# Interaction and problems in the abaca industry in Region VIII, Philippines

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**ABSTRACT**

This article aims to elucidate the level of interaction among the different players in the abaca business enterprise in Region VIII, Philippines. The study used a survey method that gathered primary data from farmers, Local Government Units (LGUs), traders, innovators from universities, processors, and non-government organizations. Appropriate sampling methods were employed in determining the sample sizes of different players, and the research instrument used to determine the interaction process is a developed questionnaire that involved a Likert scale. The data were analyzed using statistical measures such as count and average mean and presented in tabular form and network analysis. The results showed that abaca farmers have minimal to no interaction with the other key players except with the local traders. With that, the main problem for abaca farmers is the lack of innovative information to improve their production. Local traders interact with farmers moderately but have weak interaction with the Philippine Fiber Industry Development Authority (PhilFIDA) in terms of provision for research, education, and support services, among others. LGUs moderately interact with farmers but have no interaction at all with other Abaca key players. Moreover, PhilFIDA staff only have a moderate interaction with abaca farmers, and local traders rarely interact with PhilFIDA staff. Likewise, PhilFIDA's interaction with State Universities and Colleges (SUCs) is weak and SUCs have moderate interaction with farmers and the LGUs. Conclusively, the interactions among the players of the abaca industry are generally weak which can be strengthened through institutionalizing a system where stakeholders can work together for the common good and obtain a sustainable supply chain.

## 1. Introduction

Abaca (*Musa textilis Née*) is a useful fiber from a banana tree that is native to the country Philippines and grows in a tropical region (Pleños, 2022; Shahri et al., 2014; Vijayalakshmi et al., 2014). Agriculture is one of the leading livelihoods, and abaca farming is one of the sources of income for many Filipino families in the different provinces of the country. According to Pleños (2022), abaca fiber is one of the important export crops in the country, particularly, in the Region VIII area. It has changed and improved the lives and livelihoods of many farmers in the region in terms of economic activities. The Philippines is the largest commercial producer of abaca fiber in the world, with a market share of 85.18%, with Ecuador trailing behind with a 14.59% market

share (Quilatan, 2017). In particular, in Region VIII, Philippines, Eastern Visayas contributes to 17.14% of the total abaca production in the country, hence, abaca is an important industry in the Visayas region and even the whole country (Pleños, 2022).

Given more attention as a commodity, abaca could impact many abaca farmers in Eastern Visayas whose livelihoods mainly depend on abaca production. However, based on the Philippine Fiber Industry Development Authority (PhilFIDA, 2023) Region 8 Annual Report, abaca production has been decreasing until recent years with a big drop of 64.4% in 2020 compared to the previous year (Parac et al., 2021). The reduction was attributed to successive typhoons, massive extraction of abaca suckers used as planting materials for abaca expansion and rehabilitation, lack of barangay traders to buy farmers' produce, and continued spread and damage caused by the bunchy top virus. Most farms are located in far-flung areas, oftentimes mountainous which makes it difficult for extension service providers to serve and assist their needs. The Abaca Cluster Value Chain Analysis (VCA) conducted by the Philippine Rural Development Program (PRDP) corroborates this contention (Celestino et al., 2016; Magno-Ballesteros & Ancheta, 2020). In other words, abaca players are beset with a number of problems from production to marketing. In that case, agricultural extension is vital to improve abaca production and value chain activities (Salmorin & Gepty, 2023). Although agricultural extension has long been regarded as a public good, nowadays public and nonpublic extension and advisory services are both key to sustainable agriculture, resilient livelihoods, and inclusive growth (Davis et al., 2021). Pluralistic extension recognizes the inherent differences that exist between farmers and farming systems and the need to address challenges in agriculture development with different approaches.

This study was conducted to provide a clear picture of the needs and expectations of the various stakeholders, their roles, and interactions of the players, and the constraints met by the various actors using the innovation systems approach and come up with possible policy recommendations to address constraints in the overall value chain. The main objective of this survey study is to determine the interactions of extension actors in the support and delivery of services using the innovation systems framework/approach. Making use of the innovation systems perspective in the delivery of extension services along the value chain in the abaca industry provides the premise that there are important domains that play important roles in the effective delivery of innovations to make the industry vibrant and progress. Innovation serves as the means through which new knowledge is created and applied to economic processes in order to increase productivity and add value to profitable activities (Moscardini et al., 2022). In the context of an innovation system, it entails a non-linear complex process rather than in isolation wherein organizations, institutions, entities/actors (in the case of this study, the different domains are demand, research, enterprise, education, support) interact in order to generate, improve, disseminate the knowledge products to make the industry working effectively (Frieman & Lewis, 2021; Qin et al., 2022). Hence, the purpose of this study is to give insights into how to enhance the production and value chain of abaca in the region by suggesting innovative activities to level up the interaction of the different players in the industry.

