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Postharvest assessment of rice production in Northern Samar Philippines

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Abstract

The study conducted to determine the rice harvest for 2011-2012 agricultural season, harvest contribution to the food availability of the households until the next harvest, identified the main constraints facing by the farmers during the season and assess mitigating factors to overcome constraints. Survey revealed that 59% of farmers were land tenants, tenants families were the subsistence farmers belongs to marginalized group, while 20% of farmers indicated they were landowners of the land they cultivated and 21% of farmers were landless group like the laborer, carpenters, tricycle drivers and other works. The average production per hectare was 20.71 bags. The main factors that has contributed to very low production was the attack from pests and diseases (84%), the major pests are black bug and rats. Inadequate farming technique were farmers still applying traditional farming system (trampling) due to lack of appropriate training, lack of capital to pay for proper plugging and irrigation, crop maintenance and fertilization. Farmers own produced palay were lasted only an average of 6 months. Other source of food were among the strategies to allow farmers to live up to the next harvest were purchased local food in the market or store (71%), domestic laborer or daily worker (49%), taking debts from relatives (37%), selling of livestock (15%), relaying on gift (9%) and consume the seeds intended for planting (9%).

Keywords: Assessment; Food; Mitigating; Postharvest; Rice Production

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1. Introduction

In 2010 the Philippines harvested a total of 15.77 Metric Tons (MT) of rice of which 73% came from irrigated areas and 27% from non-irrigated or rain-fed areas. The average land size for rice production is only one hectare. The country harvested a total area of rice from 4.53 million hectares (ha) in 2009, about 59% and 39% lower than in Thailand and Vietnam, respectively. Thailand has a far bigger total area planted to rice, but the Philippines has a higher yield of 3.59 MT per ha compared to Thailand of 2.87 MT per ha. The average yield for irrigated rice is 3.99 MT per ha, while non-irrigated has only 2.87 MT per ha. in the country (Department of Agriculture, 1898).

Rice industry consolidating in many countries, there are opportunities to fortify a significant share of rice for distribution or for use in government safety net programs that target those most in need, especially women and children. Multisectoral approaches are needed for the promotion and implementation of rice fortification in countries (Muthayya et al., 2014).

Weather aberrations, climatic fluctuations such as El Niño, and the growing concern for their effects on agriculture have stimulated academic, public and policy-level interests on the analysis of the impacts of climate variability on agricultural production systems. Long-term climate variability influences sowing date, crop duration, crop yield, and the management practices adapted in rice production (Lansigan et al., 2000).

The non-conventional inputs such as irrigation, adoption of hybrid and third generation modern inbred varieties, attendance at rice production training sessions, use of high quality seed, inefficiencies in extension and irrigation investments and machine ownership were the main sources of production growth. This implies that further investment in rice Research and Development is essential. This suggests that reforms in the current extension system and a reorientation of the irrigation development strategies should be implemented in order to reap the potential benefits from these investments (Laborte et al., 2009).

The Philippines feeds an average of 20 persons per hectare of rice area harvested. In 2009, the average seeding rate using high-quality in-bred seeds was 69 kg per ha which is high considering the recommended rate at 40 kg. per hectare (Department of Agriculture, 1898).

The average total expenditure for paddy rice production in 2009 is PhP 25,516 per ha. of which 45% is accounted for labor and 18% for pesticides. This indicates that rice production can be more competitive if labor cost can be reduced and better pest management provided.

For irrigated lowland rice the field is prepared by plugging 3 to 4 weeks before planting. It is then flooded, and harrowed after 5-7 days. The field is kept flooded and harrowed again and levelled before the scheduled planting. Rice seedlings are transplanted 20 to 25 days after sowing at 2-3 seedlings per hill with a planting distance of 20 cm x 20 cm. Water is maintained 3 to 5 centimeter during the entire growth cycle which is around 110 to 120 days for modern rice varieties. Nitrogen fertilizers are usually applied during vegetative and flowering stage, and weeding is usually done manually. Water is drained 2 weeks before harvest (Department of Agriculture, 1898).

