

# Initiatives towards inclusive trading practices of rice value chain in Pila, Laguna, Philippines

*Diana C. Agcaoili<sup>1</sup>, Jayson S. Cabral<sup>2</sup>, Cherry Lou R. Nuñez<sup>1</sup>, Melodee Marciana E. De Castro<sup>1\*</sup>, John Julius P. Manuben<sup>3</sup>, Maria Noriza Q. Herrera<sup>1</sup>, and Remund Jordan D. Labios<sup>1</sup>*

<sup>1</sup> Department of Agribusiness Management and Entrepreneurship, University of the Philippines Los Baños, College, Laguna, 4031, Philippines

<sup>2</sup> Department of Agricultural and Applied Economics, University of the Philippines Los Baños, College, Laguna, 4031, Philippines

<sup>3</sup> National Crop Protection Center, University of the Philippines Los Baños, College, Laguna, 4031, Philippines

**Abstract.** Rice industry in the Philippines is beset with environmental, social, and economic concerns resulting in low farmer incomes, lack of food security and meager competitiveness. This study aimed to develop inclusive interventions on rice trading practices involving smallholder farmers. Primary data were derived from baseline interviews from farmers, traders, millers, wholesalers, and retailers to assess trading practices involved in the chain. Stakeholder consultations were also conducted to validate the findings and identify strategies for the initiatives. Based on the results, the major challenges identified include high production and marketing costs of paddy attributed to high material inputs and labor costs. This leads to a low profit margin for smallholder farmers. This gap relates to poor market linkage that limits the ability of farmers to receive higher prices for their produce. Interventions involving the improvement of marketability through market innovation were prioritized to address the gap. Recommendations concerning reducing institutional barriers towards smallholder farmers was provided to broaden adoption of inclusive trading practices and foster a more equitable and sustainable rice value chain.

## 1 Introduction

In the Philippines, there was an increasing demand for rice production as the country's population was increasing. In 2021, the country produced a total of 19.96 million metric tons of palay, with 15.09 million metric tons coming from irrigated areas and 4.87 million metric tons from non-irrigated areas. Out of the total production, 18.35 million metric tons of rice were attained in the total supply, and 16.49 million metric tons were utilized. Of the total supply, 81% came from locally produced rice, while the remaining 19% was sourced from imported rice [1]. The Philippines is considered the 8th largest producer of rice across all the

---

\*Corresponding author: [medecastro@up.edu.ph](mailto:medecastro@up.edu.ph)

countries, but despite this high production, rice farmers in the Philippines still could not meet the local demand and thus import rice from other countries.

The rice industry in the Philippines is beset with environmental, social, and economic concerns resulting in low farmer incomes, lack of food security and meager competitiveness. The country still faces problems that significantly affect rice production. Common problems encountered by rice farmers were the high cost of inputs, low price of palay, lack of capital, labor problem, lack of postharvest facilities, pest and diseases and irrigation system. Solving these problems and addressing the needs of farmers will enhance agricultural productivity [2]. A study report by the Food and Agriculture Organization in the United Nations in 2003, since then high production costs is still the key problem factor being identified as the problem of crises in Philippine agriculture [3].

In terms of production, the Philippines as a rice-growing country has a great number of small average farm sizes where rice production is owned by smallholder farmers. According to the Philippine Rice Research Institute, the average landholding rice farmers in the country is 1.48 hectares. Most of the labor force in agriculture accounting for 25% of the employed in total labor force in the Philippines are self-employed, small and marginalized belonging to the country's poorest of the poor [4]. Increasing the low incomes of small Filipino farmers could be the key to upgrading the sector of agriculture in the country is one of the primary objectives of the Department of Agriculture in 2019. Making the income of smallholders twice as much could be done with the use of relevant infrastructures and technologies, acquiring economies of scale through collective action, adding values, developing markets, and empowering skills of the farmers and fisherfolks [5].

There was a growing interest in inclusive trading in the agri-business sector with a desire to combine increasing levels of sustainability initiatives and improved processes of inclusive economic growth through inclusion and participation of smallholder farmers. Inclusive businesses involve profit-generating companies that have social impacts that involve poor and lower income groups and generate entrepreneurial and innovative advancement [6]. Enhancing the participation of the smallholder farmers would ensure inclusive growth and a higher scope of equity distribution of the country's economic growth. The use of a value chain approach will help farmers to ensure that each actor in the value chain will receive a fair share in the process. Involvement of the local government units, civil society groups, associations and private sector are also very crucial in the attainment of the sustainable and resilient trading practices in the rice industry [7].

A study on inclusive business models for agricultural trade in Thailand suggests a fair-trade practice and value-chain development programs [8]. This includes the partnership with multi-stakeholders such as the agencies in the government, institutes, private sectors/non-governmental organizations (NGO) and social entrepreneurs. The support of these stakeholders would avoid inequitable ways by big trading firms and affect the government policies. Partners in social aspects of fair-trade business would help link the production of smallholder farmers into the downstream of the value chain.

Value Chain analysis directed toward social inclusion supports the pro-poor and sustainable livelihood approach by initially identifying constraints and barriers to inclusive growth. Developing an inclusive value chain includes exploiting market opportunities by linking smallholder farmers and advancing and improving the communication, marketing and economic competencies and upgrading, enhancing biosecurity, provision of opportunities for technology adoption [9]. A value chain analysis was done in the study in order to assess the rice trading practices and recommend an inclusive trading to the farmers' rice producers.

