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Research article

IMPLICATIONS OF SOCIO-ECONOMIC CONDITIONS, RICE UTILIZATION, FARMING PRACTICES, AND LEVEL OFIMPLEMENTATION OF INTERVENTIONS, STRATEGIES AND POLICIES ON RICE SELF-SUFFICIENCY MANAGEMENT AND SUSTAINABILITY

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Abstract

Rice self-sufficiency is a challenge among the farming communities. As such a descriptive study is conducted in knowing the implications of socio-economic conditions, rice utilization, farming practices, and level ofimplementation of interventions, strategies and policies on rice self-sufficiency management and sustainability in Tudela, MisamisOccidental. This is according to the perception of the male and female farmer respondents. In-person survey interviews using survey questionnaire are used in 96 male and female farmer respondents in the six upland and lowland barangays of Tudela, Misamis Occidental. Results showed that the farmers obtained a good farming practice, which is supported by interventions from the agriculture sector and local government. However, farmers experienced relatively higher expenditures that affect their net income. Further, rice production is mostly for consumption of the family only and some surplus produce are sold. Rice sustainability is also dictated by some socio-cultural beliefs that augment their level of dependence to rice production. This study recommends further interventions through improved IEC materials on imparting knowledge, skills and financial management to achieve a more sustained rice production.

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Keywords: rice production,sustainable development, tropical agriculture, farming practices

INTRODUCTION

Rice is the single most important agricultural crop in the Philippines, and is therefore a major source of income for millions of Filipino farmers. The country rank 8th among producers of rice in the world and ironically, it is the world's top rice importer as well. Rice production in the Philippines has increased from 1.16 tons per hectare in 1960 to 3.59 tons per hectare in 2009, which is lower than the previous two years (2007 and 2008) due to damage done by two tropical storms-- namely Ondoy and Pepeng. Typhoons, floods, and droughts caused 82.4% of the total Philippine rice losses from 1970 to 1990 (Lansiganet al., 2000). Fluctuation in domestic rice production has a direct impact on food security, especially for the poorest people of Philippines (Koide et al., 2012). Philippines's high dependence on rice imports exposes the country to international market shocks and many have serious risk for food security (Dawe, et al., 2006; Timmer, 2010, Chhetry and Belbahri, 2009). Philippines has reached to its food self-sufficiency goal in 1978, however, it turned into a net importer of rice in 1984 (Umetsu et al., 2003). In fact, rice farming involving women is now recognized (Basser and Vedra, 2015) and organic farming is introduced (Barrot and Vedra, 2015.

Achieving self-sufficiency in food grain production is a key development objective in developing countries due to lack of foreign exchange to finance major international purchases. Self-sufficiency in rice is the primary goal of agricultural policy in the Philippines and achieving rice security is directly related to the nation's struggle in eliminating extreme hunger and poverty. An increase in international rice prices, world food crisis in 2008, high prices of agricultural inputs, rising population, natural disasters, increased urbanization, industrial land-use, and decreasing land area in rice been key factors in setting the nation back in its rice-self-sufficiency efforts (Diagneet al., 2013; Pate and Cruz, 2007; Rola, 1990; Timmer, 2010). With a 2% annual population growth rate and a steady increase in per capita rice consumption, imports will likely continue to play an important role in meeting the domestic demand for rice. The Philippine government in 2010 implemented program to support rice self-sufficiency, which mandates to reduce its import by 70% from 2.3 million tons in 2010 to 707 thousand tons in 2011.

Rice self-sufficiency is a key objective of most Asian governments, yet attaining that objective has been elusive for several countries over extended periods of time; long-term status as an exporter or importer is relatively constant, and is altered only by revolutionary events (i.e., major changes in policy or technologies). Traditional rice importers tend to eat less rice (and more wheat) than traditional exporters, so the determining factors behind rice self-sufficiency must lie on the supply side (Dawe, 2013). In addition to culture and pride, there are economic and political reasons for wanting to be self-sufficient. Importing countries, especially those that import a large share of domestic consumption, are particularly exposed to export restrictions and world price spikes because they rely on that market for supplies. While domestic price instability can just as easily be caused by domestic factors as by world price shocks (Rapsomanikis and Sarris, 2008), there is no denying that world price shocks can affect local prices, thereby prompting protests and sometimes riots (Arezki and Bruckner, 2011).

Self-sufficiency is the outcome of both domestic supply and demand, i.e. production minus consumption. Thus, efforts to achieve self-sufficiency can be through either the demand side or the supply side. On the demand side, self-sufficiency ratios can be improved if people derive more of their dietary energy supply from cereals other than rice. There is also some potential to cut down on food waste, although recently it was found out that post-harvest losses in Asian rice marketing systems are lower than commonly believed (Reardonet al., 2012)**.**But most efforts to achieve rice self-sufficiency focus on the supply side – how to produce more rice. Rice production can be increased through irrigation investments, use of new seeds, more or improved application of fertilizer, greater use of mechanization and higher support prices.

Expenditures on agriculture have been rising over time, as expression of the state's commitment to reduce poverty, raise rural incomes and household welfare, and promote foodsecurity. However, agriculture continues to exhibit disappointing performance, namely: laggardgrowth, lack of diversification and competitiveness, tepid productivity growth, and persistentpoverty among farmers. There is basis for attributing this performance at least in part to

faultydesign and execution of agricultural programs. Private goods provided as production support,most notably input subsidies, are contra-indicated based on case studies of past failures.Moreover, a series of audit reports document leakages and anomalies in these types ofprograms. This is consistent with international evidence that favors a shift in public expenditurefrom provision of private goods to provision of public goods. Extension is flagged owing toproblems in quality of services provided. Production support should be limited in duration andscope to goods characterized by market failure, most notably those embodying newtechnologies. Support for postharvest and processing facilities should be limited to strategicinvestments towards addressing coordination problems and facilitating market development.Among public goods (or goods with public good features), irrigation has not been found to beeffective based on econometric evidence. This places in question the current plan to ramp upinvestment on irrigation, making it far the largest single item for public spending on agriculture.Such investment plans should be reviewed given studies point to design flaws and otherimplementation problems in past irrigation projects. The public goods that do show evidence ofimpact on agricultural incomes and productivity are infrastructure such as roads, ports,electrification (under other infrastructure), regulatory services, and R&D for technologicalchange and agricultural modernization (Briones, 2013)

Growth of labor productivity meanwhile has largely stagnated, relative to laborproductivity in industry; however growth in agricultural output, together with themovement of labor out of agriculture has pushed up labor productivity growth in the 2000s. It isnoteworthy that growth in labor productivity in services has been declining despite being thebiggest contributor to output growth, due to rapid absorption of labor coming from agriculture.