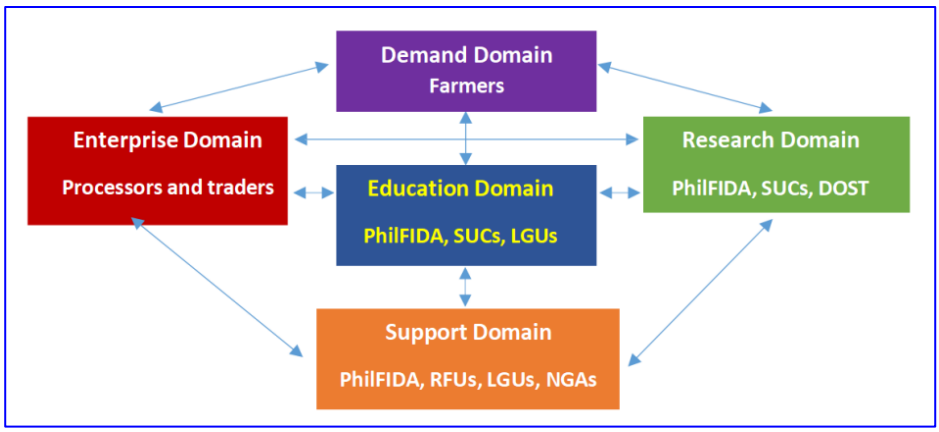
## 2. Theoretical basis

The failure of investigating only farmer and farm characteristics to explain the lack of uptake of innovations in other contexts led to the expansion of extension concerns to look at the problems, opportunities along the supply chain and the interaction of the various stakeholders of an innovation system (Antwi-Agyei & Stringer, 2021; Casinillo, 2022). Neef and Neubert (2011) portrayed that participatory agricultural research must concentrate on how to blend various forms

and focus on intensifying the participation of different stakeholders in the agriculture industry to improve production and economic profitability. Additionally, Knaggard et al. (2019) stated that the interaction of players in the agriculture industry through research projects enables to support of social transition to productivity and sustainability as well as economic development. Moreover, Valenzona et al. (2020), Aguda et al. (2022) depicted that the support of the government to the farmers and other players has a tremendous improvement to the production and supply chain of agricultural products, which contributes to the Gross Domestic Product (GDP) of the country. Hence, the interaction of stakeholders in the abaca industry must be strengthened to improve productivity, supply chain, marketability, and economic sustainability (Araya-Gutiérrez et al., 2023). Figure 2 presents the model interaction of various players in the abaca industry in Region VIII, Philippines, which serves as a theoretical framework for the research survey.

**Figure 1**

*Interaction Model for Abaca Players*




*Source.* Authors' construction (2023)

## 3. Methods

### *3.1. The research design*

This article study employed a descriptive research design to explain the level of interaction and common problems of the different players in the abaca industry in Eastern Visayas, Philippines. The research design aims to obtain the necessary information that elucidates the phenomenon and situation in the abaca industry. The study employed a cross-sectional type of data in a quantitative form gathered through a survey questionnaire. The research study used standard statistical measures to give a description of the data collected and provide a clear network figure among players in the abaca industry.

### *3.2. Locale, respondents, and ethics*

In the Philippines, Region VIII known as Eastern Visayas is one of the areas in the country where the abaca industry is wide and active (Pleños, 2022). Hence, this research study surveyed the five provinces in Eastern Visayas, Philippines, namely, Northern Samar, Eastern Samar, Biliran, Leyte, and Southern Leyte. The dominant respondents of this survey are the abaca farmers in the said provinces. The selected enablers and key informant respondents of the study came from the National Abaca Research Center based at the Visayas State University, the top management of the PhilFIDA regional office, local traders such as Ching Bee Trading Corporation in Baybay City, Philippines, abaca processing plants, and state universities and

colleges in the region. Table 1 presents the acronyms of the key players or stakeholders involved in the study.

**Table 1**

*Acronyms Were involved in the Survey*

| Abbreviation | Meaning |
|---|---|
| PhilFIDA | The Philippine Fiber Industry Development Authority |
| VSU | Visayas State University |
| UEP | University of Eastern Philippines |
| SLSU | Southern Leyte State University |
| DOST | Department of Science and Technology |
| SUCs | State Universities and Colleges |
| LGU | Local Government Unit |
| NGA | National Government Agency |
| ATI | Agricultural Training Institute |
| DENR | *Department of Environment and Natural Resources* |
| DAR | Department of Agrarian Reform |
| NGO | Non-government Organization |
| DA | Department of Agriculture |

*Source.* Authors' construction (2023)

In determining the sample size for abaca farmers, Slovin's formula was used with a reliable margin of error set by research authors, and Simple Random Sampling (SRS) was then employed with the help of random numbers. For other players, purposive sampling was used. A total of 419 abaca stakeholders were interviewed and distributed as follows: 349 abaca farmers, 24 local traders, 26 LGU personnel, 12 PhilFIDA personnel, four (04) enablers from SUCs, and four (04) small-scale processors from five (05) provinces of the region. Before the proper conduct of the survey, necessary consent letters were sent to the higher authorities in each province. In addition, all abaca farmers and other informants involved in this research were informed about the purpose of the study and told that their participation was voluntary. Moreover, abaca farmers and other informants were also informed that no sensitive information was involved in the interview and all information gathered was solely used for the sake of the research. Hence, the data gathered were treated as highly confidential to protect the reputation of the abaca farmers and other informants who participated in the research survey.

### *3.3. Instrument and data collection*

The instrument used in this article study was a developed questionnaire adapted from the study of Neef and Neubert (2011); Pleños (2022). In that case, the researchers have constructed five separate survey instruments that were used to collect information from different abaca players including abaca farmers, PhilFIDA personnel, LGU officials, academics, and traders. The content validity of the instruments was addressed by presenting them to the stakeholders. The survey instruments were also reviewed by the project team and selected staff of the

Department of Agricultural Education and Extension (DAEE) of VSU before the presentation of the survey instruments to PhilFIDA staff in Region VIII. The first part of the survey instruments gathered respondents' socio-demographic profiles, while the second section allows the description of the abaca players' level of interaction, process, and support needed in accomplishing the corresponding functions. The questionnaire for the level of interaction uses a four (04) point rating scale as follows: 1-No interaction, 2-Weak interaction, 3-Moderate interaction, and 4-Strong interaction. Table 2 shows the interval of interaction perception scores where the mean average possibly falls and its corresponding adjectival description.