## **1. 1 Current rice trading practices in the Philippines**

Rice trading involves procurement, transportation, storage, milling and distribution. According to one study conducted in 2001 about evaluation of palay trading in the Philippines (Abrogenaon), each value chain activity was assessed and evaluated in order to identify problems involving the process. Based on the results of study, the problem observed was the poor grain quality caused by mixing the varieties, discoloration and presence of impurities in the palay, farm to market load truck bans and high-level cost of transportation and low milling recovery among rice millers due to broken grains and large number of impurities. Lastly is the rise of the traders which decreases the competition of the traders and was triggered by the NFA interventions. The decrease in competitiveness due to importation has taken effect on the low-cost price of palay traders that directly affect the profit of farmers expecting to decrease in amount [10].

Having favorable tax policies and tax rates on rice farmers will give a lot of advantages to rice farmers. The government controls the importation and exportation of rice through various operations that will affect the local price levels of rice. Competition regulation was also one of the government functions that ensured companies were using fair considerations of their products and business operation strategies, which is important for the protection of groups and stakeholders, as well as maintaining the rights and interests of the related stakeholders.

Problems involving lacking funds for irrigation systems [11] and the financial support systems [12] of the farmers are also part of the concern of the political factors affecting the rice industry. Support from the respective government agencies is needed to understand and perform the solutions and resolve the existing problems identified.

Laws balancing the prices of palay is a very important factor in assuring that prices are regulated and will give fair and just financial and labor capital. Republic Act No. 3452 implements adoption to control the prices of palay, rice, and corn. This law sets the floor price for palay and provides a ceiling price for rice and corn. This law also controls government agencies, gives incentives, and provides vehicles for distributing rice and corn [13].

## **1.2 Definition of an inclusive business**

The ASEAN has promoted and issued guidelines on the use of Inclusive Business (IB) in different level of socio-economic differences. High economic opportunities are identified in ASEAN countries with the use of IB model as 56% of the population are BoP market. IB gives a high potential in providing sustainable income that will allow goods and services that are inexpensive, available, and accessible by all people [14].

Inclusive business features value creation rather than value capture. The inclusion of smallholder farmers in value chains has long been recognized as a pathway to sustainable development. Inclusiveness can be adapted through connecting to marginalized sectors or the small hold farmers into a commercial value chain and assuring that they are knowledgeable and have enough skills to be competitive with other players in the chain.

An inclusive dimension must produce an impact and facilitate equitable distribution that is value added among stakeholders, as part of the strategies in integrating the marginalized like smallholder farmers and fisherfolks, women, and youth in the value chains. The study aimed to build capacities and empower people so that they will be able to manage their own interventions to advance sustainability in business and add value to society.

Challenges to promote inclusive growth and build more sustainable agriculture and food systems pointed to the lack of programs that will link agriculture with the industry and

support services as well as insufficient activities aimed to vigorously advance value-adding activities among the many issues that need to be addressed [15].

Small hold farmers can benefit from reducing the economies of scale in production and marketing through institutions such as group farming, contract farming, and cooperatives in order to reduce the transaction cost and improve the yield production through efficiency. Capacity building and empowerment of such farmer formal groups can increase the overall efficiency of the small hold farmers and effectively generate profits in the market [16]. A study of Mijman & Wijers on exploring the inclusiveness of producer cooperatives was conducted to identify whether a cooperative is inclusive or not. Influence represented in governance whether cooperatives are community, or market-oriented, open or closed membership, and the representation in the governance of the cooperative is determined. Based on the result a market-oriented cooperatives tend to decrease the inclusiveness of a cooperative. [17].

## **2 Methodology**

The study aimed to develop inclusive rice trading practices through value chain analysis. Through the value chain approach, the constraints and opportunities identified would then be assessed and prioritized for the intervention initiatives.

Intervention initiatives and value chain development approaches targeting smallholder farmers as a huge part of the rural poor, with different degrees of marginalization, and constrained access to resources, capital markets, training and input and output markets were the main focus of the study. This intervention was analyzed and developed through a scientific gap analysis.

Primary data were derived from baseline interviews from farmers, traders, millers, wholesalers, and retailers to assess trading practices involved in the chain. The chosen site of the study was Pila, Laguna, a municipality in the province of Laguna, Philippines. A smallholder farmer producer-group will illustrate the implementation of the intervention models. The producer groups who participated in the study were the two cooperatives, Pila Laguna Agriculture Cooperative and the Samahan ng Organikong Magsasaka in Pila, whose production is carried out by small holder farmers. Thirty-one (31) smallholder farmers who were members of these two cooperatives were selected as participants of the study. A set of questionnaires was administered to the participants to gather information on demographics of farmers, farming practices, crop and pest management, finance management and marketing practices.

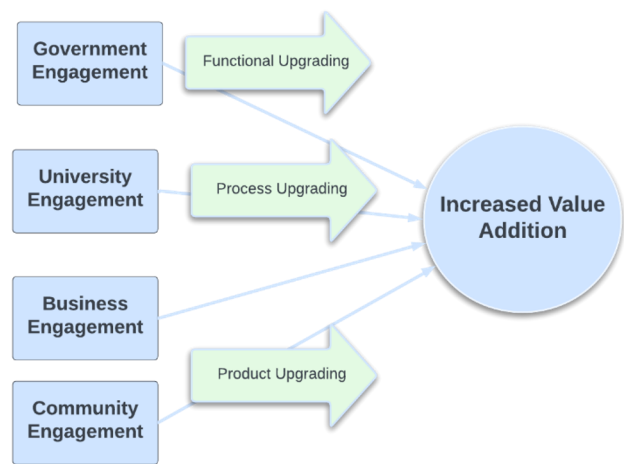
Stakeholder consultations with the farmer organizations and the local government unit (LGU) were also conducted to validate the findings to determine possible intervention strategies and initiatives. The intervention strategies and initiatives were further assessed qualitatively. This will then be used as a basis for the capacity-building training. Interventions were presented in a stakeholders' meeting attended by a representative from the traders' group, Municipal Agriculture Office, and the National Irrigation Center.