In this context, a study is conducted to evaluate the implications of the socio-economic conditions, rice utilization, farming practices and level of implementation of interventions, strategies and policies in six barangays of Tudela, Misamis Occidental on rice self-sufficiency, management and sustainability.

MATERIALS AND METHODS

The study areas

This study was conducted in rice producing barangays of the municipality of Tudela, Misamis Occidental, Philippines. .Tudela is a fourth class municipality in the province of Misamis Occidental, Philippines. According to the 2010 census, it has a population of 27,371 people. Tudela is widely known for its colorful Binalbal Festival where many revelers are clad in very gory costumes like a Giant Halloween costume party. It is held every New Year's Day. Close to the border of Tudela is Sinacaban, its neighboring town to the north, is the ecotourism attraction of Misamis Occidental Aquamarine Park (MOAP).Tudela is bounded on the north by the municipality of Sinacaban, to the south by the municipality of Clarin, to the east by Iligan Bay and to the west by the municipality of Don VictorianoChiongbian and Mount Malindang. It is a 20-minute drive from Ozamiz City to the south, and a 45-minute drive from Oroquieta City to the north. The total area of the municipality is 98.52 sq km or equivalent to 9,852 ha. (Source: MPDO, Tudela).

This study was conducted in six selected barangays of municipality of Tudela, Misamis Occidental, Philippinesto gather information on the perceptions of farmers about their socio-economic conditions that were assumed to have some impacts to rice utilization and farming practices in Tudela, Misamis Occidental. Comprising the research locales of this study were the three barangays as Upland Stations 1 to 3 (S1-S3) and three barangays as Lowland Stations 4 to 6 with a total of 96 farmer respondents at 16 farmer respondents per barangay in Tudela, Misamis Occidental, Mindanao, Philippines.The six barangays that were considered in this study in the Upland barangays were Colambutan Settlement, Mitugas and Namut. In the Lowland barangays were Nailon, Pan-ay Diot and Taguima.

Research design

The method that was used in this study wassurvey descriptive design as it involved in describing, analyzing and interpreting the existing conditions of the farmers in six selected barangays of Tudela, Misamis Occidental, Mindanao, Philippines. The study used the descriptive research method. This dealt with the descriptive-normative form wherein a survey questionnaire was used to extract information from the 96 farmer respondents in Tudela, Misamis Occidental.

Respondents and sampling method

The sampling method used was stratified random sampling. The respondents involved in the socio-demographic and economic survey were used to get unbiased information on the problem presented. There were48 randomly selected upland and 48 lowland farmers from the representative barangays of Tudela, Misamis Occidental. The respondents of this study were theactual rice farmers cultivating a parcel of land devoted to rice production in the rice growing barangays of Tudela, Misamis Occidental, Philippines The respondents were the residents of Tudela, Misamis Occidental and were chosen by random sampling who were classified as rice production farmers. During the barangay visitation phase, the barangay rice production farmerswere selected by draw by lot wherein their individual names had been written on a sheet of paper, rolled and placed in six boxes that had been labelled as S1 to S3 for upland farming barangays and S4 to S6 for lowland farmers to correspond to the six barangays. The boxes wereshaken well to avoid the settling down of some of the papers. Fifteen names had been picked from each of the labelled boxes which then became the respondents of the said barangay station.

RESULTS AND DISCUSSION

Managing pests in rice farms

The farmer respondents both in the upland and lowland areas of Tudela were asked in terms of managing pests in their respective farms. In particular, they were asked on the occurrence of some pests and the pest control mechanisms employed. The common pests in the ricefields were birds (19.79%), rats (11.45%), and black bugs (10.41%). The rests of the pests were army worms, stem borers, and rice bugs (Figure 2). In managing the pests, the farmers opted to drive then away (20.83%), water management with sprays (19.79%), improved sanitation (11.45%), leaving them behind (11.45%), while did some rituals (10.41%), and tie string (7.29%) (Figure 1).

Some farmers opted to use pesticides (14.5%) in controlling pests in their farms. While others did not apply pesticides (75%). Application of pesticides was done once (4.16%), or twice (10.41%) or as needed (7.29%). Again, majority of the farmers did not apply pesticides in their farms (Figure 2). In short, some rice produced was pesticide-free, which could be beneficial to the health-conscious consumers.

