comprised of Indian imports.

- The price fluctuation in wheat is higher than maize. For example, in April if the cost is around NR. 20/kg., within a three to four-month period the price can change significantly, increasing to NR 25.6. Many private investors channel their funds into buying and storing wheat during the arrivals after harvest, as farmers are in hurry to sell at this time and there is no place for them to store. The challenge is that these short term investors (other than the flour mill owners) do not store the wheat properly and even though it doesn't deteriorate as quickly as maize, the quality still declines over time.

CONCLUSIONS:

1. The competitiveness of the rice, maize and wheat sectors in Nepal is low compared to India because of various factors across the value chain, starting right from the price of agriculture inputs, to processing capacity, to storage infrastructure for distribution. However, Nepal is clearly less dependent on imports for wheat than the other two grains. With the open border policy, minimal customs duty levied on these commodities and overall higher productivity and more efficient distribution system in India, exports to Nepal are only increasing, thus reducing self-dependence. This does not mean that farmers in Nepal should stop growing cereals until development interventions can address the underlying issues. It is clear, though, that a multi-stakeholder approach is required (e.g. government along with development agencies, researchers and the private sector) to address the inadequacies, focusing on the following key issues and levels of engagement:
    a. *Policy level* – to address subsidy, logistics, marketing and storage issues. An enabling environment is required to increase both agricultural and industrial (e.g. processing) productivity and quality including the provision of appropriate energy supply for millers.[34]
    b. *Technology* – to bridge the productivity gaps will also require upgraded technology in mills, as well as in improved farmer growing practices.
    c. *Aggregation* – even with improved production and processing, distribution systems need to be able to efficiently channel orders by volume and quality. Lacking an effective distribution system, traders will still depend on Indian suppliers to fulfill orders.
2. Considering that cereal crops are important for Nepal's food security, and as the KISAN project focuses more on technology dissemination, the following approach is suggested for the identified commodities:

[34] The open border inherently has an outsized impact on imports from India in terms of access to Nepali markets, especially considering informal trade. However, this is a complex and longstanding policy which benefits both countries in different ways and is not likely to change soon.

Commodity	Major Challenge	Way Forward
Rice	1. *Commercial cultivation of fine varieties* 2. *Aggregation limitations* 3. *Rice Milling infrastructure*	- Use of better quality seed, appropriate inputs including mechanized equipment and irrigation systems, and improved agronomic practices for higher yields. - It is important to encourage farmers to grow fine varieties on a commercial level. - The procurement infrastructure must be improved in order to move produce according to type and volume of order. Market yards are not very functional in Nepal but there are models, such as with vegetable aggregation, that can be assessed for suitability. - The current rice milling technology and local practices cannot ensure good quality fine rice processing. Thus, there is a need to invest in upgrading the village level 0.5 MT capacity mills, which presently cater to more than 70% of Nepal's processing needs[35]. - Larger mills (e.g. 2-4 MT capacity) can process more efficiently than the more pervasive small mills, however investment costs are large.[36] Given the current energy situation in Nepal and the fact that small mill owners will inevitably face capital limitations in expansion (and upgrades will inevitably occur in an incremental fashion) the re-tooling and investment in larger mills will serve as a technological model for small millers who will cater to more niche/local markets[37]
Maize	1. *Low Productivity* 2. *Poor post-harvest handling* 3. *Aggregation limitations*	- Support for high yielding varieties/hybrids. - Training farmers on post-harvest handling and establishing community based dryers and storage facilities as produce is kept for some time before sale. - In India, produce reaches markets and aggregators at a faster speed as there are well established agriculture market yards / collection systems in place. A similar approach would be useful in Nepal.
Wheat	1. *Post-harvest handling and storage quality*	- Community level storage and warehouse receipt approach. - If the storage system is upgraded and with the initiatives supporting yield increases, Nepal can even export to India.

[35] Field interviews
[36] The cost to set up a modern 2 MT mill is approximately $400,000, as opposed to $50,000 - $75,000 for a small .5 MT mill: per interview with rice miller Bhagwan Das Agrahari, Tauliwaha, Kapilvastu.
[37] The energy situation in Nepal is problematic for industrial concerns, especially when hydro-power operations go offline. Energy costs for millers, for example, nearly doubles when they use diesel generators - unfortunately in the current environment this is a realistic energy source for the smaller millers. As economic development is linked to power supply, Nepal will have to increase its energy supplies to foster growth. Solar power could eventually provide some supplemental coverage though the costs are not yet competitive for industrial scale energy consumption.

3. Efforts by upstream value chain actors, such as millers and processors, to improve productivity on the three highlighted commodities will have a positive impact on cereal supply. Public Private Partnerships will play a key role in stimulating industry change while development actors/programs like KISAN can play a very targeted role in building capacity of farmers, millers and potentially even aggregators. For example, farmers must first understand the demand for specific types of grain (e.g. fine rice or improved maize); then they must have the confidence, technical skills and access to quality inputs to respond to market demand. Having the business literacy skills to perform a cost benefit analysis will help facilitate this process. KISAN can provide technical assistance, such as in the form of demonstration plots and business literacy classes, while it is important for mills to create their own linkages with and invest in farmers/farmer groups so that they can access the type and quantity of grains that they need.

4. Significant upgrades are needed in the way of processing technology, storage infrastructure improvements, post-harvest handling and access to credit/loans for the processors. These are inter-connected elements and focusing on a single area of improvement, such as storage, will only address part of the problem.

5. Measurable indices can be designed to demonstrate the effectiveness of interventions for improving the competitiveness of the three sectors in Nepal.

THE WAY FORWARD:

I. Rice:

There is immense scope for improving rice productivity with proper interventions in Nepal. Interventions are required across the value chain:

At the Farmer level: Individual farmers must understand the market dynamics behind growing finer quality rice for commercial sale, and how they will benefit from transitioning to improved varietals. As farmers are risk averse to engaging with commodities that are known to fluctuate in price they will need motivation and education to modify their agricultural practices. Extensive showcasing/ demonstrations of improved varieties will play an important part in publicizing and informing farmers about the benefits of changing their production orientation. Extension agencies will need to take the lead role in this endeavor with support from development projects along with research organizations and the private sector (e.g. both millers and seed traders have to be included in the initial stages of this exercise). Simultaneously, even if they have technical backstopping, farmers won't start increasing production of improved varietals until they see market demand, specifically from local - or at least - regional millers.

At the Mill level: Until local level mill operations are improved (requiring higher processing capacity/superior technology) and millers re-structure their profit orientation (e.g. foregoing the traditional practice of only charging the rice husk for processing), proper milling of fine rice

will not happen; and wholesalers will continue to depend on Indian suppliers since the supply chain is so much more organized and efficient there. The Government of Nepal will need technical support, in the form of a multi-stakeholder initiative, to develop a National Rice Mills Upgrade Plan. A similar effort was undertaken in 2004 for SISI in Karnal/Haryana, India (*see Figure 8 on page 14)* and now the Karnal belt is known for its quality rice in India as well as globally. There will inevitably be miller resistance to change as they don't want to invest in upgrades. Thus an important policy level step to explore is the role of subsidies to motivate them to make the transition.

For KISAN: The project can provide a number of strategic technical inputs from a menu of options including:

- Supporting demonstrations for farmer education and providing business literacy training;
- Advising GoN on a National Rice Mills Upgrade Plan;
- Providing technical support to build aggregator capacity – for an improved collection and distribution system (this will need to be done in conjunction with the private sector);
- Providing technical guidance to local/regional level processors to upgrade their operations;
- Working with USAID on a DCA credit guarantee so that groups, like millers and processers, that need capital to upgrade operations can access it from banks.
- Building capacity of the Agriculture Extension system to incorporate marketing staff into their ranks so as to broaden technical support beyond the current production focus. Developing capacity of staff alone will not necessarily translate into innovation, though it will broaden perspective. To encourage innovation around marketing practices it is also worth considering funding a trial initiative for the Extension system so that government staff are motivated by the availability (of even limited) funds to apply new knowledge into practice.

In addition, KISAN may play a role in liaising with research groups to conduct field trials for hybrid rice that accelerates the maturation time for fine rice varietals. Farmers are so accustomed to growing coarse rice which matures much quicker than fine rice (about 115 days compared to up to an extra month) that if a new varietal is developed that enables them to improve quality without increasing growth time – or at least vastly reducing the growth time - it will have a tremendous impact on their receptivity.