Asian rice cultivated under rain-fed systems is highly dependent on climatic changes, resulting in uncertain rice yields and supplies. The combination of these varying factors results in volatile rice prices and volumes traded (Muthayya et al, 2014).

Palay (unmilled rice) is harvested usually manually when 80 to 85% of grain is mature. Threshing is done manually or mechanically. Palay is clean and dried at 14% moisture content and milled. Farm gate price of palay is PhP 15.00 per kilogram (kg) if a farmer is a landowner he would receive a net return of P8.00 per kg of paddy rice produced. Six pesos of which returns to own labor and two pesos returns to land. If the farmer is a land lessee, the return would be slightly lower at PhP 6.00 per kg. Since Filipino farmers cultivate only a hectare of land on individual average, income from rice farming is still not enough to sustain a household even though the turn per kilogram of paddy rice is high (Philippine Statestics Authority, 2013).

Eighty-nine percent (89%) of all rice is used as food. Seed account for 2% of total utilization, processed rice products for 3%, and feeds and wastes for 6%. Milling Recovery Rate (MRR) is only 62.85%. This means that it will take almost 160 kg. of paddy rice to produce 100 kg. of milled rice (Philippine Statestics Authority, 2013).

Despite relatively high production, the Philippines contend with declining level of sufficiency and increasing dependence on imports. From 91% in 1990, the level of self-sufficiency decreased to 80% in 2010. This is because of the fast increasing population (almost 2% per annum) and the rising per capital consumption of rice. The Philippines, the world's biggest rice buyer, imported a total of 2.05 million metric tons of rice in 2010. In 2008 the country imported near the record 2.3 million tons, which helped send grain prices to all-time highs. Benchmark Thailand rice prices currently stand at $565 a ton free on board, well short of the values above $1,000 hit in early 2008 when worries about food security caused panic buying of the grain. The country lost in 2008 1.3 million tons of paddy rice, equivalent to around 845,000 tons of milled rice, after three typhoons hit key rice-growing areas in the main Luzon island from late September (Philippine Statestics Authority 2013).

1.1. Objectives

These Post-Harvest Assessment objectives were:

1- To assess the rice harvest for 2011-2012 agricultural season.
2- To determine the contribution of the harvest to the food availability of the households until the next harvest.
3- To establish the main constraints facing by the beneficiaries during the season and understand mitigating factors to overcome these constraints.

2. Materials and methods

2.1. Sampling procedure for household assessment

A simple random sampling methodology was used and where households were determined using Krejcie and Morgan formula. The sampling method adopted for household selection was designed to meet the statistical

requirements of representativeness, randomness and minimize bias. A total of 320 households randomly selected were interviewed in 21 Barangays out of 53 barangays of Las Navas municipality. Due to security and accessibility constraints five randomly selected villages were replaced purposively by others.

Interviews were conducted on the head of the household or the eldest member of the household at the time of the visit.

2.2. Qualitative assessment

Key informant interviews and focus group discussions with farmers (men and women together) were conducted by the team with support from 1 volunteer for translation from local language to English while field officers from the team conducted individual households' interviews. A total of 12 group discussions were held in 12 Barangays. These groups comprised between 25-50 farmers households being represented by heads (female or male) of households.

2.3. Training for the assessment

The team carried out a training for 17 volunteers who have been supporting the quantitative data collection at household level. The training programme was both theoretical explaining in detail the methodology for this assessment and practical to give an insight into challenges of applying the questionnaire in the field and in order to reach consensus on the questions and uniform understanding of how and what to ask in the households. The duration of the training was conducted in a one working day, see fig.1.

2.4. During the assessment the following activities were performed:

- Developing a detailed field data collection tool: Structured questionnaire for households' survey and a check list to help guiding focus group discussions.
- Training of the team member's field officer as well as community volunteers whohave performed the survey.
- A data Entry matrix was developed
- Processing and statistical analysis using SPSS 18.0 and Excel.

2.5. Geographical area

Northern Samar is a province in the Philippines located in the Eastern Visayas region. Its capital is Catarman and is located at the northern portion of the island of Samar. Bordering the province to the south are the provinces of Samar and Eastern Samar.