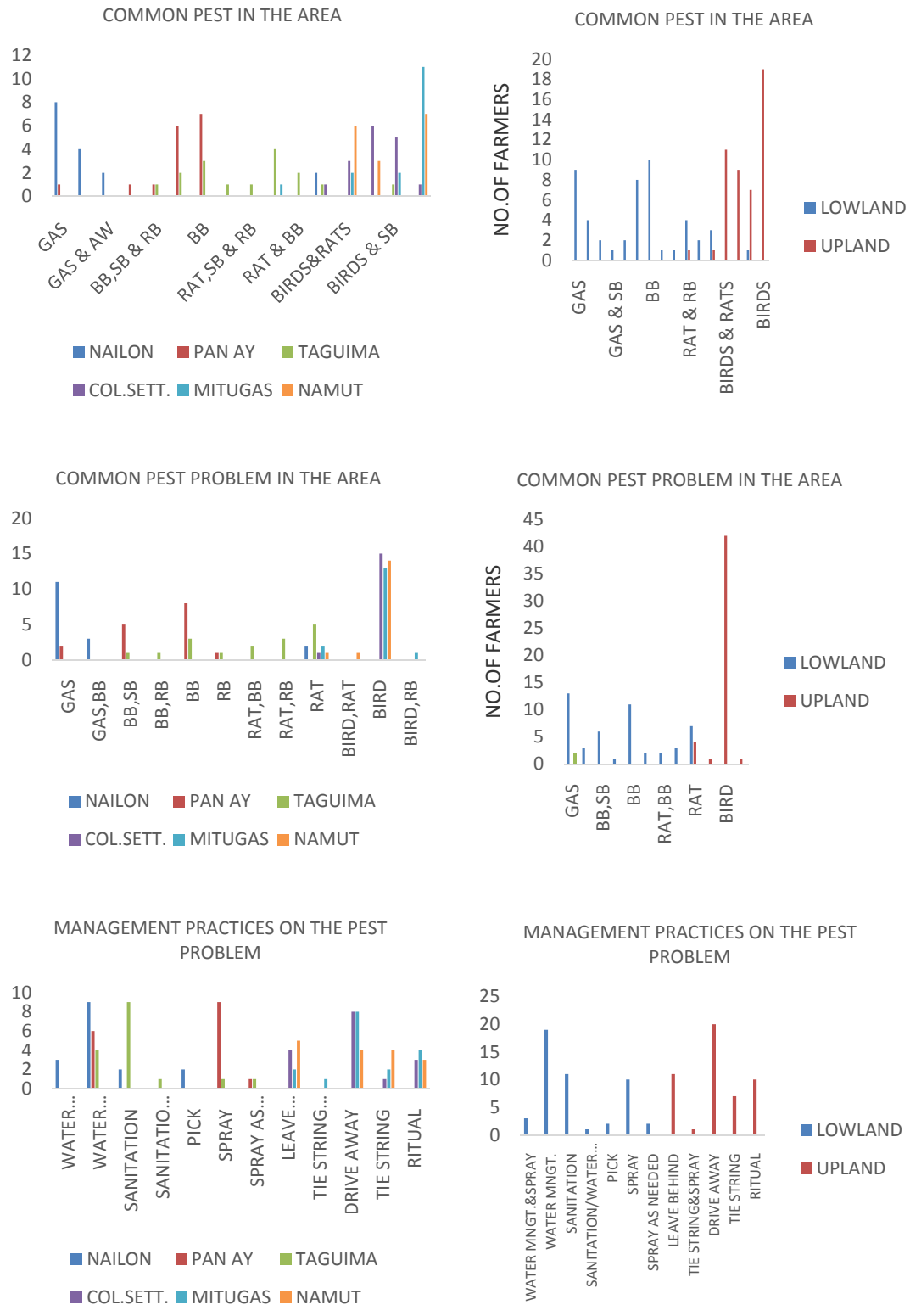


Figure 1. Distribution of farmers' response in terms of common pest in the area and management practices used in the upland and lowland barangays of Tudela, Misamis Occidental.

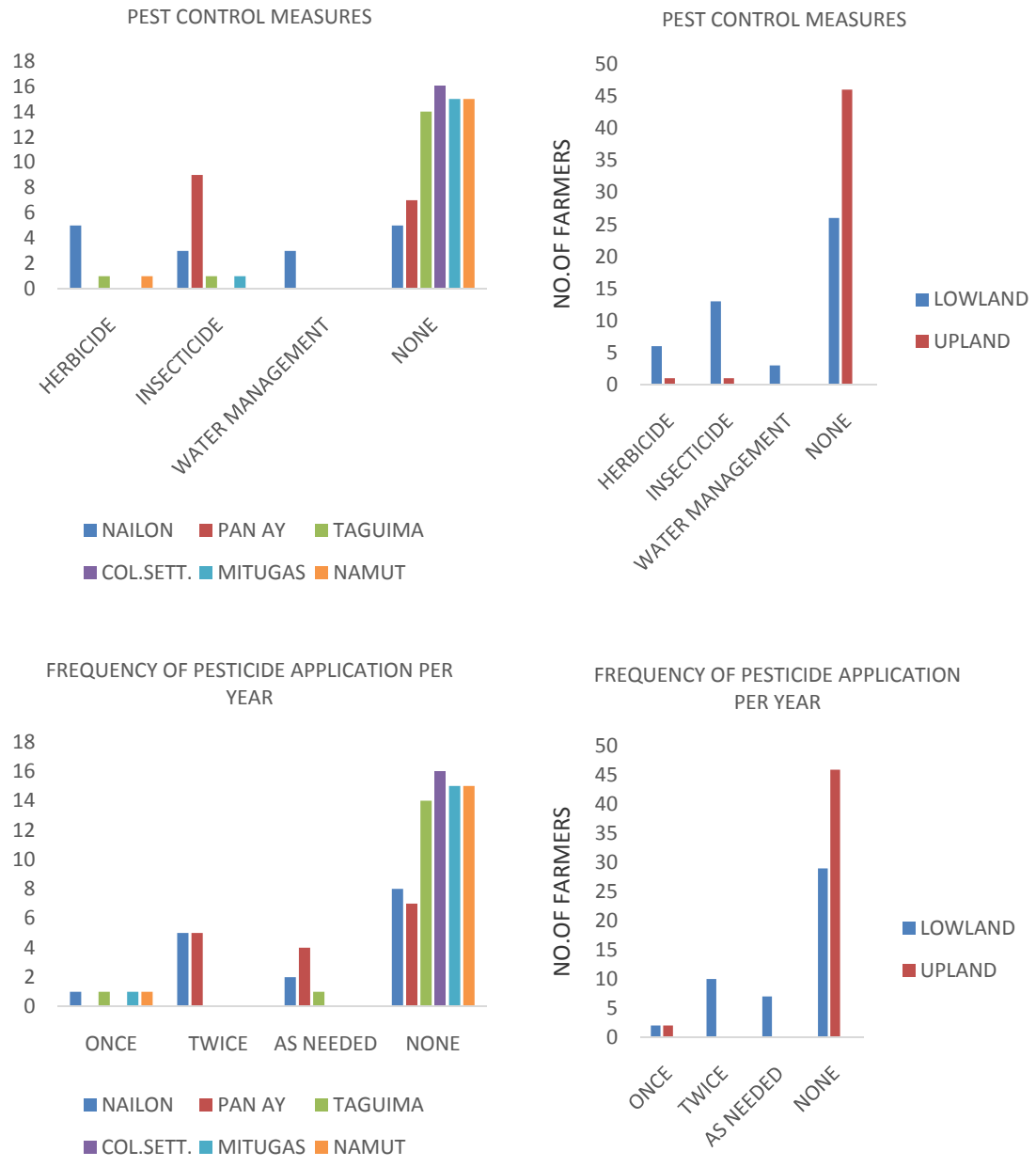


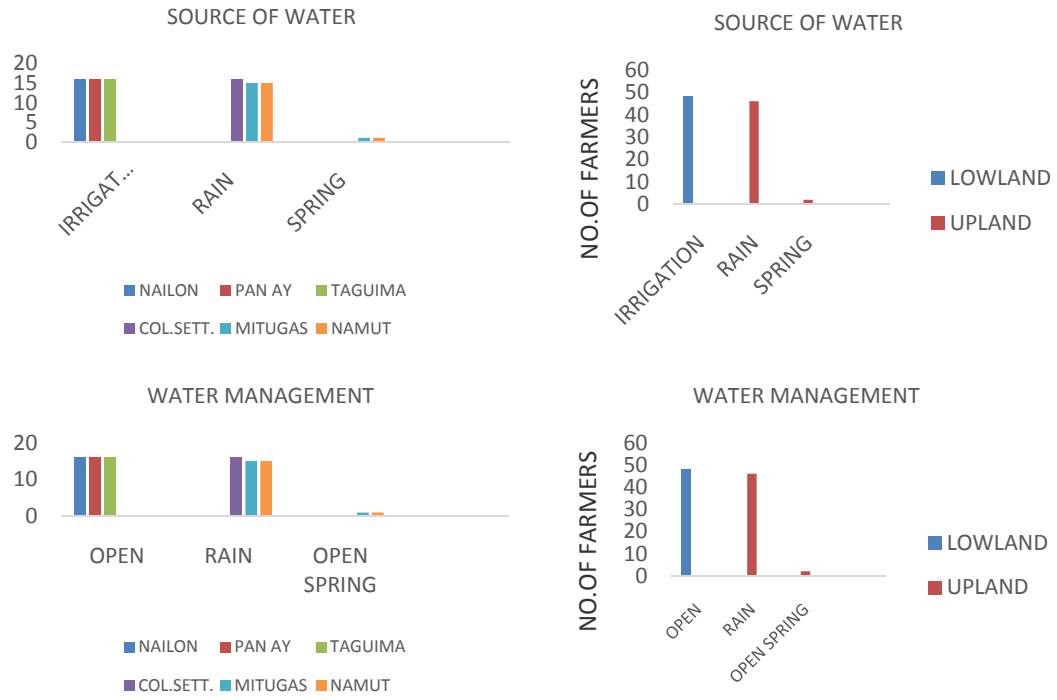
Figure 2. Distribution of farmers' response in terms of pest control measures and pesticide application in the upland and lowland barangays of Tudela, Misamis Occidental.