### **2.1 Framework of the study**

Development of upgrading strategies and intervention models to address the threats and opportunities was used as part of addressing the gap identified in the study. Intervention plans need strategic implementation in order to be effective and sustainable. [18].

This study was drawn from two platform frameworks where Patrawart (2018) described how production and marketing activities and their value-added move throughout the value chain. Participation and engagement from the multi-stakeholders from government, university, businesses, and communities are needed to increase value addition in the chain.

Government engagement includes functional upgrading processes in the value chain. Functional upgrading is developing value-addition through changing the processes to different links in the value chain [20]. University engagement will come in for process upgrading as this institution will help in empowering farmers (capacity-building) and the community to improve their production and business management skills. Lastly, the engagement of businesses through product through designing fair distribution shares connecting the upstream and downstream of businesses activities to the community. All these engagements are very important in assembling support and joint forces to prevent unfair practice by large trading companies and to influence the policies of the government. These multi-stakeholders play vital roles in bridging the smallholder farmers' production to the downstream sides of the value chain [21].



**Fig. 1.** Modified from Platform Partnership of Social Enterprise, Fair-Trade Business and Societal Partners, Patrawart (2018) [19].

2.2 Value chain approach

The study of value chains examines a system that encompasses all the social and economic elements of various businesses or producer groups that work together to provide goods or services to a particular market. These businesses share a mutual interest in buying and selling products and services, as well as exchanging knowledge and information. Value chain map that consists of five critical areas: (1) the primary customers and input requirements, (2) the product flow, (3) the activities and services offered by the actors, (4) the primary decision-makers or drivers, and (5) external influences affecting the entire system. By analyzing the value chain of the rice industry in Pila municipality, it is possible to identify segments and obstacles in the processes and suggest measures to improve the competitiveness of rice farmers. The key customers in this value chain are paddy collectors, paddy wholesalers, millers, and rice retailers.

2.3 Stakeholders' Map

A stakeholder analysis was done in the study to identify parties that are interested in an organization or company that will affect or will be affected by the farmers' cooperative producer groups. Stakeholder analysis helped determine the agencies or people that are relevant and involved in the value chain processes. The primary and secondary stakeholders were assessed based on their roles and interactions on the value chains.

2.4 Trust and Influence Matrix

Trust and influence are two of the main factors that affect the assessment of the effectiveness and sustainability of linking the farmers to the stakeholders identified. These determined which among the stakeholders do farmers give their trust the most and have a big influence on their farming and trading activities. As part of the baseline interview, the participants were asked to rate their level of trust and influence among the stakeholders. The participants ranked them from 1 being the lowest, and 3 being the highest rating. An interpretation equivalent of the average rating was created to examine the results.

2.5 Stakeholders' Consultation

Any initiative may only be sustainable with an enabling environment and support system, thus consultation to stakeholders is very important aspect. Thus, a participatory approach on which key actors were included were done to identify the gaps and prioritize interventions. Gaps for every activity in the value chain were assessed in the study. These gaps were then presented and consulted to the stakeholders of rice and gathered data on which problems faced by farmers that needs an immediate solution. Multiple criteria and factors that will impact the success of the interventions were also considered in order to come up with sound solutions. Based on results from stakeholders, farmers are faced with rising costs of farm inputs, labor shortage, and risks arising from climatic conditions.

3 Results and discussion

3.1 Value chain analysis

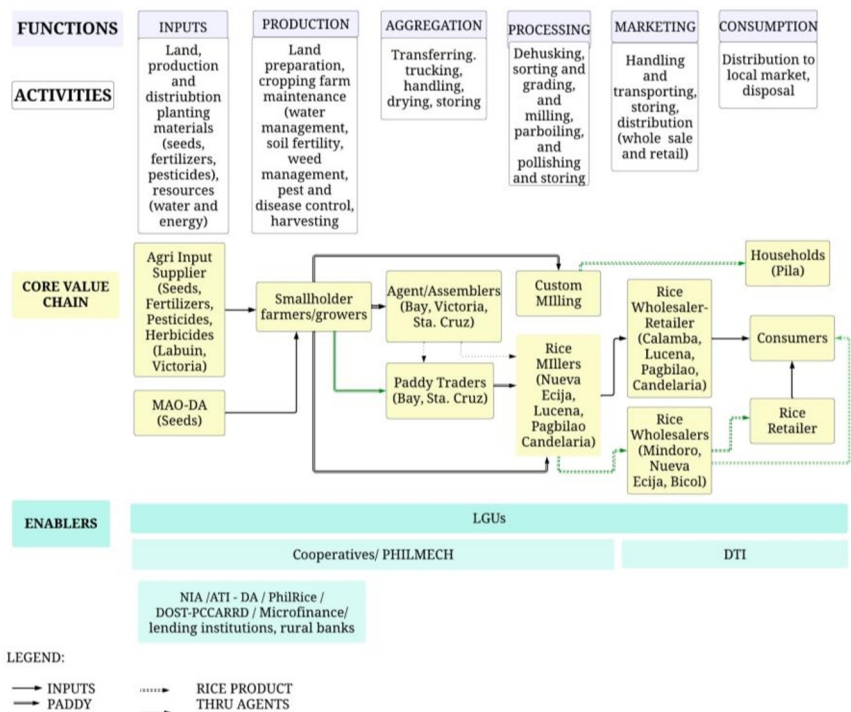


Fig. 2. Rice Value Chain Analysis

Figure 2 of rice value chain shows the interrelated functions and activities that include input provision, production, aggregation, processing, marketing, and consumption, along with its value chain actors and business enablers in rice production. All these elements are essential to facilitate the performance of the whole rice value chain and serve as reference points in the study.