All of this is contingent upon farmers increasing rice production which begins with a good supply of quality seed. Working with rice seed companies to ensure that sufficient quantities are available is an important starting point. However, linkages with rice millers is the key to success. One potential avenue for KISAN to explore is working with small rice millers to create more value for locally grown produce, such as working on the branding of fine rice at a consortium level so that meaningful quantities are aggregated. Such branded products could be marketed as "GROWN RIGHT & HANDLED RIGHT" from the farms of Nepal. Although

modernizing rice mill processing in Nepal is necessary to increase value and reduce Indian imports it is very difficult to take away the role and existence of small (e.g. 0.5 MT) local millers. Since these small mills are not in position to compete with the large Indian mills, they would benefit from concentrating on marketing the speciality local rice in and around their districts thereby increasing their revenue.[38]

II. Maize:

There is immense scope for improving maize productivity with proper interventions in Nepal.

At the Farmer level: The most important factor which will add value to current production practice is post-harvest training for Nepali maize growers (with an emphasis on reducing moisture content). This can be supported by organizing community based dryers and facilitating storage capacity. While farmers need technical support to help them increase maize productivity, as well utilize improved growing practices (which promote uniformity, higher quality and yields), they also need to be educated on feed mill quality, and understand grading parameters, so that they can produce a commodity that is commensurate with end user needs.

At the Project level: Community based dryers and storage facilities are needed which should be managed by private traders who must install a quality control system at time of intake. Nepal has seen improvements in vegetable collection and marketing centers where quality assessment and grading functions have been established at the community level – e.g. at time of collection from farmers. KISAN has helped to establish such centers for vegetables and a similar approach can be taken for maize.

A consistent message from millers is that they are not able to access large, uniform quantities of maize from Nepali farmers and in country traders. Increasing the quality of maize will be an enormous improvement but further developing the aggregation strategy for corn is important so that feed millers can source large quantities easily, thereby reducing dependency on the much better established Indian aggregation system. Training aggregators on a clear grading standards system will make their lives simpler and more profitable. Similarly, educating farmers on quality parameters will help them interphase with the aggregators and move their product.

For KISAN: Developing a post-harvest training curriculum that can be used in conjunction with quality production demonstrations with farmers in key production areas, as well as serve as the template for trainings provided by other stakeholders (including GoN), would be immensely useful. While developing such a training program KISAN can also research/ identify appropriate drying machinery and other related infrastructure; and then roll out the training to select farmer groups.

In addition, KISAN can provide technical assistance for development of grading standards and then liaise with aggregators and poultry feed mills (which have the knowledge of moving large

[38] Local varieties that are popular in a limited area and command a good price from consumers include Sugandha, Ram Dhan and Pokhreli Mansuli.

quantities of maize from the production areas along with their local aggregators) to assess where inefficiencies in the aggregation practice lie; and then help develop strategies to improve efficiencies of the system. Linking aggregators to other key players in the maize value chain, and building their capacity to provide a more uniform product in volume, will serve as a best practices business model which will promote entrepreneurship in other commodities as well.

Part of stimulating improvements in industry practices entails identifying both constraints and practical solutions along the value chain. Toward this end, it is worth exploring establishment of a Maize Industry Council with representatives of key stakeholders (e.g. farmer groups, millers, aggregators). KISAN could convene such a council and then facilitate annual or semi-annual conferences.

III. Wheat:

In the case of wheat, most of the inter-country trade happens only for reasons of price, not for quality. Thus, there are fewer appropriate interventions which can be implemented for this commodity.

At the Farmer level: Improve growing practices (agronomic/cultural) to reduce the cost of production and increase irrigation and mechanization of the farming operations are the ideal starting points.

At the Project level: Encourage a community level storage and warehouse receipt system whereby farmers can store wheat while prices are low and then access the grain when prices improve. This has to be organized in a structured, business-like manner with proper storage facilities that are affordable. A separate business profile should be developed for the storage system - outlining costs, benefits, capital needs etc. - with rural entrepreneurs responsible for overall management.

Although wheat is not as big a commercial crop as rice or maize its consumption is steadily increasing in the form of roti, and ubiquitous *chau chau* (instant noodles) and demand by some industrial houses, such as Dugar which has a large processing plant on the border, reportedly exceed supply. Likewise, Chaudhary Group of Wei Wei *cha chau* fame, needs to get a sufficient volume and quality of wheat to manufacture its noodles. But if supply comes easily, and cheaply, across the border these industrial groups will have little motivation to engage with local aggregators. Thus aggregators need to approach and create linkages with industrial houses and prove that they can efficiently fulfill orders.

For KISAN: Technical inputs are needed at a variety of levels from: a) providing farmers demonstrations on improved wheat growing practices; b) assisting seed producers' groups with improved agronomic practices to grow better seed, and market it including facilitating linkages with seed companies; c) supporting pilot implementation of a model warehouse receipt system in a KISAN program district with high wheat production potential; and initiating linkages between aggregators in key wheat production areas and Nepali industrial concerns.

Annex 1: Terms of Reference

ToR - Short term consultant

Business Case for medium-fine and fine rice and maize

Background

In the last fiscal year Nepal imported from India approximately US$250 million of rice and paddy and US$75 million of maize; approximately 1 million MTs of these two cereals valued at a total of US$320 million.

With urbanization and increased incomes, demand has increased significantly for both higher quality rice and animal protein. As a result, imports of higher value medium-fine and fine varieties of rice and maize for animal feed have soared. The vast majority of rice produced and processed in Nepal is lower value course rice and mills in Nepal are only now beginning to re-tool so that they can process and polish higher value product. Feed processors in Nepal are importing 80%-90% of their maize requirements from India. Some rice millers and feed processors in Nepal are interested in investing in farmers to increase locally available higher value rice and maize.

Indian farmers have access subsidies in the areas of seeds, irrigation, electricity, storage, etc. and have better access to higher quality inputs. In addition, mechanization is utilized in commercial production in India more often than in Nepal. Both of these reduce the cost of production in India. Rules, regulations, and practices of transporting rice and maize over the border between India and Nepal is unclear and if unregulated and untaxed may create an unfair advantage for Indian producers.

Yet Nepalese rice millers and feed processors believe that their investments in farmers will pay off for them. They must also believe it will pay off for farmers such that farmers will continue to supply them longer term. While the millers and processors have made their investment decisions based on local market knowledge and instinct after working years or decades in their industries, KISAN would like to take a deeper dive into the financials at both the farmer and processor levels, researching price differentials and margins in both Nepal and India for farmers and processors of rice and maize.

Objective

1. KISAN would like the researcher to develop the following based on discussions with farmers, transporters and other facilitators, and processors in both India and Nepal

For rice:

A. The gross margin per ha and per kilo of Nepali farmers growing medium fine or fine rice. Researcher will need:

- B. The cost of production for farmers in Nepal for medium fine and fine rice. Are OPV and hybrid seed varieties legally and widely available in the market?
- The sales price of Nepali medium fine and fine rice grain (if available) to millers. If not available, the sales price of course rice (and the estimated premium that would be paid by local processors)

B. The gross margin per ha and per kilo of Indian farmers growing medium fine or fine rice. Researcher will need:

- The cost of production for farmers in India for medium fine and fine rice.
- The sales price of Indian medium fine and fine rice grain to traders.

C. The estimated profit margin per kilo for cross border traders of medium fine and fine rice in husk. Researcher will need:

- Purchase price of medium fine and fine rice in husk from farmers (see second bullet under item 2)
- Cost of moving the rice from the Indian farmer to the Nepali miller including transport costs and cross border formalities including taxes, border facilitation, etc.)
- Sales price of medium fine or fine rice in husk to Nepali millers.

D. The margin per kilo of buying and selling already milled Indian medium fine and fine rice (per kilo). Researcher will need purchase price, other costs (if any) and sales price.

For maize:

A. The gross margin per ha and per kilo of Nepali farmers. Researcher will need:

- The cost of production for farmers in Nepal
- The sales price of Nepali maize to feed processors.

B. The gross margin per ha and per kilo of Indian farmers growing maize. Researcher will need:

- The cost of production for farmers in India for maize.
- The sales price of Indian maize grain to traders.

C. The estimated profit margin per kilo for cross border traders of maize. Researcher will need:

- Purchase price of maize from farmers (see second bullet under item 2)
- Cost of moving the maize from the Indian farmer to the Nepali processor including transport costs and cross border formalities including taxes, border facilitation, etc.)
- Sales price of maize to Nepali millers.

For wheat: The price of winter wheat.

2. Research team will interview rice millers and feed processors. For those investing in farmers, and if product is cheaper coming from India, why invest in farmers? For those not, why don't they see opportunities here? What do rice millers and feed processors believe will happen in their industries and with Nepalese farmers currently supporting them over the next five years? Will Indian imports continue to dominate? Do they believe Nepalese farmers will become more competitive, more commercial? (Interviews can be in person or via telephone.)

Methodology and work plan

The aforementioned research and deliverables shall be accomplished through a combination of desk research and interviews with relevant parties.