**Table 2**

*Interaction Perception Scores*

| Perception scores | Description |
|---|---|
| 1.00 - 1.75 | No interaction |
| 1.76 - 2.50 | Weak interaction |
| 2.51 - 3.25 | Moderate interaction |
| 3.26 - 4.00 | Strong interaction |

*Source.* Authors' guide (2023)

The researchers hired research enumerators for the data collection in the form of a face-to-face interview with the informants. During the interview, the responses of the informants were recorded in the blank space provided in the questionnaire.

### *3.4. Data Analysis*

After the survey, the data collected were assigned with coding values and encoded in Microsoft Excel. To describe the data, it was summarized using statistical metrics such as counts, percentages, minimum and maximum value, mean average, Standard Deviation (SD) for the measure of the dispersion of the data, and Coefficient of Variation (CV) as a percentage of consistency. According to Reed et al. (2002), a perception response is statistically consistent if the CV of the perception scores is less than 20%. The statistics calculation results were presented in tabular form, and a network graph was constructed from it to analyze the whole picture of the interaction among the players in the abaca industry.

## 4. Results and discussion

### *4.1. Descriptive profile of Abaca players*

The mean farm size of the abaca farmers is 1.88 hectares, with a minimum of 0.02 hectares and a maximum of 30 hectares. Out of 349 farmer respondents, 297 (85.1%) of them owned their farms. This result is consistent with the findings of Pleños (2022) that most of the abaca farmers owned their farms. Forty-three (12.32%) are tenants, seven of them (2.01%) are stewards of the farm, and only two (0.57%) rented lands for their abaca farming. The majority of the farmers were married females who owned their farms, were in their prime working age, and had only finished their elementary education. The majority of the traders were married females who were in their prime working age and had finished their college degrees. A great number of LGU respondents were married male municipal agriculturists who were of mature working age and had finished their graduate studies. Half of the PhilFIDA personnel were Provincial Fiber Development Officers (PFDO), and half were Field Development Officers (FDO), who were married males of their prime working age and obtained their college degrees. Half of the SUCs

enablers were males, married, who finished their graduate studies and located in the Leyte province, while the majority of the small-scale processors were married males in their prime working age, who had only finished their secondary education.

### *4.2. Abaca farmers' interaction with other players*

Results show that abaca farmers have no interaction with all these key players in the abaca industry except with the local traders in terms of enterprise and trading activities. However, their interaction with local traders was weak (Mean = 2.17, SD = 0.56) (Table 3). Farmers and local traders collaborate based on the supply and demand of the abaca business. Celestino et al. (2016) argued that the interaction of abaca farmers and local traders is necessary since local traders support the farmers with loans and cash advances to the produced abaca yield. For the farmers to have enough budget for agricultural inputs, the trader reinforced this by providing loans or access to credit. Hence, farmers have a direct interaction with local trades as opposed to other players. In addition to that, if there are several abaca traders in the locality, farmers choose the trader who can offer a premium price for their abaca yield. Thus, this kind of interaction, though weak, is considered "long-term" because farmers regularly sell their abaca produce to the same trader mainly because farmers can avail of credit in cash or in-kind. This kind of interaction is advantageous to the farmers because traders are considered the main source of loans or cash advances, particularly during times of emergencies. The study by Valenzona et al. (2020) emphasizes that farmers' interaction and involvement with the key players or farmers' associations is vital to exercise and enhance economic activities. The lack of interaction of abaca farmers with other stakeholders implies that PhilFIDA, the SUCs, and other institutions need to identify issues or barriers to farmer engagement and articulate the roles and responsibilities not only of the farmers as stakeholders in the abaca industry but of other stakeholders as well. Abaca farmers need to be visited often and be communicated with if possible so they can feel their importance as producers in the value chain who need the support in terms of knowledge, skills, inputs, facilities, and finances to produce quality abaca products needed to improve the supply chain. In the study of Aguda et al. (2022), it is portrayed that the role of government agencies in agriculture is to promote sustainability and improve the farmer's productivity as well as well-being.

**Table 3**

*The Demand Domain's Interaction (Farmers) with Other Stakeholders*

| Players | | Mean | SD | CV (%) | Description[a] |
|---|---|---|---|---|---|
| ***Research domain*** | *PhilFIDA* | 1.11 | 0.23 | 20.72 | No interaction |
| | *VSU* | 1.02 | 0.09 | 8.82 | No interaction |
| | *UEP* | 1.01 | 0.05 | 4.95 | No interaction |
| | *SLSU* | 1.00 | 0.00 | 0.00 | No interaction |
| | *DOST* | 1.00 | 0.00 | 0.00 | No interaction |
| ***Enterprise domain*** | *Secondary processors* | 1.09 | 0.12 | 11.01 | No interaction |
| | *Traders* | 2.17 | 0.56 | 25.81 | Weak interaction |
| ***Education domain*** | *PhilFIDA* | 1.44 | 0.43 | 29.86 | No interaction |
| | *SUCs (VSU, SLSU, UEP)* | 1.04 | 0.11 | 10.58 | No interaction |
| | *LGUs* | 1.17 | 0.23 | 19.66 | No interaction |

| Players | | Mean | SD | CV (%) | Description[a] |
|---|---|---|---|---|---|
| | *NGAs (ATR, DENR, DAR, etc.)* | 1.06 | 0.17 | 16.04 | No interaction |
| | *NGOs* | 1.04 | 0.08 | 7.69 | No interaction |
| ***Support domain*** | *PhilFIDA* | 1.74 | 0.38 | 21.84 | No interaction |
| | *DA-RFU* | 1.14 | 0.26 | 22.81 | No interaction |
| | *LGUs* | 1.28 | 0.33 | 25.78 | No interaction |
| | *NGAs (ATR, DENR, DAR, etc.)* | 1.07 | 0.17 | 15.89 | No interaction |
| **Overall mean** | | **1.20** | **0.41** | 34.17 | **No interaction** |