The whole system is influenced by a business-enabling environment, such as the policies, laws, and regulations imposed by the local government units, government agencies, and different private institutions. The enablers are the ones who support, facilitate, advise, promote, and conduct training for the key actors.

The support provided by the government, specifically by the Department of Agriculture and local government units, played a significant role in the rice sector's growth, contributing to the development of human resources and technology. The stability and support of the government are crucial in enhancing any industry's competitive positioning and player performance. For the rice sector study site of the paper, in Pila, Laguna, the Department of Agriculture offers subsidies for inputs like seeds and fertilizers to rice farmers, which helps to reduce their production costs. The government provides research, development, extension services, and training to selected local units to enhance their capabilities and improve farmers' technical knowledge.

Input suppliers and government institutions provide the inputs for the planting materials (seeds, fertilizers, pesticides) and utilities such as electricity, irrigation, machineries, and other facilities to the rice farmers. From inputs, it will proceed to production, where land preparation, cropping, and farm maintenance will be done. The smallholder farmers and rice growers for rice crop production will then handle it. Agents and traders will do aggregation of the fresh paddy before processing the rice processes. The main processes involved in the paddy were harvesting, drying, dehushing, and milling the rice. These are done by farmers, rice millers, and direct traders. Then, the handling and transporting of the processed rice will be distributed in the market by local traders. Marketing of the rice products will be done through wholesalers and retailers. Intermediaries or middlemen are also involved in the value chain process in different functions. They coordinate the information on the products and services offered and connect one major actor and process to another. Other farmer groups, associations, and cooperatives are also included, as they are vital in producing goods from raw materials to actual product sales.

Problems identified on acquiring inputs and materials was the sudden and drastic increase of inputs such as the fertilizer and pesticides. Some of the farmers avail credit arrangements to the local supplier. The farmer would pay the credit after the harvest season with a 3% interest on the price of the inputs. For the paddy production, one of the identified issues was the high labor cost of the farmers due to the intensive work done using manual or conventional production of rice. Shortage of personnel and labor were also mentioned for the challenges faced by some of the farmers.

Farmers in the study site did not sell their entire paddy production in the market. A portion of their harvest was set aside for different purposes such as the harvesters/threshers' share (10%), home consumption (11%), payment to the landlord (12%), and giving some away (3%). On average, 64% of the total harvest was sold in the market. The majority of farmers (81%) sold their paddy in fresh form due to the absence of postharvest facilities and inadequate drying and storage areas. Paddy traders are market players who engage solely in paddy trading. Their marketing activities involve drying, trucking, handling, and storing. Paddies are collected for sale to large rice millers. Some farmers will sell it directly to rice millers but there are also farmers who would sell it through paddy traders, or through agents/assemblers. These will be the ones selling it to paddy traders and rice millers. Also, there are agents who would sell it directly to rice millers. After the aggregation is the processing of the dried paddy into milling. Some of the smallholder farmers/growers will

directly mill their produce through custom millers for home consumption. Milled rice will then go directly to rice wholesalers or through agents/Assembler to rice wholesalers or rice wholesaler-retailer. Retailers will then source their milled rice from wholesalers. For consumption, consumers buy directly from wholesalers, wholesaler-retailers, retailers and to or through agent/assembler.

The role of middlemen was observed to be essential on the value chain of the study site as the agents are responsible for the negotiating and transferring the paddies and the one who contacts the rice miller traders. Large traders and agents have an informal group where they agree on paddy prices, exchange market information, and regulate traders to ensure fair competition and price control at all levels. The agents and middlemen often face challenges related to the pricing of paddy. They lack the ability to negotiate with paddy traders, who set the prices offered to farmers. As a result, farmers have little bargaining power with the middlemen and traders.

In terms of paddy aggregation, issues were recognized with the low quality of paddies from farmers, which was caused by adverse weather conditions and typhoons, as well as damage from poor rice disease management. Nevertheless, there were no shortcomings in the amount of farmers' production volume in terms of the quantity provided.

The last segment of the value chain involves marketing, which includes transporting, trading, and shipping rice to various traders, wholesalers, and retailers. The milled rice is delivered to different distribution channels such as wet markets, supermarkets, and grocery stores, which determines the final selling price of the rice. Problems identified among traders was low selling prices and price fluctuations. The baseline findings of farmers in Pila reveal a lack of competition among rice farmers in terms of marketing and processing. Additionally, there is a high concentration of power among traders due to the presence of cartels, which are independent groups that collaborate to control the price of rice paddies. This leads to low competition for rice farmers. In Pila, networks of middlemen working with rice cartels are widespread in the rice supply chain. Rice traders do not compete and instead buy rice paddies at a predetermined price agreed upon by the cartels, making them price takers. Price manipulation is prevalent, particularly during times of low supplies or scarcity. As a result, there is a strong buyer force that impedes the increase in prices of rice paddies among farmers, and rice farmers have weak bargaining power over the traders.