3. Result

The Survey revealed that the mean household's size in Northern Samar was 6 individuals per household. 14.7% of rice seeds household's beneficiaries were female headed households while 85.3% were male headed

households. The survey has revealed that 98% of beneficiaries were residents while 2% considered themselves as visitors. The average number of children under five per family was 0.68 while the average number of women adult which age was over 60 was 1.75 and adult man over 60 years average number was 1.87 per family.

3.1. Cultivated land and rice production

The survey revealed that 59% of farmers were land tenants while 20% of farmers indicated they were landowners of the land they cultivated and 21% of farmers were landless. Among the land tenants the assessment reveals that 60% of land tenants were male and 40% female while among the 20 % of land owners only 12.5% are female household's heads. The average cultivated land per households was 2.58 hectares and around 3% of beneficiaries own greater or equal to 10 hectares and less than 30 hectares (ha.).

The average land size for women headed households was 2.99 while the average land for men headed households was 2.51. The survey indicates that the average production was 53.45 bags of rice (I bag is equal to 45kg) means a total of 2,405.25 kg. The average production per hectare was 20.71 bags which was very low compare to the country average around 40 bags per ha. in lowland rice farming in the Philippines. One bag of rice at the time of the assessment costs 600 Pesos means in average each family has been able to produce 32,070 Pesos (763 US dollars).

Farmers have indicated that 60% of their production were sold, this mostly for farmers to pay their debts that they have accumulated during the past 2 years. One of the main factor that has contributed to very low production as mentioned by the farmers was the attack from pest mainly rodents and black bugs and diseases (84%). On top of this there should also be mentioned the inadequate farming technique in majority of villages were farmers still applying traditional farming system the Payatak (trampling) due to lack of appropriate training and lack of capital to pay for proper plugging and irrigation, crop maintenance and fertilization.

This result in poor land preparation and recrudescence of weeds that host insects and rodents and compete for nutrients with rice. During focus group discussion, farmers informed of several complex ways of land and crop sharing systems in the area of Northern Samar. In fact, a landowner who has no available draught power for land preparation can negotiate with a farmer who has carabao (water buffalo) for land preparation with a 50:50 sharing scheme of the harvest. The next work of the landless was during planting where they are paid PhP 50 to 60 for 800 square meter plot. The next work that entails was during the harvest season, where the laborers get one bag of wet palay for every six bags (1/6) for harvesting and threshing the rice.

3.2. Total cultivated land

The majority of farmers (83%) have informed that the principal source of seeds was from the Department of Agriculture seeds distribution. Taking into consideration that these were new varieties that farmers did not use before, other sources of seeds have been used such buying from local market, borrowing from friends and very few used seeds from own stock.

The survey indicates that 23% of farmers have been able to increase their total cultivated land while 61% have kept same level as last year. 16% of farmers who have mentioned that they have cultivated less this year compare to last year gives.

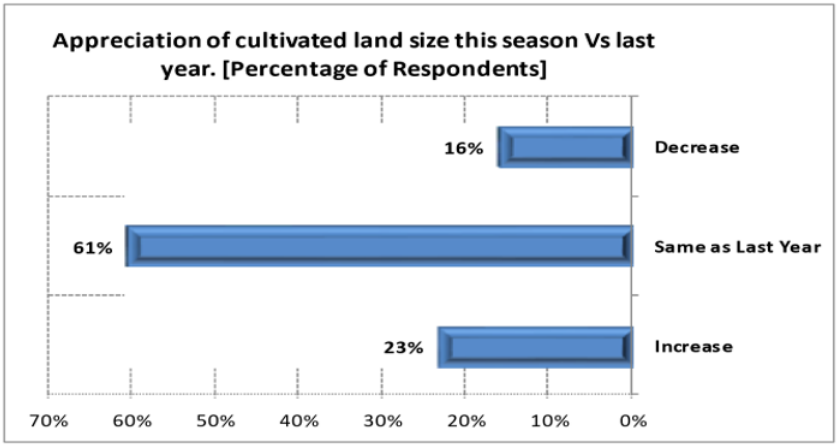

Figure 1. Appreciation of total cultivated land per year

3.3. Cultivated land decreased in a year

Thirty percent (30%) of farmers whose cultivated land has decreased have mentioned that sickness during planting period was the main cause, while 26% inform that lack of sufficient water (Insufficient rainfall) in rain-fed rice cultivation was the main reason. For 23% the lack of access to enough agricultural land was mentioned to be the main factor that affected the total land cultivated.