*Note.* a - See Table 2
*Source.* Authors' calculation (2023)

### *4.3. Traders' interaction with other players*

Table 4 shows the strength of the interaction of traders with other industry players in the region. Traders have no interaction with all players in the abaca industry except with the farmers with whom they have moderate interaction (Mean = 2.92, SD = 0.89) and the PhilFIDA with weak interaction in terms of provision of research (Mean = 1.71, SD = 0.32), education (Mean = 2.21, SD = 0.43) and support (Mean = 2.46, SD = 0.87) services. The traders not only functioned as sources of price information, but they were also involved in the inspection, weighing, and bundling of abaca fibers based on their grade or classification. Local traders act as a source of financial support or credit to abaca farmers. Moreover, abaca farmers and local traders have more interaction as opposed to other players since farmers need to sell their produce abaca yield to traders or buyers, and traders need abaca products to trade for the purpose of economic profit (Calica et al., 2024). In these activities, they only interact with the farmers, having a moderate strength of interaction with them. The traders' weak interaction with PhilFIDA may be due to very few instances they were required by PhilFIDA to attend meetings, and the bulk of their time was spent in trading and negotiations with farmers and processors. According to Celestino et al. (2016), abaca traders must be trained in the educational domain of the industry to strengthen extension delivery services and value chains to mobilize stakeholders and improve the economic profit of the players.

**Table 4**

*The Enterprise Domain's Interaction (Traders) with Other Stakeholders (N = 24)*

| Players | | Mean | SD | CV (%) | Description[a] |
|---|---|---|---|---|---|
| ***Demand domain*** | *Farmers* | 2.92 | 0.89 | 38.86 | Moderate interaction |
| ***Research domain*** | *PhilFIDA* | 1.71 | 0.32 | 18.71 | Weak interaction |
| | *VSU* | 1.25 | 0.13 | 10.40 | No interaction |
| | *UEP* | 1.00 | 0.00 | 0.00 | No interaction |
| | *SLSU* | 1.00 | 0.00 | 0.00 | No interaction |
| | *DOST* | 1.00 | 0.00 | 0.00 | No interaction |
| ***Education domain*** | *PhilFIDA* | 2.21 | 0.43 | 19.46 | Weak interaction |
| | *SUCs (VSU, SLSU, UEP)* | 1.04 | 0.01 | 0.96 | No interaction |

| Players | | Mean | SD | CV (%) | Description[a] |
|---|---|---|---|---|---|
| | *LGUs* | 1.33 | 0.22 | 16.54 | No interaction |
| | *NGAs (ATR, DENR, DAR, etc.)* | 1.13 | 0.21 | 18.58 | No interaction |
| | *NGOs* | 1.08 | 0.06 | 5.56 | No interaction |
| ***Support domain*** | *PhilFIDA* | 2.46 | 0.87 | 35.37 | Weak interaction |
| | *DA-RFU* | 1.00 | 0.00 | 0.00 | No interaction |
| | *LGUs* | 1.25 | 0.19 | 15.20 | No interaction |
| | *NGAs (ATR, DENR, DAR, etc.)* | 1.08 | 0.06 | 5.56 | No interaction |
| **Overall mean** | | **1.43** | **0.28** | 19.58 | **No interaction** |

*Note.* a - See Table 2
*Source.* Authors' calculation (2023)

### *4.4. Small-scale processors' interaction with other players*

Due to the low supply of raw materials for processing *sinamay* and other materials also lowered the interaction between farmers and small-scale processors (Mean = 2.25, SD = 0.89) as shown in Table 5. Based on the CV (39.55%), farmers' and small-scale processors' interaction is not consistent. Moreover, small-scale processors have no interaction with other players in the industry (Table 5). Among the players of abaca innovation systems which has been greatly affected economically are the small-scale processors. The need to consider the concerns and opportunities of this domain is important. Small-scale processors must be supported by government agencies, especially extension agent that promotes innovative ideas and marketing strategies to improve the economic activities of the abaca industry in the whole country (Quilatan, 2017).

**Table 5**

*Enterprise Domain (Small-scale Processors) Interaction with Other Stakeholders (N = 4)*

| Players | | Mean | SD | CV (%) | Description[a] |
|---|---|---|---|---|---|
| ***Demand domain*** | *Farmers* | 2.25 | 0.89 | 39.55 | Weak interaction |
| ***Research domain*** | *PhilFIDA* | 1.00 | 0.00 | 0.00 | No interaction |
| | *VSU* | 1.25 | 0.51 | 40.80 | No interaction |
| | *UEP* | 1.00 | 0.00 | 0.00 | No interaction |
| | *SLSU* | 1.00 | 0.00 | 0.00 | No interaction |
| | *DOST* | 1.00 | 0.00 | 0.00 | No interaction |
| ***Education domain*** | *PhilFIDA* | 1.25 | 0.32 | 25.60 | No interaction |
| | *SUCs (VSU, SLSU, UEP)* | 1.00 | 0.00 | 0.00 | No interaction |
| | *LGUs* | 1.00 | 0.00 | 0.00 | No interaction |
| | *NGAs (ATR, DENR, DAR, etc.)* | 1.00 | 0.00 | 0.00 | No interaction |
| | *NGOs* | 1.00 | 0.00 | 0.00 | No interaction |
| ***Support domain*** | *PhilFIDA* | 1.75 | 0.81 | 46.29 | No interaction |

| Players | | Mean | SD | CV (%) | Description[a] |
|---|---|---|---|---|---|
| | *DA-RFU* | 1.00 | 0.00 | 0.00 | No interaction |
| | *LGUs* | 1.00 | 0.00 | 0.00 | No interaction |
| | *NGAs (ATR, DENR, DAR, etc.)* | 1.00 | 0.00 | 0.00 | No interaction |
| **Overall mean** | | **1.16** | **0.37** | **31.90** | **No interaction** |