On water supply concerns

Water supply is important in rice production, especially in lowland farmers. Irrigation waters were mostly used (50%), although posed some corresponding payments. Others used rain-fed farming (47.91%) and spring waters (2.08%). In terms of water management, majority were using the open water sources (50%), while some used rain (47.91%) and open spring (2.08%) (Figure 4). Mostly, their rice farms had adequate water supply (52.08%), and some farms were rain-dependent (Figure 4). Rain-dependent rice farms did not require much capital, yet it might affect their cropping yield and frequency of farming or cropping season. Most of them did not encounter some problems in terms of water supply (95.83%). Some felt problems in flowing waters (4.16%) (Figure 3) as inputs like pesticides and fertilizers were carried away from their rice farms.

On farm tools and machineries

The farmer respondents were asked on the common farm tools and machineries they used. This is important in obtaining maximum rice yields through efficient land preparations and farm maintenance. Several tools were used such as scythe and hoe (34.37%), plow, sickle and shovel (8.33%), bolo (7.29%) and weeder sprayers (5.20%) (Figure 4). Should be given a chance, the farmers wished to own some farm materials, tools and equipment such as plow and carabao (21.87%), mud boat (9.37%), and tiller turtle and harvester (8.33%). Some farmers no longer wished of having farm materials and equipment (37.50%). This is because they seemed to be worried of some concerns on maintenance, fuel and operators.



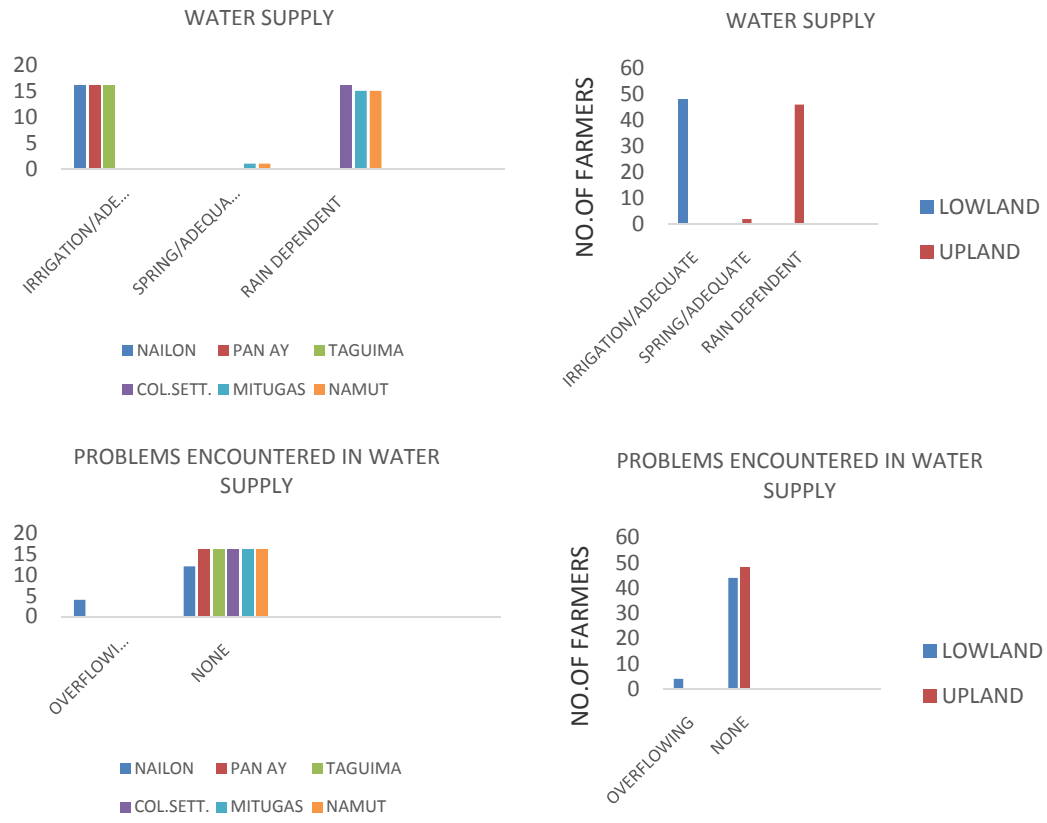
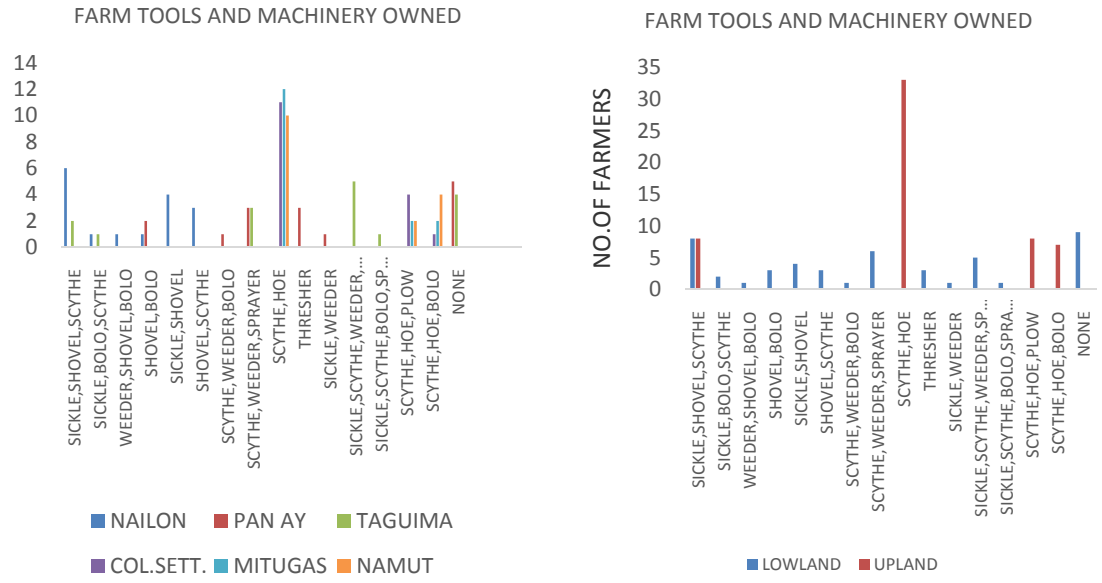


Figure 3. Distribution of farmers' response in terms of water management, supply and problems encountered in the upland and lowland barangays of Tudela, Misamis Occidental.