### **3.2 Relevant stakeholders in inclusive business promotion**

A stakeholder is a party interested in an organization or company affect or be affected by the business. Stakeholder analysis helps determine the agencies or people that are relevant and involved in the value chain process. The farmer producers of the cooperative are considered the internal stakeholders wherein the interest in the cooperative comes through a direct relationship that will directly affect their performance. On the other hand, external stakeholders do not directly work with the cooperatives but in actions and results of the study. Suppliers, traders, and public agencies are external stakeholders.

Stakeholders and their roles and interactions in the value chain:

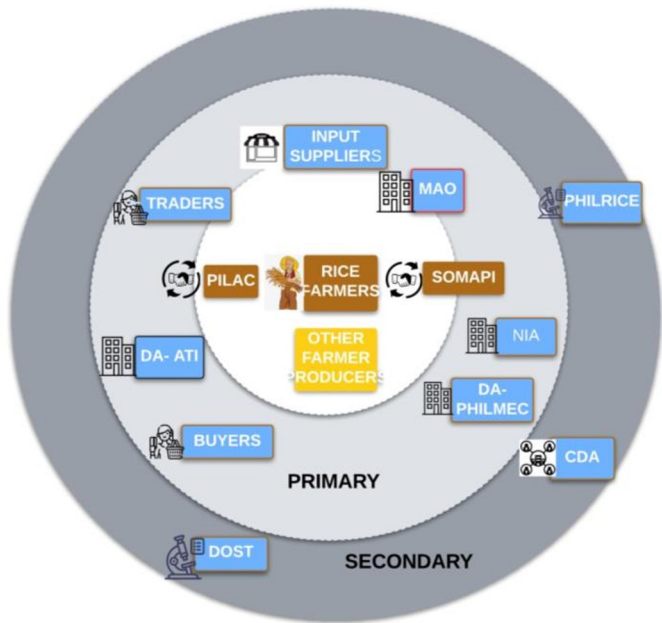
- A. Primary: Input Suppliers Pila Municipal Agriculture Office, DA-ATI, DA-PhilMech, traders/buyers, National Irrigation Authority
- B. Secondary: PhilRice, Department of Science and Technology, Cooperative Development Authority

Primary stakeholders have the highest level of interest in the production of the rice producers or the cooperative because they are directly affected by the outcome. They actively



contribute and directly give support to cooperatives. Secondary stakeholders help and support the cooperatives but on a lower or general level.

The figure below shows the stakeholder mapping where the stakeholders and their relationships identified in the baseline interview of the study were visually presented. As shown in the figure, the closer the stakeholders are to the farmers, the stronger their communication and relationship with the stakeholders. The stakeholders' proximity from the center was based on the computations made on the average and their interpretation.



**Fig. 3.** Stakeholder’s Mapping and their Interaction in the Rice Value Chain in Pila, Laguna

Stakeholders were identified and their primary roles as primary and secondary stakeholders were identified on Figure 3. Farmers interviewed were asked to rate their level of communication, relationship, trust, and influence on the stakeholders, from 1 being the lowest and 3 being the highest. The table below shows the interpretation equivalent of the average rating of farmers' communication and relationship with other stakeholders. The stakeholders, the rating, interpretation, and the function or type of support services provided to farmers are shown in Table 1.

**Table 1.** Interpretation of the Variables for Stakeholder Analysis of in Rice Commodity in Pila, Laguna

Interpretation	Average
Weak	1- 1.67
Moderate	1.68-2.33
High	2.34-3.0

**Table 2.** Results of the Stakeholders Analysis in Rice Commodity in terms of their Communication and Relationship

Stakeholders	Communicatio	Interpretatio	Relationshi	Interpretatio	Function/ Type of Support Services
Other farmers (cooperative members)	2.87	High	2.65	High	Producers
Input Suppliers	2.61	High	2.10	Moderate	Supplies provision
Municipal Agriculture Office	2.61	High	2.14	Moderate	Seed provision, <i>ayuda</i> , trainings
Department of Agriculture- Agricultural Training Institute	2.61	High	2.14	Moderate	Trainings
Department of Agriculture - Philippine Center for Postharvest Development and Mechanization	2.61	High	2.14	Moderate	Technology and machineries
National Irrigation Authority	2.04	Moderate	1.78	Moderate	Irrigation support
Traders	2.55	High	1.93	Moderate	Buyers of produce
PhilRice	2.04	Moderate	1.78	Moderate	Seeds, technology, trainings, and seminars
Cooperative Development Authority	2.04	Moderate	1.78	Moderate	Cooperative regulation
Department of Science and Technology	2.04	Moderate	1.78	Moderate	Agricultural technologies and innovation

The table above shows that the primary stakeholders have high communication and moderate relationship with farmers. In contrast, the secondary stakeholders have moderate communication and relationship with farmers as they indirectly work on the programs involving the farmers. Based on the findings, the Municipal Agriculture Office provides farmers with the highest and most support. Government agencies usually provide support such as input and supplies to farmers, technical assistance, training, and provision of technologies to help equip rice farmers to be a competitive player in the market.