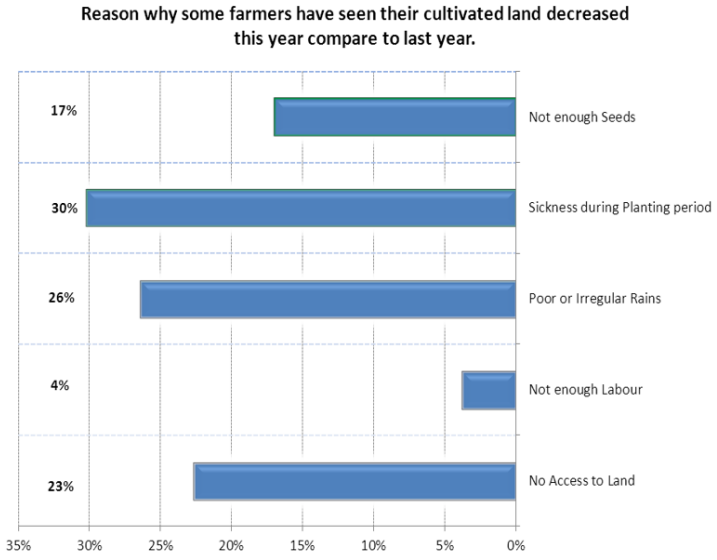

Figure 2. Reason why some farmers have seen their cultivated land decreased this year

3.4. Crop condition appreciation

Crop condition as shown in this graph states that 23% of farmers have seen normal crop of rice during this agriculture season. While 67% mentioned that the crop condition was good and 11% mentioned to have seen crop failure.

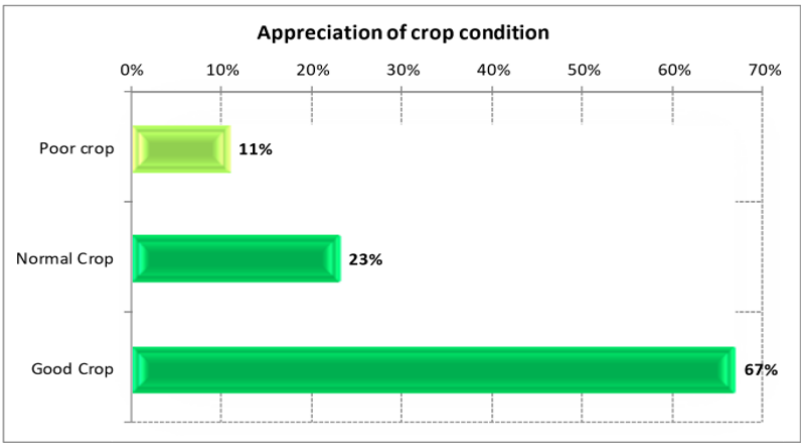

Figure 3. Crop condition appreciation by farmers

3.5. Harvest appreciation of farmers

The survey has revealed that for 63% of farmers living in Las Navas, the rice production was seen as above normal while 28% of farmers have indicated to have had normal harvest. 9% of farmers said that rice harvest was below normal. Farmers have indicated to have saved small amount of seeds for next season as they appreciated the quality and the yield of the rice varieties received from the International Non-Government Organization (INGO). During focus group discussion, needs for sufficient amount of seeds have been raised as farmers could not save enough.