*Note.* a - See Table 2
*Source.* Authors' calculation (2023)

### *4.5. LGUs' interaction with other players*

Shown in Table 6 is the strength of interaction between the LGUs and stakeholders in the abaca industry in Region 8. The results indicate that the LGUs have no interaction with all abaca stakeholders except with farmers (Mean = 2.77, SD = 0.45) with moderate interaction. The local government in the Philippines is divided into three levels: provinces and independent cities, component cities and municipalities, and barangays, all of which are collectively known as Local Government Units (LGUs). PhilFIDA has always been working closely with LGUs to rehabilitate abaca production in Region 8 and revive abaca plantations whipped by several typhoons. Thus, this close coordination between PhilFIDA and LGUs may disagree with the results of the study but imply that there is a need to strengthen the capability of LGUs as support service providers. The support of the government units in the abaca industry is important since it provides support, innovative technologies, and business investment for the advancement and sustainability of the economic value chain (Norton & Alwang, 2020; Tamsah et al., 2022).

**Table 6**

*Support Domain's (LGU's) Interaction with Other Stakeholders (N = 26)*

| Players | | Mean | SD | CV (%) | Description[a] |
|---|---|---|---|---|---|
| ***Demand domain*** | *Farmers* | 2.77 | 0.45 | 16.25 | Moderate interaction |
| ***Research domain*** | *PhilFIDA* | 1.12 | 0.08 | 7.14 | No interaction |
| | *VSU* | 1.00 | 0.00 | 0.00 | No interaction |
| | *UEP* | 1.08 | 0.04 | 3.70 | No interaction |
| | *SLSU* | 1.00 | 0.00 | 0.00 | No interaction |
| | *DOST* | 1.00 | 0.00 | 0.00 | No interaction |
| ***Enterprise domain*** | *Processors* | 1.12 | 0.08 | 7.14 | No interaction |
| | *Traders* | 1.23 | 0.12 | 9.76 | No interaction |
| ***Education domain*** | *PhilFIDA* | 1.69 | 0.23 | 13.61 | No interaction |
| | *SUCs (VSU, SLSU, UEP)* | 1.08 | 0.01 | 0.93 | No interaction |
| | *NGAs (ATR, DENR, DAR, etc.)* | 1.19 | 0.02 | 1.68 | No interaction |
| | *NGOs* | 1.08 | 0.01 | 0.93 | No interaction |
| **Overall mean** | | **1.28** | **0.23** | **17.97** | **No interaction** |

*Note.* a - See Table 2
*Source.* Authors' calculation (2023)

### *4.6. PhilFIDAs' interaction with other players*

Increasing abaca farmers' income through improving farm productivity is one of the objectives of PhilFIDA. As such, strong interaction between the two stakeholders is expected. However, PhilFIDA considered their interaction with farmers as only moderate (Mean = 2.58, SD = 0.93) due to a limited number of field personnel and other assigned duties (Table 7). Meanwhile, among the functions of PhilFIDA is the licensing and registration of fiber trade participants, including local traders. Usually, interaction between PhilFIDA personnel and local traders occurs only during the latter's application for a license and, in some cases, during stakeholders' forums when some traders are invited to attend. With this, PhilFIDA personnel viewed their interaction with them as weak (Mean = 1.92, SD = 0.12). Likewise, they had a weak interaction with SUCs (Mean = 2.33, SD = 0.07) particularly NARC of VSU. Although they collaborate in some capacity-building activities, as well as during Coalition meetings organized by VSU, there is still a need to strengthen their collaboration, especially in research which is not evident. For the rest of the abaca stakeholders, PhilFIDA had no interaction at all, as indicated in the weighted mean results. PhilFIDA's role in the abaca industry is vital since they are responsible for introducing innovative ideas and new knowledge that solve problems in biological aspects along with the support of universities and other scientists (Barbosa et al., 2023).

**Table 7**

*Support Domain's (PhilFIDA Staff's) Interaction with Other Stakeholders (N = 12)*

| Players | | Mean | SD | CV (%) | Description[a] |
|---|---|---|---|---|---|
| ***Demand domain*** | *Farmers* | 2.58 | 0.93 | 36.05 | Moderate interaction |
| ***Research domain*** | *VSU* | 1.58 | 0.12 | 7.59 | No interaction |
| | *UEP* | 1.33 | 0.10 | 7.52 | No interaction |
| | *SLSU* | 1.17 | 0.09 | 7.69 | No interaction |
| | *DOST* | 1.08 | 0.12 | 11.11 | No interaction |
| ***Enterprise domain*** | *Processors* | 1.42 | 0.07 | 4.93 | No interaction |
| | *Traders* | 1.92 | 0.12 | 6.25 | Weak interaction |
| ***Education domain*** | *LGUs* | 1.75 | 0.11 | 6.29 | Weak interaction |
| | *SUCs (VSU, SLSU, UEP)* | 2.33 | 0.07 | 3.00 | No interaction |
| | *NGAs (ATR, DENR, DAR, etc.)* | 1.75 | 0.05 | 2.86 | No interaction |
| | *NGOs* | 1.50 | 0.91 | 60.67 | No interaction |
| **Overall mean** | | **1.80** | **0.21** | **11.67** | **Weak interaction** |

*Note.* a - See Table 2
*Source.* Authors' calculation (2023)