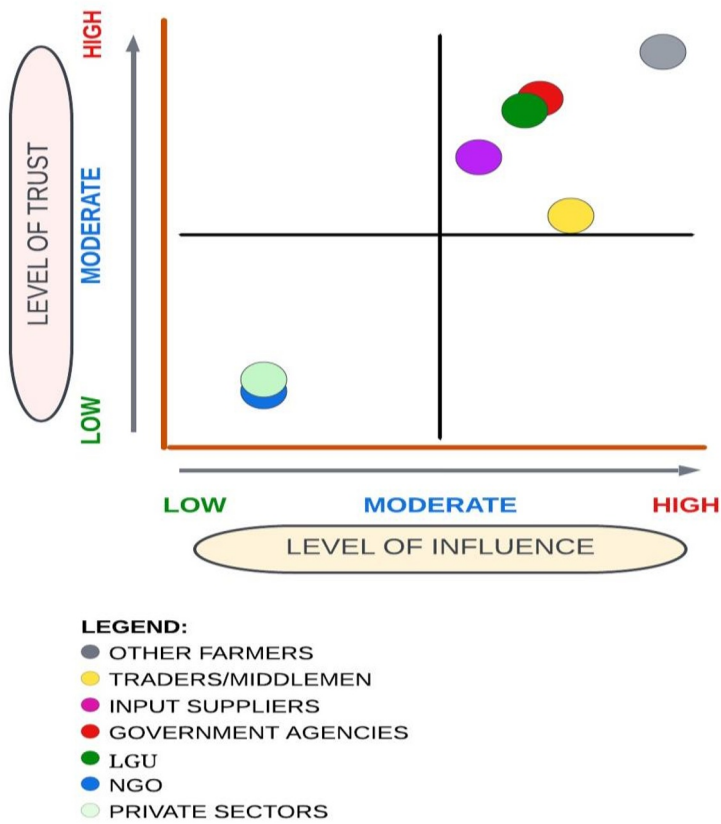
**3.3 Trust/influence matrix of stakeholders**

A stakeholder matrix involves plotting the stakeholders on an X- and Y-axis using the two-intersecting variable. The grid identifies each variable as high or low, which creates four

quadrants. This matrix will show an analysis of how farmers interact with relevant stakeholders and describe their level of impact to determine which among these would have a good and positive connection with farmers for future partnerships and linkages. This will also determine which stakeholder aspect they could improve their relationship with. Table 3 will also be used to interpret the farmers' trust/influence matrix.

**Table 3.** Summary of the result and interpretation of the stakeholder analysis of Rice Commodity in Pila, Laguna.

Stakeholders	Level of Trust	Interpretation	Level of Influence	Interpretation
Other farmers producers	2.75	High	2.61	High
Traders/buyers	1.7	Moderate	2.33	Moderate
Input suppliers	2.19	Moderate	2.1	Moderate
Government Agencies	2.35	High	2.29	Moderate
LGU	2.32	Moderate	2.23	Moderate
NGO	1.34	Weak	1.34	Weak
Private Sector	1.34	Weak	1.34	Weak
Other stakeholders	2.08	Moderate	1.86	Moderate



**Fig. 4.** Influence Diagram of the Rice Farmers Stakeholders in Pila, Laguna

The influence diagram shows above four quadrants with two intersecting variables, the level of trust and the level of influence. It gives categories of (1) high, low, (2) low, low, (3)

high, high, and (4) low, high. Based on the diagram above shows that rice farmers have a high level of trust and are highly influenced by other farmers, government agencies, traders/middlemen, LGUs (MAO), and input suppliers. This matrix is very subjective since their basis of trust in these people was based on the influence that the stakeholders provide and its impacts on their rice production. Regarding other stakeholders, there was a moderate level of trust and influence. Since there are no private sectors and NGOs providing assistance to the farmers, their level of trust and influence was very low. Understanding the interrelationships between these stakeholders will help strategically plan for the study and assess their level of support to promote and integrate the inclusive business model.

### **3.4 Evaluation of the Identified Gaps**

Results during the stakeholders' consultation meeting were assessed to validate the findings on the baseline interview of the farmers. With this, various issues were also raised during the meeting. Limited water supply in some areas was raised by one of the farmers. From the baseline interview, twenty six percent of the participants have answered lack of water. This indicates that it depends on the area and in some places the supply of water is weak. A water pump irrigation system was commonly used by Pila rice farmers. According to National Irrigation Authority, not all water stations are reached during summer season, as the water distribution that came from the main dam was difficult. Residential areas are one of the reasons for this difficulty in the continuous flow of water to rice fields for farmers. Issues on waste disposal, garbage from household and management that leads to the inconsistent supply of water were also raised. From this, this was concluded that NIA should look into the concern areas with limited access and water supply with the help of the local government units.

The DA-MAO have affirmed the cooperation and support from the local government units and agencies on provision of some inputs and initiatives on addressing the technical gaps among farmers.

One of the identified issues also during the stakeholders' consultation was the issue of smallholder farmers as being price-takers. In order to improve the situation of the farmers, an increase on palay price may be possible with the help of the bargaining power of the cooperatives in order to address and compensate for the increase high cost of inputs. It was mentioned that farmers have low bargaining power to traders. Middlemen are also setting their prices low based on the price dictated by the trader.

Based on the identified gaps, possible interventions were discussed. To evaluate the general intervention types, the stakeholders' preferences were elicited by requesting them to compare these intervention types against each other in terms of which one is more important for them. This assessment of each gap helped address the issues on different enterprise functions.

#### **3.4.1 Prioritizing Interventions**

After the baselining survey, key intervention types were determined based on the identified gaps. The four general intervention types identified were: 1) cost, 2) productivity, 3) marketability, and 4) adaptability. Cost refers to interventions that would result in the reduction of the agricultural farm input cost. Productivity refers to improved quantity of output. Marketability refers to intervention related to market innovation. Adaptability refers to strategies to minimize the effect of disasters, natural calamities, and climate change.