Required skills and experience

The Independent researcher will have a background and combination of skills in private sector development, market analyses and agribusiness as well as research experience.

Sources to be consulted

- KISAN Staff
- Feed Companies and Rice Millers in the West, Mid-West and Far-West of Nepal
- Any other Nepalese Importers of (medium) fine rice paddy and maize
- (Medium) fine rice paddy and maize Export Companies from India
- Indian Organizations (GoI, NGOs, etc.) who can provide the cost of production for Indian farmers
- Wholesalers/retailers of (medium) fine rice
- Any other valuable source of information

KISAN project will provide technical and logistics backstopping support throughout the assignment period especially, in the field level coordination with the key stakeholders. For logistics arrangement of vehicle, Regional and district-based offices of KISAN will provide necessary support.

Expected outputs/deliverables

Narrative Report not longer than 10 pages (excluding annexes) that includes:

- Cost and income information as outlined above
- Synopses of interviews with rice millers and feed processors on both sides of India-Nepal border
- Conclusions as to the potential for successful commercialization of medium-fine and fine rice and maize in Nepal

Annex 2: Cost of Cultivation – Uttarakhand Pant Nagar Agricultural University

Table 1: Cost of Cultivation (tentative) of Major Kharif Food grains in the Plains of Uttarakhand during the Year 2013-14

S. No.	PARTICULARS	Rs/ ha	
		Fine Paddy	Coarse Paddy
I	OPERATIONAL COST		
i	Family labour	8530	6111
ii	Hired labour	14020	14048
iii	Bullock labour		0
iv	Machine hours	6934	5206
2	MATERIAL COST		
i	Seed	931	863
ii	Manure	1416	2949
iii	Fertilizer	5136	6320
	Plant protections & chemicals	920	710
	Irrigation	921	1271
3	TOTAL WORKING CAPITAL	30278	31367
i	Interest on working capital	568	588
li	Depreciation	3354	3354
iii	Land Revenue	16	16
iv	Rental value of land	20000	20000
	Interest on owned fixed capital assets	4844	4844
4	Cost of Cultivation at Cost Al	34216	35325
5	Cost of Cultivation at Cost	67574	66264
6	Yield of main product (Q/ha)	40	53
	Yield of by product (Q/ha)	50	64
8	Selling price of main product (Rs/Q)	1768	1287
9	Cost of Production at cost C2 (Rs/Q	1573	1152
10	GROSS RETURNS	75962	73999
11	NET RETURNS OVER cost Al	41746	38674
12	NET RETURNS OVER cost	8388	7735

Note:

- Figures are rounded off to their nearest integers.
- Interest on working capital has been worked out @ 7.5 per cent per annum for half of the crop period, while interest on capital assets has been worked out @13 per cent per annum half of the crop period.

Table 2: Cost of Cultivation (tentative) of Major Kharif Food grains in the Hills of Uttarakhand during the Year 2013-14

S. N	PARTICULARS (Expenditure incurred on)	Paddy	Fingermillet (Mandua)	Barnyard millet (Jhangora)	Soyabean
I	OPERATIONAL COST				
i	Family labour	26503	20155	21687	39286
ii	Hired labour	1211	1507	1506	
iii	Bullock labour	5697	5472	5231	6429
iv	Machine hours			0	0
2	MATERIAL COST				
i	Seed	1746	521	518	6208
ii	Manure	3181	1599	2538	2619
iii	Fertilizer	1878	5		90
iv	Plant protections & chemicals				0
	Irrigation	0		0	
3	TOTAL WORKING CAPITAL	13713	9104	9793	15346
i	Interest on working capital	257	171	184	288
ii	Depreciation		357	350	279
iii	Land Revenue		0		
iv	Rental value of land	4000	3000	3000	3000
	Interest on owned fixed capital asset	106	224	194	320
4	Cost of Cultivation at Cost Al	14110	9632	10327	15913
5	Cost of Cultivation at Cost	44719	33011	35208	58519
6	Yield of main product (Q/ha)	24	12	10	8
7	Yield of by product (Q/ha)	27	13	13	
8	Selling price of main product (Rs/Q)	1543	1293	1431	5919
9	Unit cost of main product at Cost	1749	2516	3012	7315
10	GROSS RETURNS	39444	16962	16728	47352
11	NET RETURNS OVER Cost Al	25334	7330	6401	31439
12	NET RETURNS OVER Cost	-5275	-16049	-18480	-11167

Note:

- Figures are rounded off to their nearest integers.
- Interest on working capital has been worked out@ 7.5 per cent per annum for half of the crop period, while interest on capital assets has been worked out@13 per cent per annum half of the crop period.

Table 3: Cost of cultivation of major rabi crop produces in the plains of Uttarakhand during the Year 2013-14/ ha

S. N.	PARTICULARS	Wheat	Mustard
I	OPERATIONAL COST		
	Family labour	5427	2214
ii	Hired labour	3972	4205
iii	Bullock labour		
iv	Machine hours	9223	2761
2	MATERIAL COST		
i	Seed	2987	507
ii	Manure	1308	1365
iii	Fertilizer	4225	768
iv	Plant protections & chemicals	675	641
	Irrigation	983	974
3	TOTAL WORKING CAPITAL	23373	1 1221
	Interest on working capital	438	196
ii	Depreciation	3046	1580
iii	Land Revenue	16	16
iv	Rental value of land	20000	16250
	Interest on owned fixed capital assets	3992	3086
4	Cost of Cultivation at Cost Al	26873	13013
5	Cost of Cultivation at Cost	56276	34547
6	Yield of main product (Q/ha)	46	12
	Yield of by product (Q/ha)	41	
8	Selling price of main product (Rs/Q)	1420	2928
9	Cost of Production at cost C2 (Rs/Q)	1081	2879
10	GROSS RETURNS	73933	35136
11	NET RETURNS OVER Cost Al	47060	22123
12	NET RETURNS OVER Cost	17657	589

Note:

- Figures are rounded off to their nearest integers.
- Interest on working capital has been worked out @ 7.5 per cent per annum for half of the crop period, while interest on capital assets has been worked out @13 per cent per annum half of the crop period.

Table 4: Cost of cultivation of major rabi crop produces in the hills of Uttarakhand during the Year 2013-14 (Rs/ha)

S. N	PARTICULARS (Expenditure incurred on)	Wheat (irrigated)	Wheat (Unirrigated)
I	OPERATIONAL COST		
	Family labour	14026	1281 I
ii	Hired labour		385
iii	Bullock labour	6377	3991
iv	Machine hours		
2	MATERIAL COST		
i	Seed	2185	1884
ii	Manure	1928	2049
iii	Fertilizer	1120	72
iv	Plant protections & chemicals		
	Irrigation		
3	TOTAL WORKING CAPITAL	11610	8381
i	Interest on working capital	218	157
ii	Depreciation	433	423
iii	Land Revenue		
iv	Rental value of land	4000	3000
	Interest on owned fixed capital asset	237	211
4	Cost of Cultivation at Cost Al	12261	896 i
5	Cost of Cultivation at Cost	30524	24983
6	Yield of main product[Z](Q/ha)	18	13
7	Yield of by product (Q/ha)	19	14
8	Selling price of main product (Rs/Q)	1410	1 362
9	Unit cost of main product at Cost (Rs/Q)	1480	1714
10	GROSS RETURNS	29087	19855
11	NET RETURNS OVER Cost Al	16826	
12	NET RETURNS OVER Cost	-1437	-5128

Note:

- Figures are rounded off to their nearest integers.
- Interest on working capital has been worked @ 7.5 per cent per annum for half of the crop period, while interest on capital assets has been worked out @13 per cent per annum half of the crop period.