### *4.7. SUCs' interaction with other players*

The SUCs constitute part of the enablers among the abaca stakeholders. Solely representing SUCs in Region 8 is the National Abaca Research Center (NARC) of VSU. We tried to send questionnaires to other SUCs like SLSU and UEP through emails but they never responded. NARC is mandated to help uplift the abaca industry through an integrated and multidisciplinary abaca research and development program. Carrying NARC'smandate, NARC respondents viewed their interaction with farmers (Mean = 3.25, SD = 0.50) and the LGUs as

moderate (Mean = 3.00, SD = 0.55) as shown in Table 8. With farmers, their interaction usually occurs during a field visit to extension project sites, responding to walk-in clients or requests for technical assistance, conducting training, and hosting the abaca summit, among others. NARC also attends to LGU requests for training, technical assistance, and other request on abaca-related issues. The abaca coalition meeting held every quarter is the usual time for NARC personnel to interact with other abaca stakeholders, thus, their interaction with them is weak. In the paper of Moscardini et al. (2022), universities are responsible for new innovative ideas in agriculture and provide training to enhance the farming system and farmers' knowledge of their production.

**Table 8**

*Research Domain's (SUCs) Interaction with Other Stakeholders (N = 4)*

| Players | | Mean | SD | CV (%) | Description[a] |
|---|---|---|---|---|---|
| ***Demand domain*** | *Farmers* | 3.25 | 0.50 | 15.38 | Moderate interaction |
| ***Enterprise domain*** | *Processors* | 2.00 | 0.62 | 31.00 | Weak interaction |
| | *Traders* | 2.00 | 0.62 | 31.00 | Weak interaction |
| ***Education domain*** | *PhilFIDA* | 2.50 | 0.35 | 14.00 | Weak interaction |
| | *SUCs (VSU, SLSU, UEP)* | 2.50 | 0.35 | 14.00 | Weak interaction |
| | *LGUs* | 2.75 | 0.48 | 17.45 | Moderate interaction |
| | *NGAs (ATR, DENR, DAR, etc.)* | 2.50 | 0.34 | 13.60 | Weak interaction |
| | *NGOs* | 2.25 | 0.31 | 13.78 | Weak interaction |
| ***Support domain*** | *PhilFIDA* | 2.00 | 0.60 | 30.00 | Weak interaction |
| | *DA-RFU* | 2.25 | 0.63 | 28.00 | Weak interaction |
| | *LGUs* | 3.00 | 0.55 | 18.33 | Moderate interaction |
| | *NGAs (ATR, DENR, DAR, etc.)* | 2.25 | 0.45 | 20.00 | Weak interaction |
| **Overall mean** | | **2.35** | **0.65** | 27.66 | Weak interaction |

*Note.* a - See Table 2
*Source.* Authors' calculation (2023)

### *4.8. Analysis of the overall interactions among players*

The study found that abaca farmers have minimal to no interaction with the other key players in the abaca industry except with the local traders (Figure 2). Local traders interact with farmers moderately but have weak interaction with PhilFIDA in terms of provision for research, education, and support services. LGUs moderately interact with farmers but have no interaction at all with other Abaca key players. Due to a limited number of field personnel and limited activities, PhilFIDA staff have only moderate interaction with farmers. Local traders rarely interact with PhilFIDA staff as this only happens occasionally during stakeholder forums and licensing applications. Likewise, PhilFIDA's interaction with SUCs, particularly with NARC, is weak. SUCs, particularly NARC, have moderate interaction with farmers and the LGUs. Although NARC also interacts with other abaca key players in the region, they only do so during quarterly coalition meetings. Thus, their interaction is weak. Abaca farmers are the source of raw materials like "*escuhido*" or raw fiber threads utilized by small-scale producers who are into buying, making, and selling *sinamay*. However, as a result of the ABTV (Abaca Bunchy Top Virus) outbreak, the amount of raw materials supplied by farmers drastically fell,

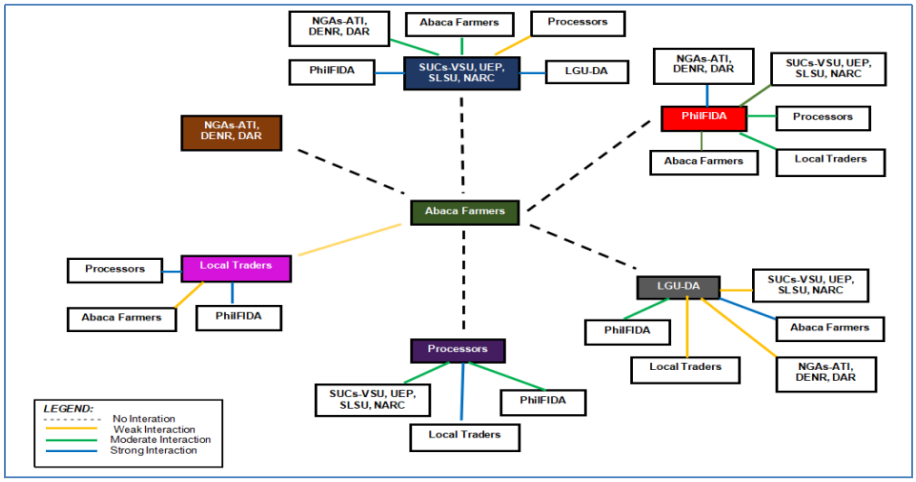
which in turn led to a decline in the number of small-scale processors, thus weakening the interactions with farmers. In general, there is loss or weak interaction among players in the abaca industry which implies that there is less collaboration in activities that can benefit practically all players in the industry.