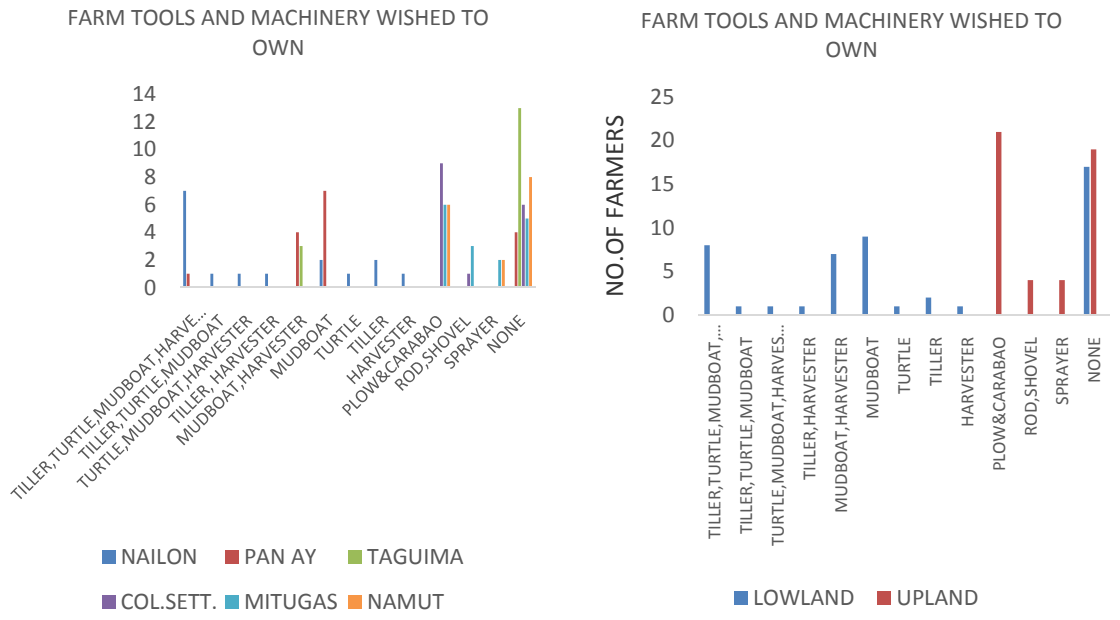


Figure 4. Distribution of farmers' response in terms of farm tools and machineries used in the upland and lowland barangays of Tudela, Misamis Occidental.

Post-harvest management

Rice when harvested required an efficient post-harvest technology and management. This is to ensure that the yield obtained from rice farming is optimized and losses be avoided. Some items were asked such as types of drier, problems on post-harvest, the size of farms, average rice production per cropping season, price of *palay*and milling recovery. In terms of drying, laminated sacks (58.33%) were mostly used apart from using solar mats (41.66%). Some problems were encountered prior to rice harvest due to bird consumption of grains (50%), few laborers were contracted (31.25%) due to some labor concerns, expensive labor fee (10.41%) and occurrence of thieves (4.16%). Size of the farm matters as well to project the amount of rice to be dried or harvested. Mostly, sizes varied at 0.1 to 0.25 has (31.25%), 0.25 to 0.50 has (27.08%) and 0.76 to 1.0 has (25%) (Figure 5).

On the average, rice production obtained per cropping season had 0 to 999 kg/has (35.41%). Some obtained yields such as 3,000 to 3,999 kg/has (14.58%) and 4,000 to 4,999 kg/has (19.79%) (Figure 7). Rice produced was mostly for consumption purposes only (50%). However, if *palay*was bought on site, it obtained prices at P18.00/kg and 17/kg at 29.16% and 16.66%, respectively. In terms of 'clean' rice recovered after milling, it revealed that 85.41% were recovered, while others observed to have a recovery percentage of 45% and 55% at 5.20% and 7.29%, respectively (Figure 6). Price of rice per kilogram prior to milling is also important if farmers gained from farming and avoided further expenses incurred. Usually, prices ranged from P2.00 to P2.50 per kilogram of *palay*at 5.20% and 44.79%, respectively. Most of the farmers preferred rice mills (50%) in milling their *palay,* while in the uplands, they preferred using mortar and pestle (50%) (Figure 7).