Annex 3: Cost of Cultivation Department of Agriculture Uttar Pradesh

प्रदेश के प्रमुख फसलों के उत्पादन लागत (रू0/हे0)
वित्तीय वर्ष 2014-15

क0सं0	फसल	लागत मूल्य
01	धान	48299
02	गेहूँ	48308
03	मूँगफली	29606
04	राई सरसों	34801
05	बाजरा	24074
06	मक्का	24481
07	उर्द	19453
08	मूँग	18933
09	अरहर	33660
10	सोयाबीन	22326
11	जौ	36047
12	चना	26930
13	मटर	32257
14	मसूर	27729

STA. (Bopom)

Annex 4: Cost of Cultivation of Fine Rice by a Seed Company in India

COST OF CULTIVATION (ACRE)			
HEADS	**HYBRID**	**OPV**	
Land Preparation	1500	1500	**ADDITIONAL INCOME**
Seeds	1350	1000	
Sowing	1200	1500	
Manures & Manuring	2000	2000	
Weeding after cultivation & Irrigation	500	1000	
Plant protection	200	500	18450
Harvest and other Expenses (Rs.)	3000	3000	
Total	9750	10500	
Yield (Kg)	3000	1800	
Gross Income (Rs.) (@ 8.5/ KG)	33000	15300	
Net income (Rs.)	23250	4800	

Annex 5: Cost of Production in Nepal KISAN Team

Variety Rice	Cost of production	Income net	District	Variety Maize	Cost of production	Income net	District	Variety Wheat	Cost of production	Income net	District
	68,164				42,119	11,804			45,331		
	62,298				43,632			b11022	60,949	76,695	Darchula
	56,024				46,740				44,015		
	56,390				45,861				44,759		
	61,041				46,353				5,583	46,089	
	54,547				47,113				50,818	10,143	
Radha 12	67,224	14,328	Sunsari	Rampur composite	60,358	1,231		Pasang lahm	67,977	107,707	Mustang
	71,269				48,165				56,786		
Ramp Masuli	58,082	8,073		Hetauda Composite	47,175	11,430	Udyapur		60,029		
	68,923				48,180				53,764		
Radha 4	58,704	10,781			52,298				50,130		
	64,178			arun 1	50,743	2,394			51,214		
	61,245			rampur 2	48,611	4,450	kamchapur		54,525		
	60,712				627,348				50,084		
local	45,658		Taplejung	cost average	48,258	average income	7,500		52,955		
	48,167								748,919		
	52,667							cost average	49,928	average income	15,000.00
	47,307										
Khumal 3	52,630	7,130									

	47,050										
Ramp Masuli	50,687	7,004									
Radha 4	48,475	11,566	Dang								
	50,670										
Makwanpur 1	56,167	15,278	Makwanpur								
Ramp Masuli	53,975	7,326									
	1,422,254										
cost average	56,890		7,500								

Annex 6: Cost of Production of Hybrid Rice KISAN Team

Cost of Production/Katha

Crop: Hybrid Rice

SN	Particulars	Unit	Qty.	Rate Rs.	Total amounts Rs.
1	Seed (Var. Prithvi)	kg	0.5	430	215
2	Nursery bed Preparation	day	0.5	300	150
	Compost	Doko	3	20	60
	Bavistin for soil treatment	gm	0.5	100	50
3	Ploughing for land preparation	Day	1	500	500
4	Fertilizers				
	Compost	Dunlop	1	400	400
	DAP	kg	5	52	260
	Urea	Kg	7	25	175
	Muret of potash	Kg	3.5	35	122.5
5	Labor for transplantation	day	1	300	300
6	Micronutrients				
	Zinc sulphat/kisan zinc	kg	1.5	100	150
	Biosteem	kg	0.4	150	60
7	Weeding/hoeing/top dressing	day	1	300	300
8	Insecticides - Chloropyriphos	Bottle	1	70	70
9	Irrigation --Diesel	lit.	2	100	200
10	Harvesting	day	0.5	300	150
11	Threshing and winnowing	day	0.5	300	150
12	Packaging/transportation/marketing	day	0.5	300	150
	Total				**3462.5**

Annex 7: Cost of Production of Maize KISAN Team

Cost of Production/Katha

Crop: Maize

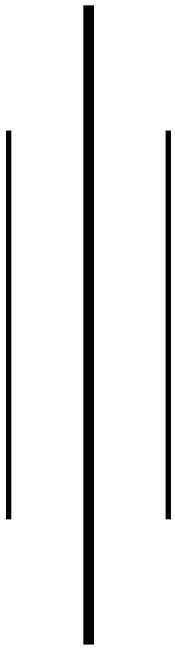
SN	Particulars	Unit	Qty.	Rate Rs.	Total amounts Rs.
1	Seed (Var. Arun improved)	kg	1	400	400
2	Malathion dust	kg	0.5	60	30
3	Ploughing for land preparation	Day	0.5	300	150
4	Fertilizers				
	Compost	Dunlop	1	400	400
	DAP	kg	4	52	208
	Urea	Kg	6	25	150
	Muret of potash	Kg	3	35	105
5	Labor for seed sowing	day	0.5	300	150
6	Weeding/hoeing/top dressing	day	2	300	600
7	Irrigation --Diesel	lit.	2	65	130
8	Harvesting	day	1	300	300
9	Threshing and winnowing	day	2	300	600
10	Packaging/transportation/marketing	day	0.5	300	150
	Total				**3373**

Annex 8: Cost of Production & Marketing Margin of Cereal, Cash, Vegetable & Spices Crops in Nepal

COST OF PRODUCTION & MARKETING MARGIN OF CEREAL, CASH, VEGETABLE & SPICES CROPS IN NEPAL

2070/2071

(2013/2014)



Government of Nepal

Ministry of Agriculture & Cooperatives

Department of Agriculture

Agribusiness Promotion & Marketing Development Directorate

Market Research & Statistics Management Program

Harihar Bhawan, Lalitpur

www.agribiz.gov.np

2071

Table 1.3 Costs and Profit of Improved Irrigated Paddy of some (Terai) Districts

Districts	Total Cost	Gross Income Farmgate	Gross Profit Farmgate	Benefit Cost Ratio	Varieties
Jhapa	65762.77	83826.15	18063.39	1.27	Radha-12
Saptari	65706.30	73576.40	7870.10	1.12	Tarahara -I
Dhanusa	61588.00	80112.80	18524.81	1.30	Janaki
Sarlahi	63517.38	79400.60	15883.23	1.25	Radha-12
Chitwan	65862.95	87715.35	21852.40	1.33	Makwanpur-I
Kapilwastu	60896.15	79379.55	18483.41	1.30	Janaki-I
Dang	60554.75	77580.80	17026.05	1.28	Janaki
Bardiya	60702.93	89044.80	28341.87	1.47	Rampur Masuli
Average	**63073.90**	**81329.56**	**18255.66**	**1.29**	

Table 1.3 shows the total cost of production per Ha, gross income, gross profit and benefit cost ratio of main season improved irrigated Paddy cultivated on of some (Terai) Districts. The average cost of production, gross income and benefit cost ratio was found Rs. 63073.90, Rs. 81329.56 and 1.29 per hectare respectively. This figure shows that the farmers can get net profit Rs 18255.66 from one Ha of paddy cultivation in normal situation. The average BCR is 1.29.

When we talk about the cost component, 63% cost covered by labor, whereas only 19% cost covered by the machinery use. Similarly manure and fertilizers covered 9% cost, seed covered 4%, plant protection on materials covered only 1% and others miscellaneous covered 3% cost in main season improved irrigated Paddy cultivation on of some (Terai) Districts that is been presented in the pie chart below.

Chart 1.c. Costs component of Improved Irrigated Paddy of some (Terai) Districts

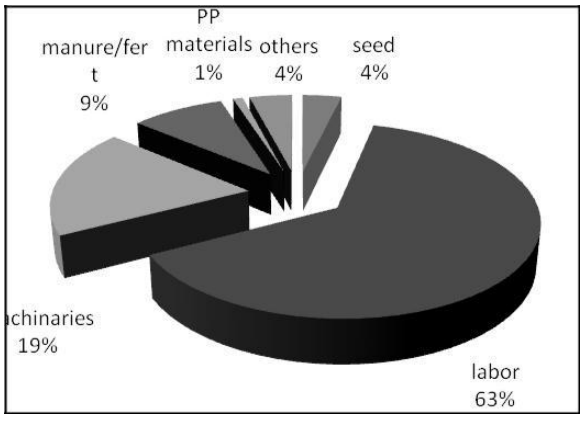


Table 1.4 Costs and Profit of Improved Irrigated Paddy of some (Mid-hill) Districts

Districts	Total Cost	Gross Income Farmgate	Gross Profit Farmgate	Benefit Cost Ratio	Varieties
Sindhuli	67791.75	100089.60	32297.86	1.48	Khumal-7
Dolakha	64266.24	86802.45	22536.21	1.35	Khumal-3
Bhaktapur	79024.86	87778.80	8753.94	1.11	Khumal-2
Makwanpur	64346.68	90227.20	25880.53	1.40	Khumal-4
Baglung	58958.78	94304.55	35345.77	1.60	Khumal-5
Average	**66877.66**	**91840.52**	**24962.86**	**1.37**	

Table 1.4 shows the total cost of production per Ha, gross income, gross profit at farmgate and benefit cost ratio of improved irrigated Paddy cultivated on in some (midhill) Districts. The average cost of production, gross income and benefit cost ratio was found Rs. 66877.66, Rs. 91840.52 and 1.37 per hectare respectively. This figure shows that the farmers can get net profit Rs 24962.86 from one Ha of paddy cultivation in normal situation. The average BCR is 1.37.