In looking at the interactions of the different actors of the abaca industry based on an innovation systems approach, it is evident that the flow of information/technologies that come from the research institutions funneled through the change system, who are responsible for the extension delivery system, is not reaching out to the end-users who are ultimately the farmers. For instance, the lack of information on abaca disease management has been ranked first as the major problem. There are already some ways of managing the disease. However, it seems that farmers are not aware of these, or if they are aware, they are not clearly explained how the protocol, like the application of herbicide and rouging, can be properly done. Although PhilFIDA staff reported that farmers are given lectures and demonstrations on how they apply the herbicide to abaca plants, it was not clear what will be the effect of the application of herbicide to abaca plants. Many farmers reported that when they applied the chemical, they thought their abaca plants would recover from the disease. Instead, all plants applied died.

This is just an example of how communication in innovation plays an important aspect in technology dissemination (Barbosa et al., 2023; Qin et al., 2022). The lack of training support and monitoring continued to follow-up and collaboration among the important actors in the technology dissemination is apparent. Needless to say, some farmers have attitudinal problems that despite training attended and other support, they still insist on their ways. However, traditional farmers are less likely to be productive as opposed to farmers that is guided by extension agents, showing more productivity with the help of new advanced technology and knowledge (Antwi-Agyei & Stringer, 2021; Casinillo & Seriño, 2022).

**Figure 2**

*Overall Interaction of the Different Players in the Abaca Industry*




*Source.* Authors' construction (2023)

### *4.9. Problems identified by stakeholders in the Abaca industry in Region 8*

The abaca industry in the country is beset with many challenges causing its performance to decline. Stakeholders or Value Chain Analysis (VCA) respondents were asked to rank the top five problems that they felt were most prevalent in Region 8, specifically in their neighborhood (Figure 3). Farmers and traders ranked *"lack of information in disease management and*

*rehabilitation of abaca farms*" as the most pressing issue on abaca after the ABTV nearly wiped out all abaca farms in the nation. The majority of farmers claimed that no training was offered in this regard and that no technicians were accessible to assist them. As a result, farmers either did nothing or took action without proper guidance. In 2009, PhilFIDA initiated the "Abaca Disease Management Project" (ADMP) in coordination with concerned local government units to reduce ABTV incidence to less than 5%, a level that farmers can manage and control by rouging. However, because not all farmers take the initiative and commitment to control the disease even at the initial/minimal stage of infection, disease prevalence continues to be a concern. PhilFIDA also acknowledged this as an issue due to their limited field personnel although this was only second in rank among the issues noted. Besides, implementation of the ADMP was only done in some areas. There were also instances where farmers did not attend training on disease management, thus, information on ABTV management was not widely disseminated. Abaca focal persons from LGUs also admitted that training on pest & disease management was very limited. Likewise, the limited number of technicians to monitor abaca farmers was also a reason cited as a problem. This problem was also ranked second by the LGUs.

Due to the bunchy top virus, rehabilitation of abaca farms was necessary; thus, the need to have sufficient disease-free planting materials, especially of high-yielding varieties. However, these were in *limited supply.* This was the second-most prevalent issue noted by both farmers and traders. Farmers also expressed dissatisfaction with not receiving any High-Yielding Variety (HYV) abaca seedlings. Although either tissue-cultured or seed-derived seedlings were distributed to farmers, these were still very limited. Additionally, some seedlings that were distributed were allegedly already disease-infested. For PhilFIDA, the *limited supply of disease-free planting materials of high-yielding abaca varieties* was the number one problem of the abaca industry in the region. Admittedly, the supply of planting materials both from both PhilFIDA and other sources was also limited. This problem ranks only third for the LGUs.

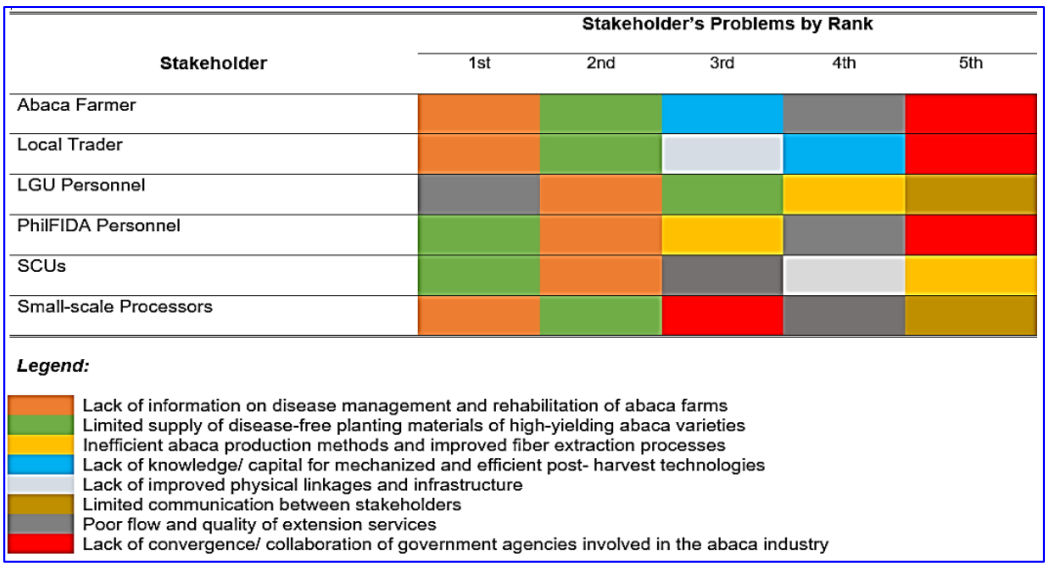
The type of post-harvest facilities utilized for stripping and drying abaca fibers has a significant impact on the quality of the abaca fibers produced. The majority of abaca producers in Region 8 mostly employ manual stripping, which yields low-grade fiber, as was indicated in the VCA report. Also based on the 2020 fiber statistics report, the present level of mechanization is only 8.92% machine-extracted fiber or 4,723 metric tons from the total annual production of 52,962 metric tons (PFIDA, 2023). Especifically, for Region 8, the use of manual stripping practice could be due to the problem of lack of knowledge and/or capital for mechanized and efficient post-harvest technologies. *Limited capital is indeed a major issue for abaca farmers that prevents them from* buying mechanized stripping machines. This concern ranked third among the top five problems identified by farmers and fourth by traders. Farmers' fundamental family needs, particularly food, are therefore given priority when spending their money. Lack of training and absence of a personal stripping machine were the identified causes for the lack of knowledge of mechanized and efficient post-harvest technologies. The lack of capital also resulted in the problem of *inefficient abaca production methods and fiber extraction processes* which the PhilFIDA personnel and LGUs considered as the third and fourth in rank, respectively, among the problems identified. While capital is a valid reason for most farmers not adopting mechanized stripping practice, it can be further explained by the fact that they trade their fibers to local traders at semi-classified or "all in", meaning ungraded fiber as procurement basis where the price is set for all fiber grades. Such is the case because local traders are not knowledgeable in fiber grading and only classify abaca fibers according to their quality when selling to GBEs. The *poor flow and quality of extension services* were ranked fourth among the issues that farmers