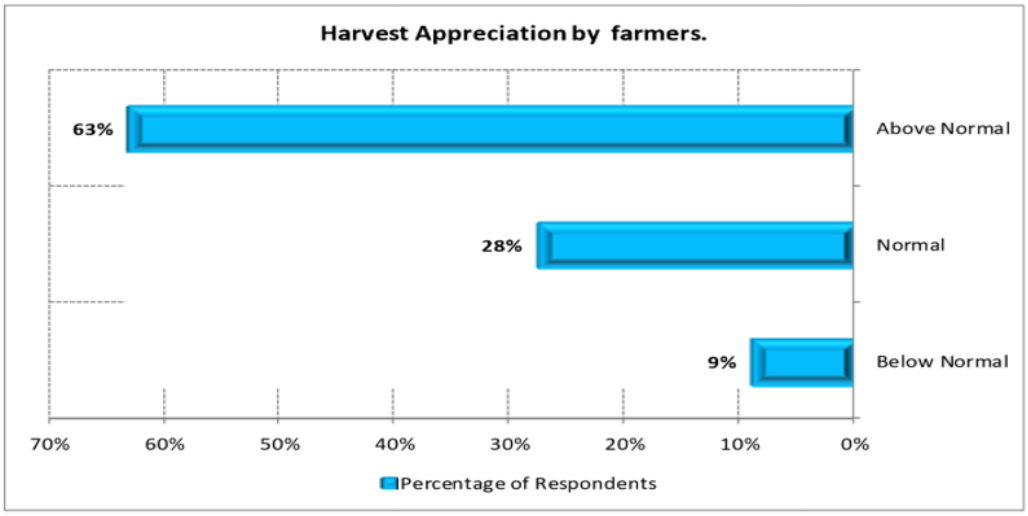

Figure 4. Harvest Appreciation this year for farmers living in Las Navas

3.6. Farmers with enough food from own production

The survey as indicated that farmers will use own produced food for an average of 5.86 months and then will rely on coping strategies as indicates in the graph. Purchase of food on local market or store (71%), rely on food casual labor/daily works (49%), taking debts from relatives (37%) or selling of livestock to buy food (15%). Relaying on gift (9%) and consume seeds stocks (9%) will be among the strategies to allow farmers to go up to the next harvest.

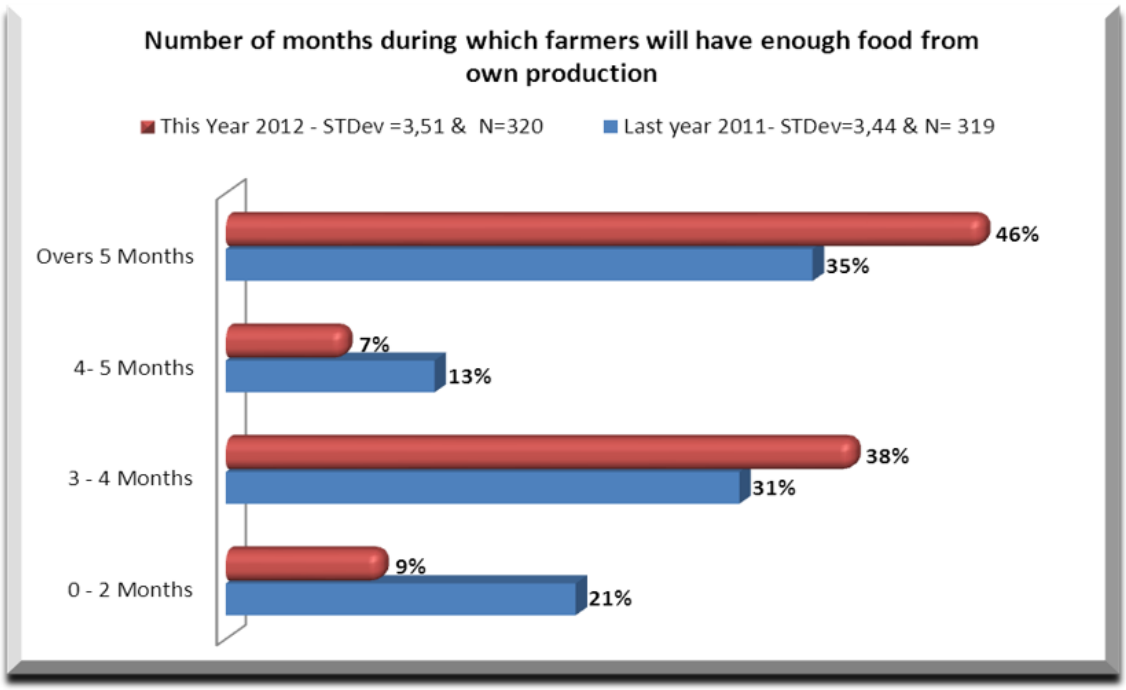

Figure 5. Number of month during which farmers will have enough food from own Production