When we talk about the cost component, 78% cost covered by labor, whereas only 6% cost covered by the machinery use. Similarly manure and fertilizers covered 8% cost, seed covered 4%, plant protection on materials covered only 1% and others miscellaneous covered 3% cost in main season improved irrigated Paddy cultivated on of some (Terai) Districts that is been presented in the pie chart below.

Chart 1.d. Costs component of Improved Irrigated Paddy of some (Mid-hill) Districts

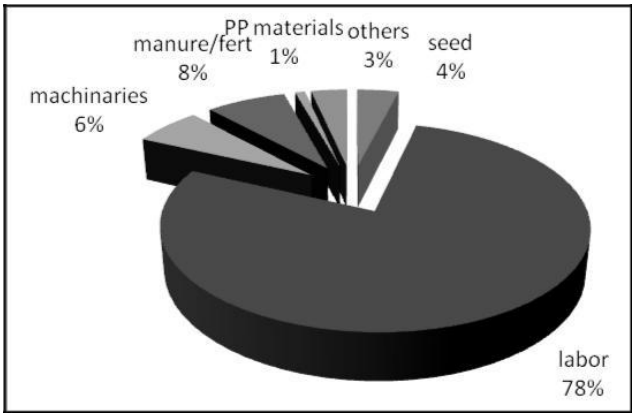


Table 1.5 Costs and Profit of Local Unirrigated Paddy of some (Midhill) Districts:

Districts	Total Cost	Gross Income Farmgate	Gross Profit Farmgate	Benefit Cost Ratio	Varieties
Panchthar	64373.11	65854.80	1481.70	1.02	Local
Dailekh	58005.88	62349.20	4343.33	1.07	Local
Baitadi	51748.27	60497.70	8749.43	1.17	Local
Myagdi	59878.02	64209.60	4331.58	1.07	Local
Doti	59544.57	65818.80	6274.23	1.11	Local
Average	**58709.97**	**63746.02**	**5036.05**	**1.09**	

Table 1.5 shows the total cost of production per Ha, gross income, gross profit at farmgate and benefit cost ratio of Local Unirrigated Paddy of some (Midhill) Districts. The average cost of production, gross income and benefit cost ratio was found Rs. 58709.97, Rs. 63746.02 and 1.09 per hectare respectively. This figure shows that the farmers can get net profit Rs 5036.05 from one Ha of local unirrigated paddy cultivation in normal situation. The average BCR is 1.09.

When we talk about the cost component, 83% cost covered by labor, whereas only 1% cost covered by the machinery use. Similarly manure and fertilizers covered 7% cost, seed covered 5%, plant protection materials covered only 1% and others miscellaneous covered 3% cost in Local Unirrigated Paddy of some (Midhill) Districts that is been presented in the pie chart below.

Chart 1.d. Costs component of Local Unirrigated Paddy of some (Midhill) Districts

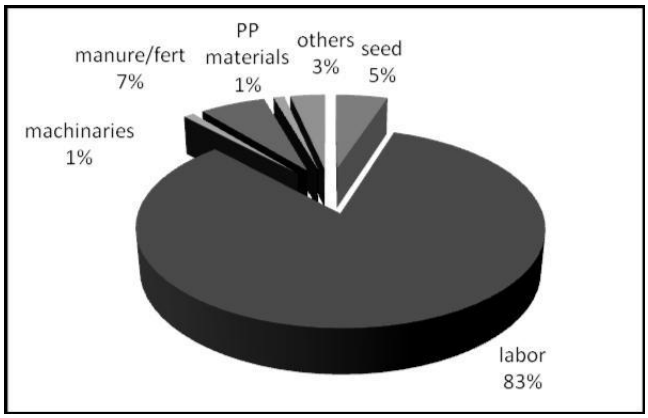


Table 1.6 Cost and Profit of Improved Unirrigated Paddy of Terai Districts

Districts	Total Cost	Gross Income Farmgate	Gross Profit Farmgate	Benefit Cost ratio	Varieties
Saptari	68154.08	76697.95	8543.88	1.13	Tarahara-1
Siraha	67188.17	73871.55	6683.38	1.10	Hardinath-2
Surkhet	61959.51	100089.60	38130.10	1.62	Himali
Average	**65767.25**	**83553.03**	**17785.78**	**1.27**	

Table 1.6 shows the total cost of production per Ha, gross income, gross profit at farmgate of improved unirrigated Paddy cultivated in some (Terai) Districts. The average cost of production, gross income and benefit cost ratio was found Rs. 65767.25 Rs. 83533.03 and 1.27 per hectare respectively. This figure shows that the farmers can get net profit Rs 17785.78 from one Ha of improved unirrigated paddy cultivation in normal situation. The average BCR is 1.27.

When we talk about the cost component, 67% cost covered by labor, whereas only 17% cost covered by the machinery use. Similarly manure and fertilizers covered 8% cost, seed covered 4%, plant protection on materials covered only 1% and others miscellaneous covered 3% cost in I Unirrigated Paddy of some (Terai) Districts that is been presented in the pie chart below.

Chart 1.e. Cost component of Improved Unirrigated Paddy of Terai Districts

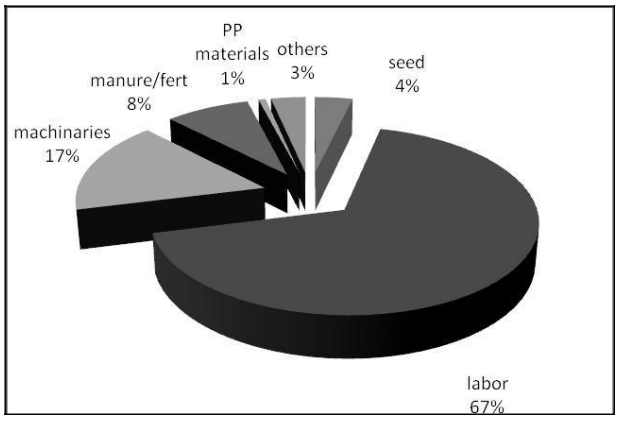


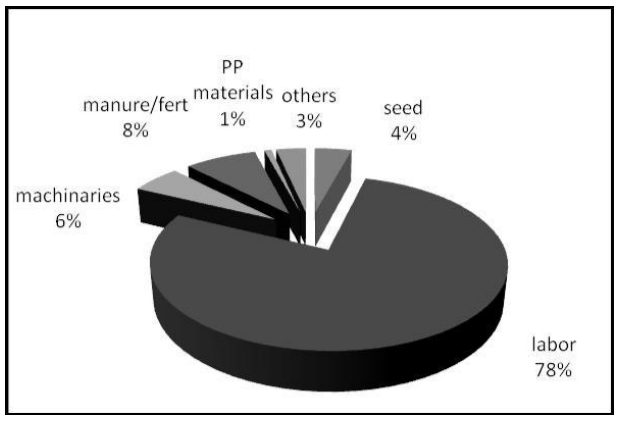
Table 1.7 Costs and Profit of Improved Unirrigated Paddy of Midhill Districts

Districts	Total Cost	Gross Income Farmgate	Gross Profit Farmgate	Benefit Cost Ratio	Varieties
Tanahu	61235.15	91300.10	30064.96	1.49	Khumal-9
Makwanpur	62398.81	88679.60	26280.80	1.42	Rampur Masuli
Dadeldhura	64607.28	92829.45	28222.17	1.44	Rampur Masuli
Average	**62747.08**	**90936.38**	**28189.31**	**1.45**	

Table 1.7 shows the total cost of production per Ha, gross income, gross profit at farmgate of improved unirrigated Paddy cultivation in some (midhill) Districts. The average cost of production, gross income and benefit cost ratio was found Rs. 62747.08 Rs. 90936.38 and 1.45 per hectare respectively. This figure shows that the farmers can get net profit Rs 28189.31 from one Ha of improved unirrigated paddy cultivation in normal situation. The average BCR is 1.45.

When we talk about the cost component, 78% cost covered by labor, whereas only 6% cost covered by the machinery use. Similarly manure and fertilizers covered 8% cost, seed covered 4%, plant protection materials covered only 1% and others miscellaneous covered 3% cost in Unirrigated Paddy of some (midhill) Districts that is been presented in the pie chart below.