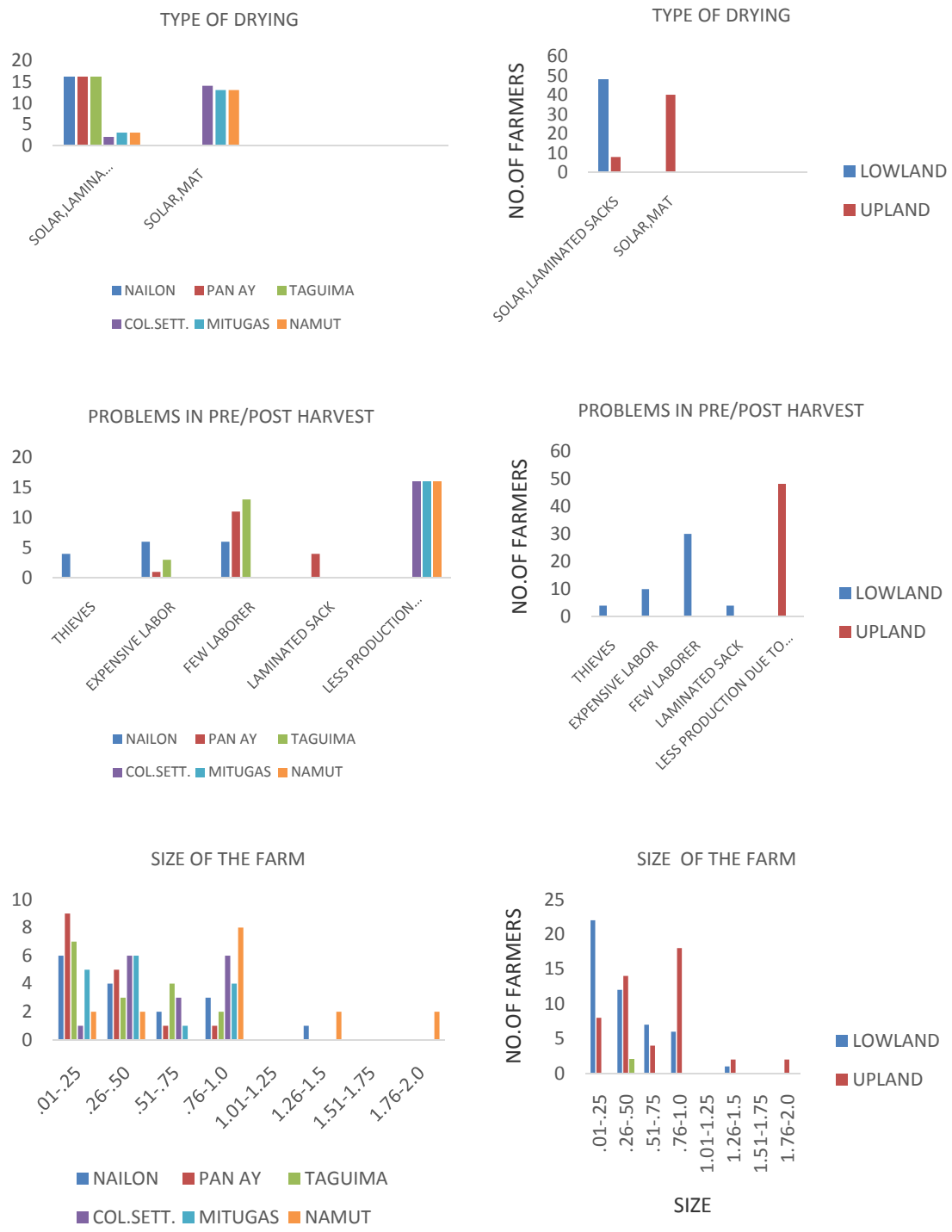


Figure 5. Distribution of farmers' response in terms of type of dryer, size of farm and problems in post-harvest in the upland and lowland barangays of Tudela, Misamis Occidental.

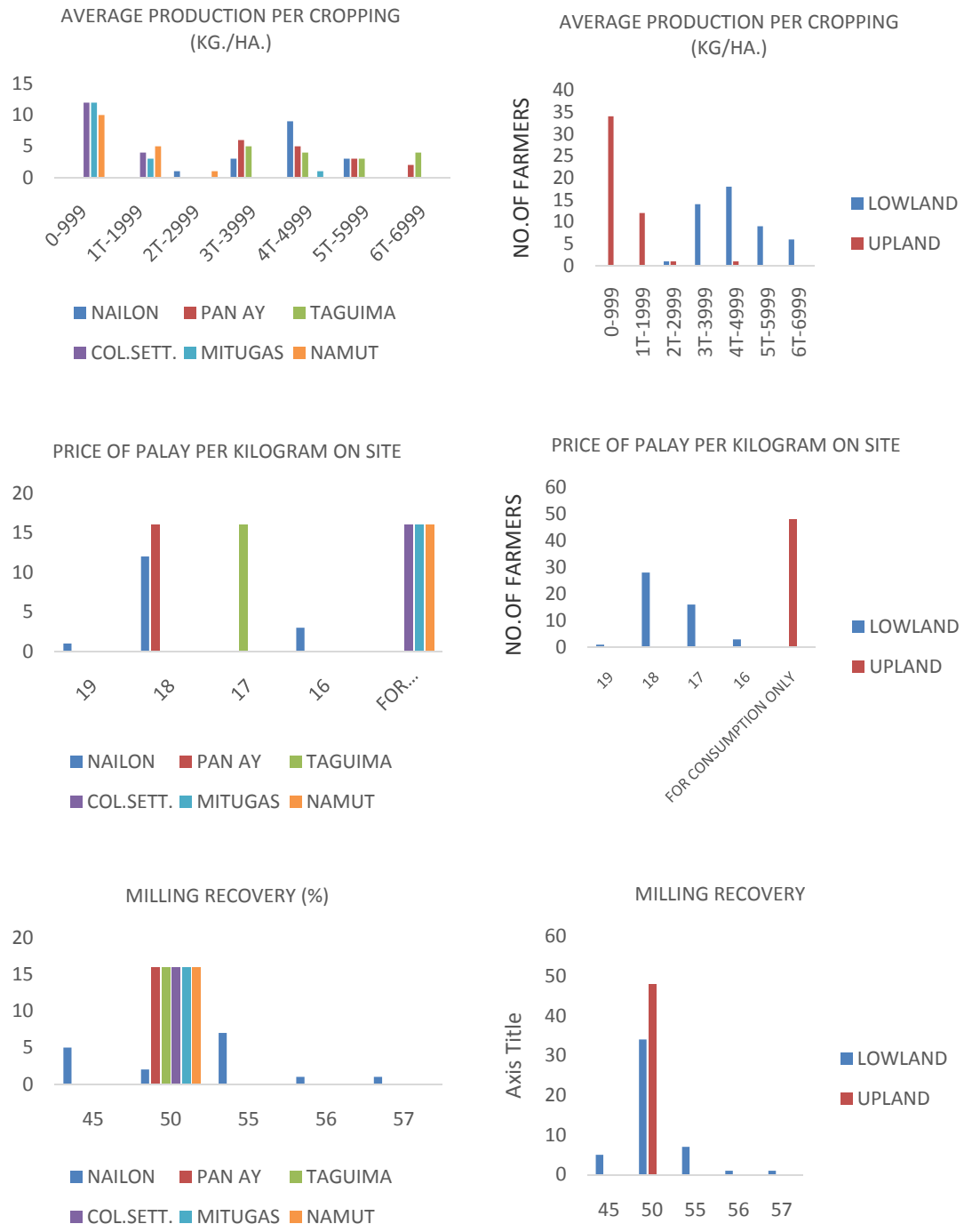


Figure 6. Distribution of farmers' response in terms of average production per cropping season, price of *palay*and milling recovery in the upland and lowland barangays of Tudela, Misamis Occidental.