3.7. Major production constrains of farmers

Eighty four percent (84%) of farmers in Las Navas areas pest attack and disease was the major constraint to rice production in year 2012. Flooding during heavy rains has been mentioned [36%] as another major constrain to crop production this year. The lack of appropriate farming equipment was for 19% of farmers seen as a major constraint to rice farming this year while 8% mentioned the lack of seeds. Although farmers could get access to their local variety which is low production, farmers have informed during focus group discussion to be in need of good quality rice seeds, early mature and higher production.

3.8. Correlation between Cultivated area and production

The survey has indicated that in year 2011 46% of farmers will have enough food for over than 5 months from own production compare to 35% the in year 2012. The seeds distribution has contributed to increase the portion of farmers who will have enough food from own production during a period of 3 to 4 months from

31% last year to 38% this year while reducing significantly the portion of those being able to eat only during a period of 2 months (from 21% year 2012 to 9% year 2013).

Table 1. Correlation between Cultivated area and production

		Cultivated Area	Production per bag
Cultivated Area	Pearson Correlation	1	.631(**)
	Sig. (2-tailed)		.000
	Sum of Squares and Cross-products	3 243.880	41 605.276
	Covariance	10.169	130.424
	N	320	320 1
Production Bags	Pearson Correlation	.631(**)	
	Sig. (2-tailed)	.000	
	Sum of Squares and Cross-products	41 605.276	1341 483.847
	Covariance	130.424	4 205.279
	N	320	320