Chart 1.f. Costs component of Improved Unirrigated Paddy of Midhill Districts



2. Wheat

Table 2.1 Costs and Profit of Improved Wheat of some (High-hill) Districts

Districts	Total Cost	Gross Income Farmgate	Gross Profit Farmgate	Benefit Cost Ratio	Varieties
Rolpa	53565.93	94822.40	41256.47	1.77	Pasang Lahmu
Manang	62820.63	96263.05	33442.43	1.53	Pasang Lahmu
Solukhumbu	64505.74	77101.38	12595.64	1.20	WK-1204
Humla	60237.65	86184.96	25947.31	1.43	WK-1204
Tehrathum	55475.59	92498.40	37022.81	1.67	Annapurna-3
Mustang	60009.43	112918.65	52909.23	1.88	Pasang Lahmu
Average	**59435.83**	**93298.14**	**33862.31**	**1.57**	

Table 2.1 shows the total cost of production per Ha, gross income, gross profit at farmgate and benefit cost ratio of improved wheat cultivation in some (highhill) Districts. The average cost of production, gross income and benefit cost ratio was found Rs. 59435, Rs. 93298 and 1.57 per hectare respectively. This figure shows that the farmers can get net profit Rs 33862 from one Ha of improved wheat cultivation on in normal situation. The average BCR is 1.57.

When we talk about the cost component, 72% cost covered by labor, whereas only 2% cost covered by the machinery use. Similarly manure and fertilizers covered 6% cost, seed covered 16%, plant protection materials covered only 1% and others miscellaneous covered 3% cost in improved wheat of some (highhill) Districts that is been presented in the pie chart below.

Chart 2.a. Costs component of Improved Wheat of some (High-hill) Districts

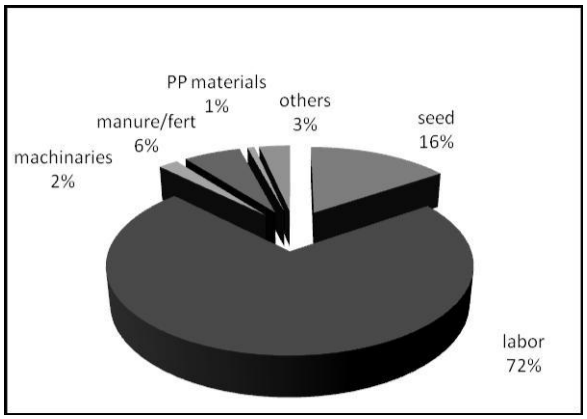


Table 2.2 Costs and Profit of Improved Irrigated Wheat of some (Midhills) Districts

Districts	Total Cost	Gross Income Farmgate	Gross Profit Farmgate	Benefit Cost Ratio	Varieties
Ilam	53903.30	82878.30	28975.01	1.54	Annapurna-3
Baitadi	51048.51	80902.80	29854.29	1.58	Gaura
Bhojpur	54247.07	89646.00	35398.93	1.65	Kanti
Doti	55303.14	102192.60	46889.46	1.85	Annapurna-1
Sindhuli	58581.28	84322.40	25741.12	1.44	Kanti
Dhading	53141.15	66259.20	13118.05	1.25	RR-21
Makwanpur	51819.12	76280.50	24461.38	1.47	BL-1135
Argakhanchi	53099.15	81132.40	28033.25	1.53	Annapurna-4
Average	**53892.84**	**82951.78**	**29058.94**	**1.54**	

Table 2.2 shows the total cost of production per Ha, gross income, gross profit at farmgate and benefit cost ratio of improved and irrigated wheat cultivation in some (midhill) Districts. The average cost of production, gross income and benefit cost ratio was found Rs. 53892, Rs. 82951 and 1.54 per hectare respectively. This figure shows that the farmers can get net profit Rs 29058 from one Ha of improved wheat cultivation in normal situation. The average BCR is 1.54.

When we talk about the cost component, 71% cost covered by labor, whereas only 5% cost covered by the machinery use. Similarly manure and fertilizers covered 7% cost, seed covered 13%, plant protection materials covered only 1% and others miscellaneous covered 3% cost in improved wheat of some (midhill) Districts that is been presented in the pie chart below.

Chart 2.b. Costs component of Improved Irrigated Wheat of some (Midhills) Districts

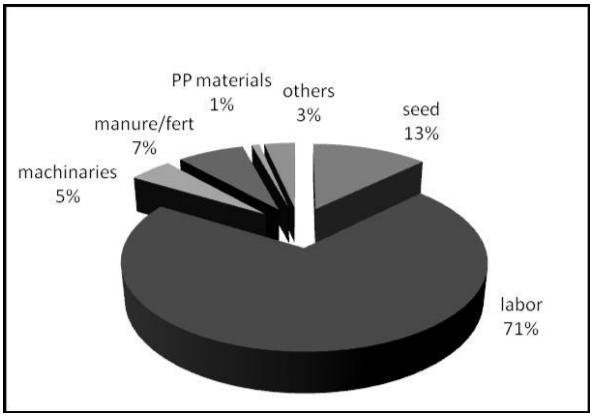


Table 2.3 Costs and Profit of Improved Unirrigated Wheat of some (Midhill) Districts

Districts	Total Cost	Gross Income Farmgate	Gross Profit Farmgate	Benefit Cost Ratio	Varieties
Terhathum	55475.59	92498.40	37022.81	1.67	Annapurna-3
Palpa	57169.30	74071.40	16902.10	1.30	Lerma -52
Gulmi	56678.68	78685.75	22007.08	1.39	Annapurna-1
Makwanpur	52550.78	66602.25	14051.47	1.27	BL-1135
Average	**55468.59**	**77964.45**	**22495.86**	**1.41**	

This table shows the total cost of production, gross income, gross profit at farmgate and benefit cost ratio of wheat (improved unirrigated) cultivation in midhill Districts. The average cost of production, gross income and benefit cost ratio was found Rs. 55468, Rs. 77964 and 1.41 per hectare respectively. This figure shows that the farmers can get net profit Rs 22495 from wheat (improved and unirrigated) cultivation on in normal situation. The average BCR is 1.41

When we talk about the cost component of wheat cultivation in unirrigated condition in midhill, 75% cost covered by labor, whereas only 1% cost covered by the machinery use. Similarly manure and fertilizers covered 8% cost, seed covered 12%, plant protection materials covered only 1% and others miscellaneous covered 3% cost in improved wheat of some (midhill) Districts that is been presented in the pie chart below.

Chart 2.c. Costs component of Improved Unirrigated Wheat of some (Midhill) Districts

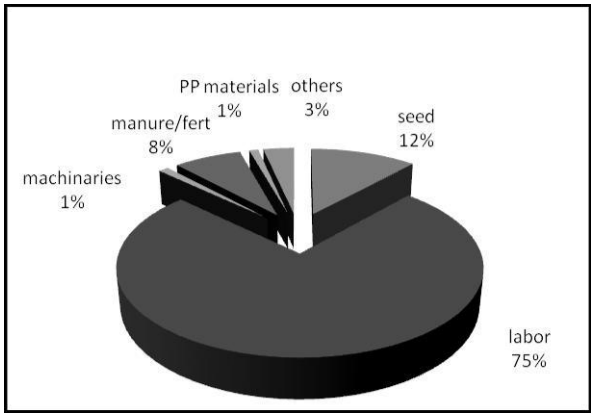


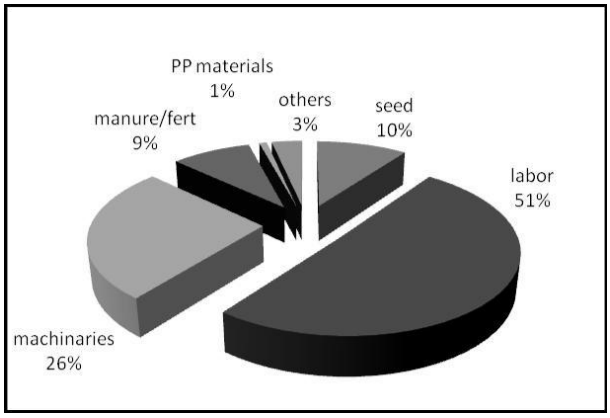
Table 2.4 Costs and Profit of Improved Wheat of Terai Districts

Districts	Total Cost	Gross Income Farmgate	Gross Profit Farmgate	Benefit Cost Ratio	Varieties
Morang	60058.85	65002.10	4943.25	1.08	UP-262
Siraha	61402.52	71512.35	10109.83	1.16	NL-279
Chitwan	62923.55	67736.25	4812.70	1.08	Rohini
Rupandehi	63623.56	68715.50	5091.94	1.08	BL-1022
Dang	59483.53	70591.50	11107.98	1.19	BL-1022
Bardiya	60949.47	74155.50	13206.03	1.22	Adatiya
Kailali	62577.83	72962.40	10384.58	1.17	Bijaya
Surkhet	60640.22	74053.65	13413.44	1.22	NL-971
Average	**61457.44**	**70591.16**	**9133.72**	**1.15**	

This table shows the total cost of production, gross income, gross profit at farmgate and benefit cost ratio of wheat (improved) cultivation in Terai Districts. The average cost of production, gross income and benefit cost ratio was found Rs. 61457, Rs. 70591 and 1.15 per hectare respectively. This figure shows that the farmers can get net profit Rs 9133 from wheat (improved) cultivation in normal situation. The average BCR is 1.15.