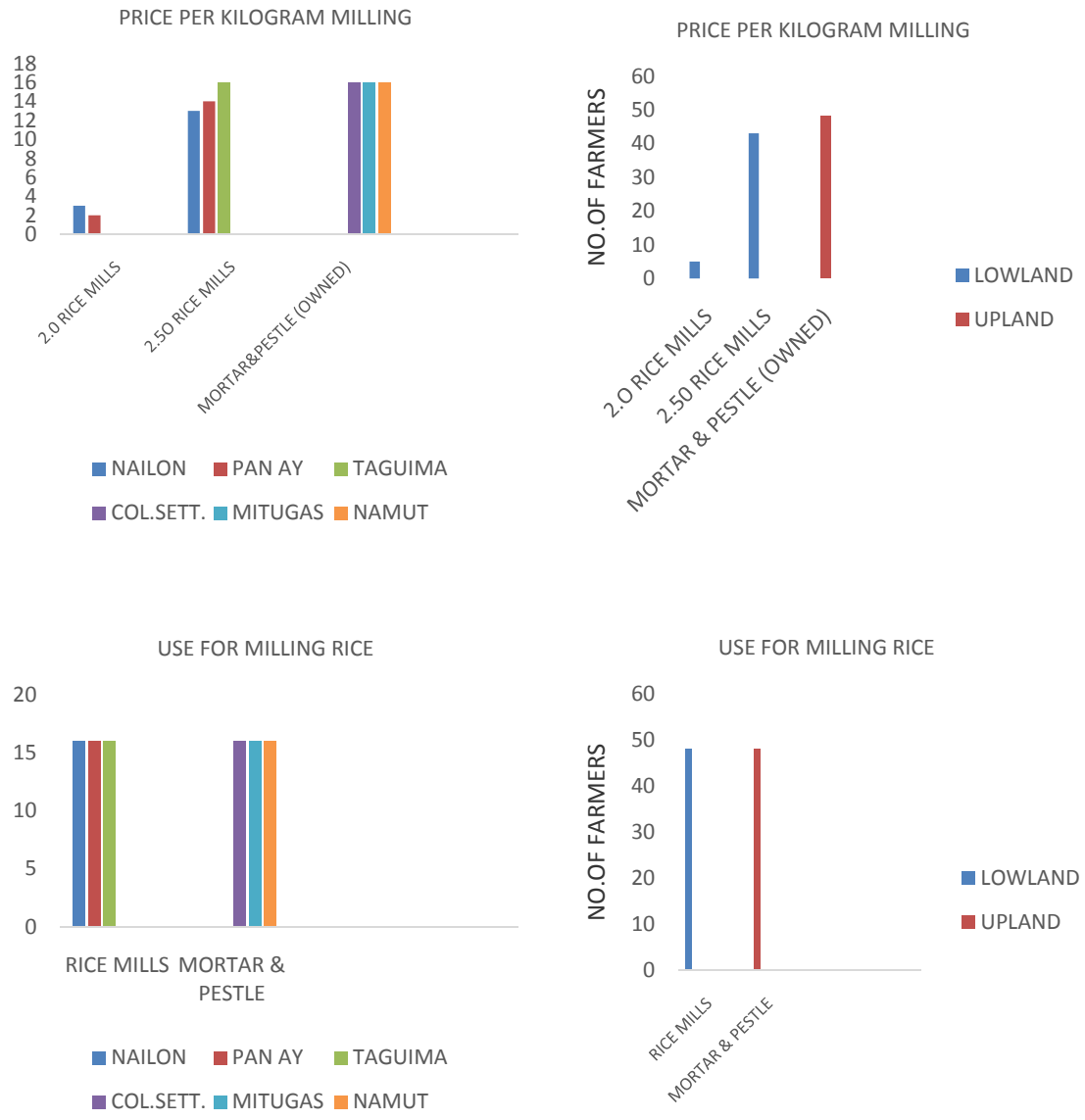


Figure 7. Distribution of farmers' response in terms of price per kilogram of milling use of milling the rice in the upland and lowland barangays of Tudela, Misamis Occidental.

Other farming issues and concerns

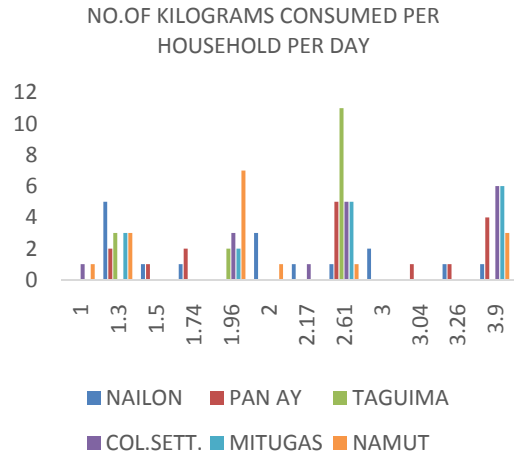
Some other concerns on rice farming were asked to the farmer respondents. In particular, they were asked on the number of kilogram of rice consumed per household per day, the quantity of *palay*sold after harvest and access to crop insurance.

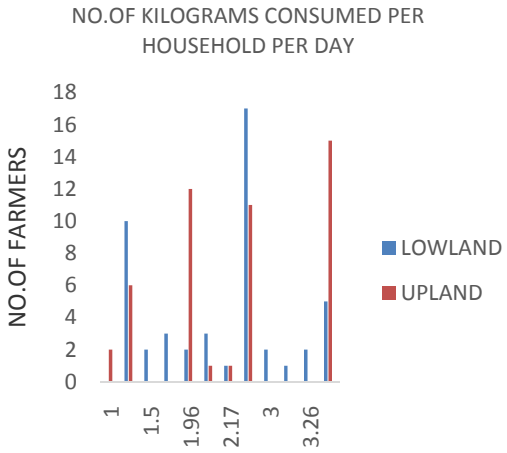
Response to the number of kilos of rice consumed per household revealed varied answers such as 1.3, 1.96 and 3.9 kg per household per day. This consumption pattern is dependent on the number of members in the household. Majority of the farmers opted not to sell their rice produced (64.58%). For those farmers who opted to sell their

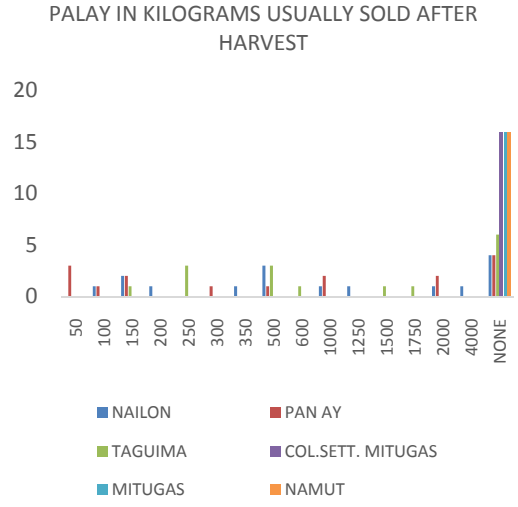
palay, it usually ranged from 150, 250 and 500 of *palay*sold at 3.12%, 5.20% and 7.29%, respectively. Most of them did not file crop insurance (87.5%) for unknown reasons (Figure 8).