*** Correlation was significant at the 0.01 level (2-tailed)*

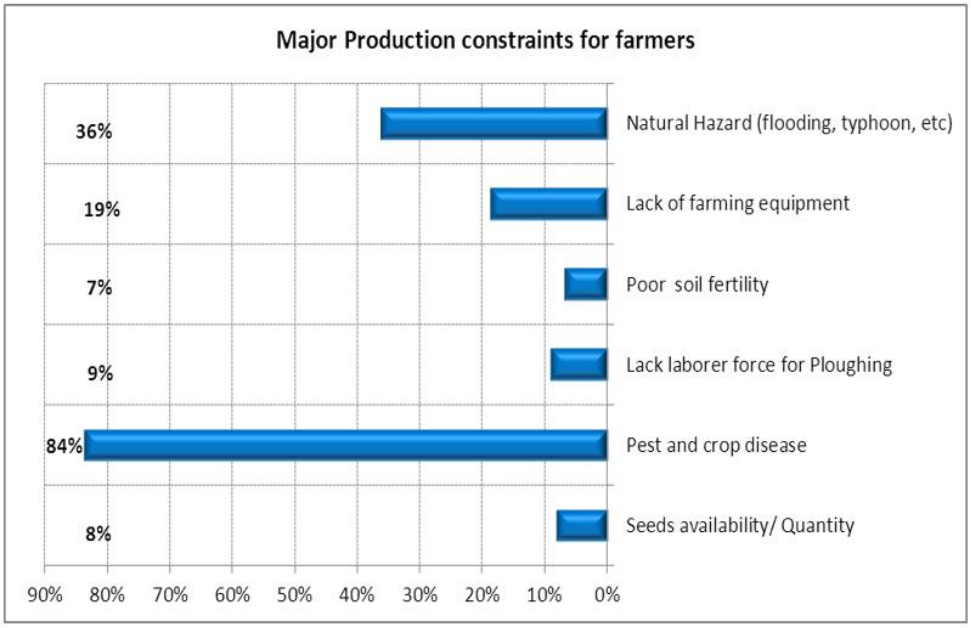

Figure 6. Major production constrains faced by farmers In Las Navas

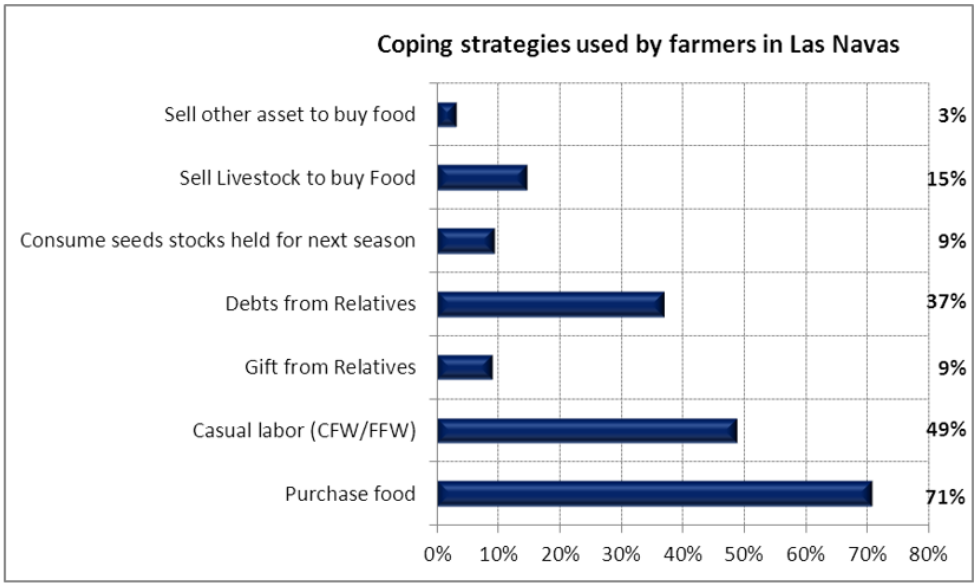

Figure 7. Coping strategies that farmers will use

4. Conclusion

This assessment has revealed that the major constraints and opportunities to rice production include;

4.1. Constraints

1- Pest attacks and disease on rice during cropping and limited attack during postharvest handling and conservation;
2- Lack of access to good quality rice seeds resulting in very low yields;
3- Crippling combination of lack of appropriate plugging forces and a nonexistent or limited extension services for adequate technical support to the farmers partly resulting in poor agricultural practices such as the Payatak (trampling) system;
4- Lack or limited of access to formal micro-credit, preventing farmers from taking formal loans for appropriate agricultural inputs;
5- Poor post-harvest facilities: lack of rice thresher, mechanical drier and appropriate storage compelling farming households to consume or sell their harvest early at unfavorable prices;
6- Labor constraints and lack of agriculture inputs preventing households from opening larger portion of agricultural land;
7- Natural hazard and regular flooding and unpredictable climate patterns in recent years;
8- Poor soil fertility as well as lack of bio or chemical fertilizers;
9- Inaccessible markets largely due to poor roads to link rural barangays to markets;
10- Non-existence of irrigation systems affecting rice and other crop production.

4.2. Opportunities

1- Support of the government in rice farming mechanization has started in its implementation;
2- Bottoms up planning were piloted in most of the municipalities to make use of the farmers taught, ideas, plan and decision making in improving their rice farming systems;
3- Low land rice areas are wide enough for rice farming expansion;
4- Water source for irrigation are abundant in the area;
5- Based on this study, politicians and law makers will somehow give more resources for rice farming in Northern Samar Philippines;
6- Based on this study, International Non-Government Organization and line agencies has the specific ideas to address causes in rice production.

4.3. Potential programming activities

It was clear from the overall analysis and the prioritized problems during focus group discussion exercises that any livelihood and food security programming in Las Navas should include:

1- Agricultural crop production activities focusing on extension technologies especially for rice- This should be done though partnership with the Department of agriculture by strengthening capacity of existing extension agents for appropriate technical support to farmers.
2- Pest and disease management through appropriate technical training
3- Good quality, early mature and high yield rice seeds dissemination,
4- Improving access to plugging forces and adequate agriculture inputs to enable farmers to opening more land for farming, reduce labor cost and increase their production.
5- Provide or improve access to irrigation systems for rice production would enable farmers to produce at least 2 times per year and increase their income.
6- Improve access to appropriate postharvest facilities such mechanical drier, rice threshers, etc. to reduce loose and create jobs opportunities for vulnerable farmers.

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