When we talk about the cost component of wheat cultivation in Terai, 75% cost covered by labor, whereas only 1% cost covered by the machinery use. Similarly manure and fertilizers covered 8% cost, seed covered 12%, plant protection materials covered only 1% and others miscellaneous covered 3% cost in improved wheat of some (midhill) Districts that is been presented in the pie chart below.

Chart 2.d. Costs component of Improved Wheat of Terai Districts



3. Maize:

Table 3.1 Costs and Profit of Improved Unirrigated Maize of Some (Highhills) Districts

Districts	Total Cost	Gross Income	Gross Profit	Benefit Cost	Varieties
		Farm gate	Farm gate	Ratio	
Taplegunj	60652.00	68448.00	7796.00	1.13	Manakamana-3
Sankhuwasawa	62369.68	79424.00	17054.32	1.27	Sitala
Average	61510.84	73936.00	12425.16	1.20	

This table shows the total cost of production, gross income, gross profit at farmgate and benefit cost ratio of maize (improved and unirrigated) cultivation in some (highhill) Districts. The average cost of production, gross income and benefit cost ratio was found Rs. 61510, Rs. 73936 and 1.20 per hectare respectively. This figure shows that the farmers can get net profit Rs 12425 from maize (improved) cultivation in normal situation. The average BCR is 1.20.

When we talk about the cost component of maize cultivation in highhill, 87% cost covered by labor, but no any type of machinery are used. Similarly manure and fertilizers covered 6% cost, seed covered only 3% cost, plant protection on materials covered only 1% and others miscellaneous expenditure covered 3% cost in improved maize of some (highhill) Districts that is presented in the pie chart below

Chart 3.a. Costs component of Improved Unirrigated Maize of Some (Highhills) Districts

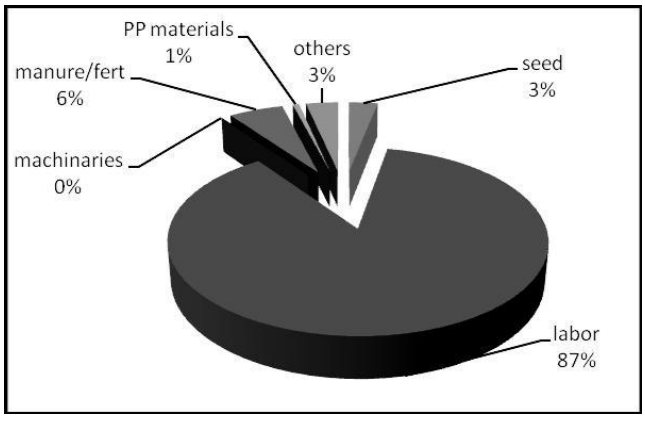


Table 3.2 Costs and Profit of Improved Maize of Some (Midhills) Districts

Districts	Total Cost	Gross Income	Gross Profit	Benefit Cost	Varieties
		Farmgate	Farmgate	Ratio	
Bhojpur	63171.05	77793.30	14622.25	1.23	Deuti
Udayapur	64430.09	68389.50	3959.42	1.06	Rampur Comp
Dhankuta	60731.88	76942.00	16210.13	1.27	Sitala
Salyan	62118.65	65458.80	3340.15	1.05	Manakamana-3
Dadeldhura	57440.94	70992.00	13551.06	1.24	Manakamana-4
Palpa	59763.20	63660.80	3897.60	1.07	Manakamana-3
Syanja	61648.10	65549.20	3901.11	1.06	Manakamana-4
Gulmi	57052.15	61183.80	4131.65	1.07	Khumal Pahelo
Surkhet	57185.05	66861.00	9675.95	1.17	Manakamana-5
Achham	65601.67	71728.80	6127.13	1.09	Manakamana-6
Average	**60914.28**	**68855.92**	**7941.64**	**1.13**	

This table shows the total cost of production, gross income, gross profit at farmgate and benefit cost ratio of maize (improved and unirrigated) cultivated in some (midhill) Districts. The average cost of production, gross income and benefit cost ratio was found to be Rs. 60914, Rs. 68855 and 1.13 per hectare respectively. This figure shows that the farmers can get net profit Rs 7941 from maize (improved) cultivated in normal situation. The average is BCR 1.13.

When we talk about the cost component of maize cultivated in midhill, 87% cost covered by labor, but no any type of machinery are used. Similarly manure and fertilizers covered 6% cost, seed covered only 3% cost, plant protection materials covered only 1% and others miscellaneous expenditure covered 3% cost in improved maize of some (highhill) Districts that is been presented in the pie chart below.

Chart 3.b. Costs component of Improved Maize of Some (Midhills) Districts

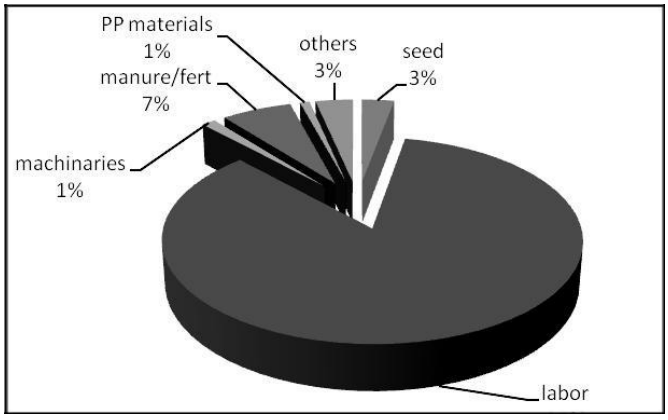


Table 3.3 Costs and Profit of Improved Maize of Terai Districts

Districts	Total Cost	Gross Income Farmgate	Gross Profit Farmgate	Benefit Cost Ratio	Varieties
Sunsari	59106.96	62208.90	3101.94	1.05	Rampur-2
Nawalparasi	53686.09	65940.00	12253.92	1.23	Rampur Comp
Jhapa	56240.28	79397.20	23156.93	1.41	Gaurav
Sarlahi	56935.83	60328.80	3392.98	1.06	Rampur-2
Chitwan	54667.43	59921.25	5253.83	1.10	Rampur Comp
Rupandehi	62367.07	64891.20	2524.13	1.04	Arun -1
Dang	54611.78	66410.10	11798.32	1.22	Manakamana-6
Bardiya	53893.67	59707.70	5814.04	1.11	Arun -1
Average	**56438.64**	**64850.64**	**8412.01**	**1.15**	

This table shows the total cost of production, gross income, gross profit at farmgate and benefit cost ratio of maize (improved) cultivated in some (Terai) Districts. The average cost of production, gross income and benefit cost ratio was found to be Rs. 56438, Rs. 64850 and 1.15 per hectare respectively. This figure shows that the farmers can get net profit Rs 8412 from maize (improved) cultivated in normal situation. The average BCR is 1.15.

When we talk about the cost component of maize cultivated in Terai, 73% cost covered by labor, 12% cost was covered by machinery used. Similarly manure and fertilizers covered 8% cost, seed covered only 3% cost, plant protection materials covered only 1% and others miscellaneous expenditure covered 3% cost in improved maize of some (Terai) Districts that is been presented in the pie chart below.

Annex 9: Subsidy Provision in Nepal by KISAN Team

SUBSIDIES IN RICE, WHEAT AND MAIZE PRODUCTION IN NEPAL

S.No.	Subsidy in Rice, Wheat and Maize Production	Details of Subsidy	Source
1	Agriculture machinery (Power tiller, Thresher machine, Sugarcane crushing machine, ginger grinder)	50% subsidy	PALPA: DADO Office
2	Seed production (Rice, Maize, Wheat etc.)	50% subsidy in improved seed, lab test free	PALPA: DADO Office
3	Mini kit support for demonstration (cereals i.e., Rice, wheat, Maize etc.):	100% subsidy	PALPA: DADO Office
4	Electricity subsidy	50% Subsidy on Meter installation and 50% subsidy in service charge based meter reading	PALPA: DADO Office
5	Crop Insurance (Insured only for cost of production)*	Premium rate: 5% of cost of production (of the total premium cost, GoN bears 75% and farmer 25%) Farmers can claim up to 90% of total production cost if crop failure is totally caused by beyond of farmers control	PALPA: DADO Office
6	Maize	50% - 75% financial subsidies for buying seed of Maize to farmers group.	Jajarkot: DADO Office
7	Wheat	50% subsidy for buying seed along with transportation to Agriculture Service Center near to group	Jajarkot: DADO Office
8	Rice	1 KG seed kit in 100% subsidy in limited numbers for Rice pocket areas.	Jajarkot: DADO Office
9	Wheat thresher	25% financial subsidy	Jajarkot: DADO Office

10	Corn thresher	50% financial subsidy	Jajarkot: DADO Office
11	Hand paddy harvester (along with motor, Petrol engine)	50% financial subsidy	Jajarkot: DADO Office
12	Paddy winding hand machine	50% financial subsidy	Jajarkot: DADO Office

* Example: If a farmer needs NRs 10,000.00 for cultivation of cauliflower on one ropani (20 ropani = one Ha.) of land then the premium amount is 10,000*5%=500.00.