For the rice stakeholders, marketability has the highest weighted average. This implies that interventions related to market innovation are the most important to the stakeholders. This can be related to the fact that there was a poor market linkage in the area, which limits the ability of the stakeholders to receive a higher price for their produce. This was followed

by productivity. Stakeholders also wanted intervention that would increase the quantity of output. This is due to the prevalence of pests and diseases, which lower rice productivity. Interventions that would reduce the input cost ranked third, while adaptability got the lowest weighted average. Stakeholders are more concerned about increasing productivity than the cost since it can offset the effect of high input costs. Moreover, stakeholders do not have control over high input prices. Intervention types related to adaptability are least prioritized, maybe because it doesn't occur regularly, and they are getting support when affected by disasters and natural calamities. It can be noticed that the values of the weighted average of the four intervention types are close to each other. This implies that even though farmers prefer one over another, all four intervention types are treated equally important.

Respondents were also asked to rate the four general intervention types. They gave each attribute a rating ranging from 1 to 10, with 10 being the highest rating. Based on the stakeholders' perception, they have given marketability an average rating of 9.31, which is consistent with the weighted average computed.

**Table 4.** Quantitative Assessment of Rice Stakeholders on the Intervention Types

Intervention-type	Average	Overall Rank	Rank Frequency				Ratings
			1	2	3	4	
Cost	24.41%	3	4	4	4	1	9
Productivity	25.07%	2	5	1	6	1	9
Marketability	27.13%	1	5	3	2	3	9.31
Adaptability	23.38%	4	5	2	1	5	8.92

The Table 4 shows the result of the assessment based on the ranking and prioritization done by the stakeholders. The participants prioritize the marketability aspect for the intervention with an average percentage of 27.13%. Second was the productivity aspect, followed by cost, and adaptability with 25.07%, 24.41%, and 23.38% respectively.

3.5 Initiatives on Rice Trading Practices

The following are the interventions that were proposed for the intervention of the study on inclusive rice trading.

3.5.1 Capacity Building of the Farmers

Capacity building training includes enhancement of technical and entrepreneurial training. Farmers were trained in rice production and processing, social capital building and management, and enterprise development to enhance their knowledge and increase their awareness on the updates on innovations from the partner agencies of the study. Technical training was based on the identified gaps where the S&T solutions developed by the Department of Science and Technology will be promoted and will be complemented by the existing standards for agricultural and food production to help increase and update the farmers with the available source of smart technology such as using the Rice Crop Manager Advisory and SARAI Alerts and Advisories mobile application. Technologies on fertilizers such as the use of Bio-N and Carrageenan could help promote natural resources management and conservation. Bio-N fertilizer is a microbial-based fertilizer that provides at least 50% of the nitrogen requirements of rice and promotes growth of rice and soil fertility. This fertilizer could be a substitute for chemical fertilizers that is eco-friendly. For the Carrageenan plant growth promoter, a polysaccharide extracted from seaweeds, serves as plant growth

supplement to rice. It is proven to be an effective organic fertilizer that increases rice yield by 15-30%. The introduction of these biofertilizers that are organic and ecofriendly, farmers in Pila Laguna may observe its effect on their rice yield and encourage them to utilize these fertilizers in their production to increase their cultivation productivity.

For the entrepreneurial training, farmers were trained on agribusiness-related topics on financial management, marketing, and business planning. Farm management such as record keeping and developing necessary monitoring systems for their farm activities and trading.

The main thrust of the training program was to create awareness and educate them regarding practical ways of upgrading and improving their current knowledge on rice farming systems. Maximum adoption of this new information and topics is expected among participants in order to ensure that there will be an increase in efficiency, productivity, and sustainability on their rice farming. Additionally, this training will also help the farmers to boost their competitiveness on the local rice market. Aside from this, the training also aims to increase their understanding of the impact of each stakeholder and rice market players on their overall rice production in the industry. Moreover, the participants are expected to gain and increase their skills and knowledge on the following issues and subject matter on agribusiness management and entrepreneurship, specifically topics on Value Chain and Resource Mapping of Pila, Cooperative Management, Human and social capital development, Digital marketing, financial management and enterprise development. Technical topics on rice farming, specifically topics on: Pesticide and safety management, Weed Management, Disease Management and Nutrient Management.

### ***3.5.2 Establishing a System for Support Services***

Value chain actors are supported by business development support providers who play an essential role in facilitating the value-creation process. These support providers can be distinguished as: (1) providers of physical inputs, such as planting materials at the production level or packaging materials at the processing level; (2) providers of non-financial services such as storage, transport, laboratory testing, management training, market research and processing; and (3) providers of financial services which is separated from other services because of the fundamental role played by working and investment capital in getting the VC on a sustained economic growth. These support providers can be private-sector, public-sector or civil society groups, and they can be part of the governance structure. A system for establishing partnerships with these providers will be developed which will be tailored-fit to the needs of the enterprises.

### ***3.5.3 Facilitating Access to Finance***

The results of the financial analysis would help to evaluate the businesses to determine their performance and suitability. This would also serve as input in determining whether the client would need loans/financial services to finance the investment, or the proportion should be invested from own resources. If arrangements must be made, this would involve the identification of the most appropriate financing institutions that would best assist the enterprises.