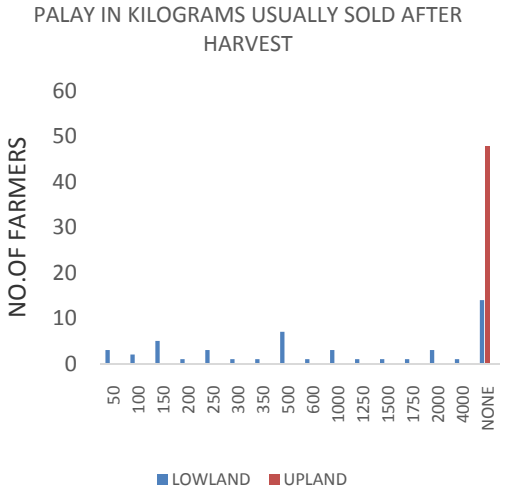
On interventions, programs and policies to rice farming

The farmers shared some of their farming experiences in terms of the interventions, programs and policies related to rice production. According to them, they had access to high quality seeds from their co-farmers, from seed growers and from DA technicians. They regularly attended meetings, seminars and assemblies related to farming practices. Some had attended farmers' field schools. The government proposed an ordinance of no burning of rice straws, and this initiative was favorably agreed by the farmers. Besides some farming policies, the government initiated some forms of interventions such as seeds, fertilizers, pesticides, laminated sacks, and social pensions. They were observant and responsive to government initiatives and were members of some farming organizations, cooperatives and microfinance centers. This resulted to easy access to soft loans to finance their farming inputs and most of all they had the knowledge in terms of monetary management.









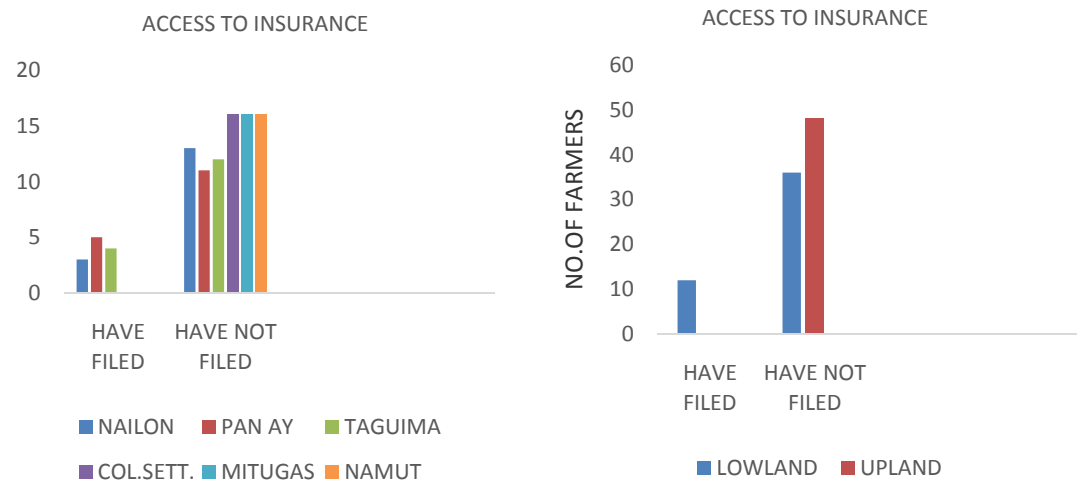


Figure 8. Distribution of farmers' response in terms of number of rice consumed per household, *palay*sold after harvest and access to crop insurance in the upland and lowland barangays of Tudela, Misamis Occidental.

Statistical analysis

An analysis of variance was used to test if there were significant differences in the responses of the upland and lowland farmers in terms of the implications on the level of interventions, strategies and policies related to rice production. Results revealed that all the responses were not significantly different (P value > 0.05) (Table 1). This means that the farmer respondents had common perceptions relevant to the interventions, strategies and policies to rice production. After all, it is the common staple food, the rice, that is being produced by both upland and lowland farmers.

Table 1. Differences in the responses of the upland and lowland rice farmers in the barangays of Tudela, Misamis Occidental.

Farmers' perceptions	F value	P Value
Common pests in the area	5.21	0.67
Common pests problem	4.34	0.56
Management practices on pests	3.85	0.12
Pest control measures	2.67	0.18
Frequency of pesticide application	4.28	0.92
Source of water	3.21	0.65
Water management	3.81	0.52
Water supply	1.25	0.18
Problem on water supply	3.18	0.18
Farm tools and machinery used	4.25	0.12
Farm tools and machinery wished to own	5.11	0.31
Type of dryer	4.68	0.32
Problem on post-harvest	1.37	0.38
Size of farm	1.96	0.11
Average production per cropping season	2.95	0.21
Price of palay	3.23	0.26
Milling recovery	3.87	0.96
Price of kg per milling	2.85	0.71
Use of milling the rice	2.34	0.65

Number of kg consumed per HH	3.11	0.75
Palay in kg sold after harvest	4.31	0.18
Access to crop insurance	2.34	0.21

CONCLUSIONS AND RECOMMENDATIONS

Rice farming is a major source of income for millions of Filipino farmers. Yet, what lacks among us is on the instincts of producing more to accommodate the rice needs of the Filipinos. In the case of the Tudela farmers, they opted to keep their produce within their family's consumption. While it is not bad, however, other communities might lack access to rice that is being sold in the market. As such, we tend to import rice from other areas. So true that most of us are still dependent on rice imports that exposes the country to international market shocks and many have serious risk for food security.

The use of several rice varieties particularly those that are pest-resistant or drought-resistant are important technologies being developed. This must be the thrust of the local government, and that, the rice farmers are responsive to this initiative.

The farmers in Tudela reported higher expenditures on various inputs for rice production. Inputs were in the forms of fertilizers, pesticides, fuel, operators and field laborers. To sum it up, their rice yield seemed not enough to compensate the resources or capital used. In this case, expenditures on agriculture are rising over time in response to reduce poverty, raise rural incomes and household welfare, and promote foodsecurity. However, lack of governmental support to farmers might affect the level of production and response to the challenges. In fact, production support was limited in duration andscope to goods characterized by market failure, most notably those embodying newtechnologies. Support for postharvest and processing facilities should be limited to strategicinvestments towards addressing coordination problems and facilitating market development.Among public goods (or goods with public good features), irrigation has not been found to beeffective based on econometric evidence. This places in question the current plan to ramp upinvestment on irrigation, making it far the largest single item for public spending on agriculture.Such investment plans should be reviewed to avoid further problems in the future.

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