have cited. As a result, there is no monitoring, little to no training on pest and disease management, little to no support for abaca farmers, and the distribution of low-quality planting materials. Similar to this, PhilFIDA staff ranked this issue fourth, primarily because of the shortage of field personnel. However, the main issue for LGUs is the poor flow and quality of extension services. This is particularly true for LGUs where abaca is not a priority commodity, which results in poor extension service flow and quality. Budget and personnel restrictions were two more reasons for problem occurrence. This result is consistent with the findings of Aguda et al. (2022), in which service quality not being met can negatively affect the expected goals of various players in agriculture.

Farmers, traders, and PhilFIDA staff ranked *the lack of convergence or coordination among government agencies involved in the abaca industry* as the fifth problem. Farmers and traders believed that there was no collaboration or convergence among these organizations because of the weak or nonexistent support from the government or other key players. However, given the existence of the Abaca Coalition for Region 8, which was established in 2018 to develop and put into action steps and harmonize strategies on abaca production rehabilitation, only a few of the PhilFIDA personnel saw the lack of collaboration/convergence among government agencies involved in the abaca industry as a problem. Additionally, the organization is strengthened through its quarterly meetings, which also allow them to learn about the activities of the coalition members in the disease-stricken abaca areas. Although the pandemic momentarily suspended the coalition's activities, it has already started up again in 2022. *Limited communication between stakeholders* was considered by small-scale processors & LGU personnel as the fifth problem of abaca in the region. Abaca was not a priority for some LGUs, and a limited number of technicians were cited as reasons for the problem. Indeed, communication is a very important aspect of convergence. Hence, a need to strengthen the convergence by pushing for more tangible collaborative activities among stakeholders (Knaggård et al., 2019; Tamsah et al., 2022).

**Figure 3**

*Stakeholder's Problems by Rank*




*Source.* Authors' construction (2023)

## 5. Conclusion and economic implications

The abaca industry players have expressed their needs and expectations and how these were addressed by the extension service providers as they perform their respective roles in the abaca value chain. In conclusion, local traders interact with farmers moderately and vice versa since the two players are working together for the marketing aspect and economic profitability of abaca products. Other players are observed to have weak interaction under the VCA because of some constraints in the abaca industry activities. Based on expectations, various players especially the extension service providers, were addressing these to a certain extent; however, farmers themselves did not feel development interventions were visible in their lives even if there were provisions for planting materials and other inputs from PhilFIDA and LGUs. PhilFIDA did some brainstorming and planning to address the concerns of farmers; however, due to lack of funds, personnel, and collaboration with other stakeholders, as well as the lack of capability of LGU-based extension staff in solving farmers' problems were among the constraints raised by stakeholders. It was also evident that stakeholders needed support respective of the roles, functions, and processes they were dealing with to make the abaca industry vibrant.

Conclusively, the interactions among the players in the industry are generally weak which can be strengthened through institutionalizing a system where stakeholders can work together for the common good. The existence of the Abaca coalition serve as a vehicle for making the innovation system approach work has to build on strong institutional capacities and policies that can strengthen the bond of commitment and belongingness among the stakeholders involved. PhilFIDA must take the lead role in putting this system in place but needs a versatile and strong ability to communicate, organize, collaborate, and even orchestrate so that the coalition becomes the avenue of support from the different stakeholders especially the farmers who are the producers.

Key players in the industry have very low to moderate interaction, implying the lack of convergence and collaboration to make the industry booming. In the abaca value chain, each player has to interrelate with each other such that the farmers can connect directly not only to traders but to other stakeholders as needed. A user-friendly app or platform may be developed for all stakeholders to access and be updated on important information such as the prevailing price of abaca fiber, abaca varieties, etc. This is one way to strengthen communication and networking among stakeholders and address different problems in the value chain.

The result also implies that SUCs and other research institutions, such as NARC, may need to involve the traders in planning an abaca research and extension project because they too can contribute to strengthening the abaca enterprise and the local economy. Furthermore, the need for institutional strategies like the adoption of the innovation system approach, where stakeholders play active roles in addressing issues and concerns of the industry, are imperative. As for future research, one may look at the effectiveness of the extension delivery system and investigate the benefit sharing, added value and efficiency, and VCA of the interaction of the different players in the abaca industry. Furthermore, a comparison analysis between the interaction and market structure of the abaca industry in Region VIII and other regions in the country must be investigated to strengthen the current results of the study.

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