Of the total premium amount of NRs. 500.00, the farmers' contribution = 500 * 25% = 125 and GoN's subsidy is equal to 500 * 75% = NRs. 375.

In case of crop fully damaged/failure beyond farmers capacity/control the amount that a farmer can claim is 90% of total cost of production i.e., 100,000*90%=9,000.00

If the crop is partially damaged than he/she can claim @ 90% based on the assessment of crop losses.

NOTE: Loss claim is eligible only for production cost, not from expected income in terms of monitory value of crop production.

Source: Information collect from different sources by KISAN Staff, February 2016

Annex 10: Subsidies in Rice Wheat and Maize in Uttar Pradesh

SUBSIDIES IN RICE, WHEAT AND MAIZE PRODUCTION IN INDIA

S.No.	Subsidy in Rice, Wheat and Maize Production	Details of Subsidy	Source
I	Agriculture machinery		Department of Agriculture, UP
	Tractor (till 40 H.P)	25% of fixed price or Rs 45000, whichever is less	
	Power Tiller (8 H.P. or more)		
	Pump Set (till 75 H.P)	40% of fixed price or Rs 45000, whichever is less	
	Seed drill, sugarcane cutter, plotter, reaper, binder		
	Power thresher	50% of fixed price or Rs 10000, whichever is less	
	Fan, chief cutter		
	Tractor mounted sprayer	40% of fixed price or Rs 20000, whichever is less	
	Aeroblast sprayer		
	Rotaveter	25% of fixed price or Rs 12000, whichever is less	
	Seed Drill/ multicraft plotter		
	Knapsack prayer/ foot sprayer/ power sprayer	25% of fixed price or Rs 2000, whichever is less	
	Lazer Land leveler	25% of fixed price or Rs 4000, whichever is less	
	Pump set		
	Sprinkler set	25% of fixed price or Rs 25000, whichever is less	
		50% of fixed price or Rs 30000, whichever	
		50% of fixed price or Rs 3000, whichever is less	

		50% of fixed price or Rs 150000, whichever is less 50% of fixed price or Rs 10000, whichever is less 50% of fixed price or Rs 75000, whichever is less	
2	Maize Seed	Rs 5000 per quintal or 50 % of cost, whichever is less	Department of Agriculture, UP
3	Wheat Seed	RS 500-900 per quintal depending upon age of the seed	Department of Agriculture, UP

Annex 11: List of Respondents

SN.	Name of Person	Occupation/ Designation	Contact Details
1	Sudhakar Jaiswal - Large Size Rice Miller	Director, Shikharpur Agro Industries, Nautanwa, District Maharajganj, Uttrakhand India	955972444
2	Rakesh Manikore - Medium Size Wheat Flour Miller	Director, Wheat Flour Mill, Nautanwa, District Maharajganj, Uttrakhand, India	9838501248
3	Subhash Jaiswal - Village Level Grain Aggregator	Village Level Trader, Lotan, Nautanwa, District Maharajganj, Uttrakhand, India	9839548854
4	Manoj Kumar - Village Level Grain Aggregator	Village Level Trader, Adda Bazzar, Nautanwa, District Maharajganj, Uttrakhand, India	9519341300
5	Ajay Kumar Agrohi - Seed and Grain Trader	Ansh Traders, Trader and Distributor of Seeds, Naugarh, District Chandauli, Uttar Pradesh, India	8400499373
6	Nirmal Chapparia - Large Wheat Flour Miller	Wheat Flour Mill, Naugarh, District Chandauli, Uttar Pradesh, India	9415122905
7	Zubair Ahmed - Seed Company Rep.	New India Seed, Badni, Uttar Pradesh, India	8005067851
8	Sant Ram - Medium Size Rice Miller	Shyam Traders, Rice Millers, Badni, Uttar Pradesh, India	737641665
9	Mayaram - Big Rice Miller	Bharat Enterprises, Rice Miller, District Balrampur, Uttar Pradesh, India	
10	Sanjay - Small Rice Miller	Shiv Shakti Enterprises, District Balrampur, Uttar Pradesh, India	9793880917
11	Vijay - Grain Trader	Vijay Traders, Grain Trader, Bahraich, Uttar Pradesh, India	8874713490
12	Vijay Kedia - Grains Exporter	Suraj Mal Mohan Lal - Grain exporters, Bahraich, Uttar Pradesh, India	9415054280
13	Nitish Lath - Grains Exporter	Lath Traders - Grain Exporters, Grain Market, Bahraich, Uttar Pradesh, India	9415036876
14	District Marketing Office	Uttar Pradesh State Agricultural Marketing Board, Bharaich, Uttar Pradesh, India	
15	Arvind Kumar Sah - Small Rice Miller	Dev Bhar Rice Mill, Nepalgunj, Nepal	
16	Punam Chandra Tater - Large Flour Miller and Retailer	Golcha Flour Mill, Large Scale Millers of Wheat and Rice, Nepalgunj, Nepal	
17	Pradeep Chajjer, Executive Director - Large Miller and Retailer	K L Duggad Group, Large Scale Millers and Retailers, Nepalgunj, Nepal	
18	Local Grain Broker	Grain Market, Nepalgunj, Nepal	

19	Shiva Prasad Jaiswal - Small Rice Miller	Dinesh Siva Enterprises, Bahadurgunj, Kapilvastu, Nepal	9847085812
20	Satya Narayan Gupta - Trader	Shiv Sagar Galla Bhandhar, Grain Trader, Krishnanagar, Nepal	
21	Krishna - Trader	Sameer Enterprises, Grain Trader, Krishnanagar, Nepal	9857055101
22	Farmer Group Meeting	Sitaram and Deurali Krishak Samuha, Tilaurkot, Kapilvastu, Nepal	
23	Bhagwandas Agrahari - Medium Size Rice Miller	Shiva Shakati Rice Mill, Dohani 4, Kapilvastu, Nepal	9857050951
24	Siya Ram Agrahari - Trader	Grain Trader, Bhairawa, Nepal	9847032544
25	Bhairav - Poultry Feed Miller	Abhishek Dana Udyog, Poultry Feed Millers, Bhairawa, Nepal	9857021155
26	Saudagar Jaiswal - Large Rice Miller	RK Agro, Bhairawa	9857024327
27	Tara Khatiwada - Poultry Feed Co.	Well Hope Agri. Tech Pvt. Ltd. Bharatpur Municipality 13, Kalyanpur, Chitwan	9802902869
28	Pancha Shakati Feed Industries - Poultry Feed Miller	Kalyanpur, Main Office Belchowk, Narayanghadh, Chitwan	
29	Basant Paudel - Poultry Feed Miller	R R Feed Industries, Gita Nagar, Chitwan	9855059305
30	Farmer Group Meetings	Bharatpur and Khairani Municipality, Bharatpur	
31	Pradeep Kumar, Executive Director - International Trade	Nimbus Group - International Trade, Kathmandu	
32	Dinesh Gautam, CEO - Poultry Feed	Nimbus Group - Poultry Feed Mill, Kathmandu, Nepal	9802030977
33	Manish Khemka, Executive Director - Large Wheat Millers	CG Seeds, Thapathali, Kathmandu, Nepal	9801089850
34	Devendra - Rice Importer & Distributor	Jai Kamla Store, Kathmandu, Nepal	5524163
35	Devendera Shrestha - Rice Importer and Distributor	Devender Trade Center, Kathmandu, Nepal	9801026125
36	Laxmi Dhakal - Chairman, Seed Entrepreneurs Association	Seed Entrepreneurs Association of Nepal (SEAN), Kathmandu, Nepal	9858420560
37	Basanta Marahatta - Secretary, Seed	Seed Entrepreneurs Association of Nepal, Kathmandu, Nepal	9851064923

	Entrepreneurs Association		
38	Directorate of Agriculture, Lucknow	Department of Agriculture, Lucknow, India	
39	Director of Research	Pantnagar Agricultural University, Pantnagar, Uttrakhand, India	
40	Head of Agricultultural Economics	Pantnagar Agricultural University, Pantnagar, Uttrakhand, India	