### ***3.5.4 Institutionalization***

This refers to ensuring the institutionalization of the sustainable and inclusive value chain approach into the partners and other stakeholder processes. Stakeholder consultation will be conducted to (1) present the findings from the evaluation of comparative advantages of implemented solutions; (2) forge long-term strategic alliances; and (3) recommend a mix of

policy instruments. Memorandum of Understanding/Agreement whichever is appropriate will be forged with key actors and stakeholders.

Further, the management team of the producer-groups will be tasked to oversee the planning, manage the continuous implementation of interventions, lead the coordination with the players, among others. The most crucial thing is that all players will have a shared understanding of the overall.

### ***3.5.5 Roles and responsibilities in IB Promotion and Collaboration Linkage***

Inclusive business assumes to have a necessary links and collaboration with the process of partnering with the stakeholders such as the input suppliers, trader/buyers, Municipal Agriculture Office-Department of Agricultural and National Irrigation Authority. These stakeholders have a key role to promote inclusive trading practices.

### ***3.5.6 Support functions***

The stakeholders such as the DA -Agricultural Training Institute, DA-Philippine Center for Postharvest Development and Mechanization, PhilRice, DOST, and Cooperative Development Authority will provide a support function to the promotion of the inclusive business model. These agencies may provide consulting and advisory that will support the cooperatives through specific knowledge on inclusive business and implementation. These partners may also help in raising awareness on different innovations in rice productions.

With all the partnerships and organizations, these will serve as the implementors of the strategic plans of having sustainable and inclusive value chains. The LGUs and the two cooperatives are expected to lead and promote partnerships from different associations or agencies and even to private sectors.

To be transformative, the initiatives must also use innovations which can be technological or non-technological to be able to provide profitable engagements with the poor or marginalized farmers. Technological aspects may include adoption of mobile applications, biofertilizers, etc., while non-technological aspects may include adapting business models. [22]

## **4 Conclusion**

Based on the results, the major challenges identified include high production and marketing costs of paddy attributed to high material inputs and labor costs. This leads to lower profit margin for smallholder farmers. This gap relates to poor market linkage that limits the ability of farmers to receive high prices for their produce.

Interventions involving the improvement of marketability through market innovation were prioritized to address the gap of the smallholder farmer producer group. The small producer group was expected to enhance their competitive positioning in the industry through inclusive initiatives that will link the farmers to the markets. The attainment of the inclusive trading to IB promotion highly depends on the commitment and structured programs of the farmer-producer group composing of the smallholder farmers.

Adoption of inclusive rice trading practices provides significant advantages not only for business entities but also to smallholder farmer producers. However, since these groups are not fully equipped and capable based on their available physical, human, and social capital resources, the need for a strong foundation support system from the stakeholders is needed. Partnerships and collaborations among the players and actors in the trading system of rice from the upstream and downstream level of chains are very crucial in attaining the desire of

adoption of the inclusive model. Strong internal and external coordination of the people and the information in the chain processes are very important.

**Acknowledgements.** The authors would like to thank the Department of Science and Technology – Philippine Council for Agriculture, Aquatic and Natural Resources Research and Development (DOST-PCAARRD) for funding and support for the conduct of this study.

## References

1. PhilRice Ricelytics State of the Rice Sector in the Philippines (2022)
2. I. A. Arida, Problems in Rice Farming: a Filipino Farmer's Perspective **34**, 42 (2010)
3. FAO Agriculture (2003)
4. Philippine Statistics Authority Employees and Wages in the Agriculture (2020)
5. Sugar Regulatory Administration The New Thinking for Agriculture (2019)
6. A. A. Lashitew, L. Bals, R. Van Tulder Inclusive Business at the Base of the Pyramid: The Role of Embeddedness for Enabling Social Innovations **162**, 421–448 (2020)
7. Sugar Regulatory Administration The New Thinking for Agriculture (2019)
8. J. Patrawart. Promoting Rice Value Addition through Inclusive Business Model. (2018)
9. Australian Centre for International Agricultural Research Inclusive Value Chains (2019)
10. N. O. Abrogena, C. Galut, A.C. Aguinaldo, V. A. Duldulao et al Palay/Rice Trading in the Philippines: an evaluation for the rice R & D (research and development) **25**, 69 (2001)
11. A. Inocencio, R. Barker Current Challenges in Agricultural Water Resource Development and Management in the Philippines **28**, 1-17 2018
12. Department of Agriculture Facing the big challenges in Philippine Agriculture (2022)
13. The Lawphil Project Republic of the Philippines Act No. 3452
14. Associations of Southeast Asian Nation Guidelines for the Promotion of Inclusive Business in ASEAN (2020)
15. F. C., Jr. Sanchez 2010 Sanchez, F.C., Jr. (2015). Challenges faced by Philippine agriculture and UPLB's (University of the Philippines Los Baños) strategic response towards sustainable development and internalization **21**, 191 (2016)
16. FAO A Regional Rice Strategy for Sustainable Food Security in Asia and the Pacific (2014)
17. J. Mijman, G. Wijers Exploring the inclusiveness of producer cooperatives. Journal from Science Direct, Current Opinion in Environmental Sustainability **41**, 74-79 2019
18. D. O'Brien Cooperatives are the preferred business model to build a more inclusive economy (2019)
19. J. Humphrey, H. Schimitz Global Governance and Upgrading: Linking Industrial Cluster and Global Value Chain Research, IDS Working Paper (2000)
20. J. Patrawart. Promoting Rice Value Addition through Inclusive Business Model. (2018)
21. Associations of Southeast Asian Nation Guidelines for the Promotion of Inclusive Business in ASEAN (2020)
22. J. Patrawart. Promoting Rice Value Addition through Inclusive Business Model. (2018)