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## Baseline profile of agriculture performance and rural development indicators in Quirino Province, Philippines: insights and implications

Junel B. Guzman, Urdujah G. Alvarado, Josie Y. Bas-ong, Gilbert C. Magulod Jr.\*

*Cagayan State University, Tuguegarao, Cagayan, Philippines*

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### Abstract

Agriculture holds immense importance as it serves as the backbone of human civilization, providing the foundation for food security, economic growth, and livelihoods of billions of people. This cross-sectional research aimed to establish a baseline of agriculture performance and rural development indicators among farmers and fishers in Quirino Province, Philippines. The study collected data from 200 participants through structured questionnaires to gain valuable insights into agricultural practices and the rural development landscape. The findings reveal challenges related to an aging workforce, gender disparities, and low cooperative membership in the region. A significant proportion of respondents fall within the middle-aged group, emphasizing the reliance on experienced individuals in agriculture. Addressing the aging agricultural workforce and promoting youth engagement is crucial for the sector's continuity and growth. The study highlights a near-equal representation of male and female participants, necessitating efforts to empower women in farming for sustainable rural development. Additionally, addressing the needs of farming households and enhancing access to education and resources are essential to boost agricultural productivity. The study emphasizes the importance of land tenure security for farmers and fishers, along with the potential for increased collaboration with government agencies, NGOs, and development partners to support agricultural development in the region. This baseline survey provides critical insights for policymakers and stakeholders to devise targeted strategies aimed at fostering sustainable rural development and a prosperous agricultural sector in Quirino Province, Philippines.

\*Corresponding Author: Gilbert C. Magulod ✉ [gilbertmagulod\\_rdecusulasam28@yahoo.com](mailto:gilbertmagulod_rdecusulasam28@yahoo.com)

## Introduction

In many developing nations, agriculture serves as the primary income source, holding the potential to uplift farm revenue and alleviate rural poverty (Balisacan *et al.*, 2012; Suh, 2015). The Philippines, with millions of farmers dependent on rice as a crucial agricultural product (Bordey, 2010; Briones, 2010; Fuwa & Marciano, 2017), witnessed significant rice production, reaching 16.82 million metric tons from 1970 to 2008. However, natural calamities, such as typhoons, caused a decline in output to 15.77 million metric tons in 2010. Despite this setback, the country achieved a record high of 16.68 million metric tons in 2011, aided by a 3.4 percent increase in rice-growing area and improved seed-fertilizer technologies facilitated by enhanced irrigation access (National Agricultural Statistics Service).

Challenges to achieving rice self-sufficiency and food security emerged, including the 2008 food crisis, high agricultural input costs, land ownership restrictions, and a growing population (Galero *et al.*, 2014; Timmer, 2012; Villaver *et al.*, 2019). The Philippines' substantial reliance on rice imports (Brooks *et al.*, 2013; Timmer, 2012) further threatened food security. To address these issues and eliminate extreme hunger and poverty, the Philippine government enacted strategies to achieve rice self-sufficiency (Trethewie, 2012), leading to a drastic drop in rice imports from 2.3 million tons to 707 thousand tons.

However, the Philippines face challenges in land scarcity, hindering its efforts to match rice production levels of other major Asian countries. With only 4.69 million hectares of rice harvested in 2012 compared to India, China, Indonesia, and Thailand with 44, 29, 12, and 10 million hectares, respectively, the country's small landmass, growing population, climate, and land ownership issues contribute to its status as a rice-importing nation (International Rice Research Institute).

Farmers' access to land and financial resources are vital for efficient land management, and land reform

programs have been initiated by the Philippine government to make land more accessible (Akinyemi & Mushunje, 2019; Ballesteros and Bresciani, 2008; Koirala *et al.*, 2016). The Comprehensive Agrarian Reform Program (CARP) launched in 1988 aimed to redistribute farmland to landless farmers and renters. However, the program's full implementation has been challenging, and the limited possession of 7 hectares of farmland under CARP may impact the rental market's efficiency and lead to conflicts over land leases and property rights (Vargas, 2003).

Existing studies may have focused on broader national or regional trends, potentially overlooking the unique factors influencing agricultural practices and rural development in Quirino. By conducting a survey in this specific province, the study can bridge this gap by providing granular data and insights that are directly relevant to local decision-makers, policymakers, and stakeholders. The establishment of a baseline is critical for understanding the current state of agriculture in Quirino Province and measuring progress over time. Without this baseline data, it becomes challenging to assess the impact of any future interventions, policies, or development programs in the region accurately. By conducting this survey, the study aims to fill the gap in knowledge, providing a foundation for evidence-based policymaking and targeted strategies to enhance agricultural productivity and foster sustainable rural development in Quirino Province. Ultimately, addressing this research gap can lead to more effective and tailored approaches in promoting economic growth and poverty alleviation in the region.

As agriculture is a primary income source in the region, accurate data on its performance and rural development indicators will enable policymakers to develop evidence-based interventions tailored to the unique needs of Quirino Province. The survey's findings can shed light on factors influencing agricultural productivity, market trends, and the impact of government interventions on the sector.

Additionally, understanding the information sources and technology adoption among farmers and fishers can inform efforts to enhance knowledge dissemination and support the adoption of modern agricultural practices. By establishing this baseline, the study empowers stakeholders to devise targeted and sustainable solutions that can improve agricultural productivity, reduce rural poverty, and contribute to the overall progress of Quirino Province and the Philippines as a whole.

The primary research objective of this study is to establish a baseline of agriculture performance and rural development indicators in Quirino Province, Philippines, focusing on the demographic characteristics of farmers and fishers, their land ownership status, sources of income, membership in agricultural cooperatives/associations, possession of government IDs, and engagement with government and non-governmental organizations. Additionally, the study aims to identify factors contributing to the low membership in agricultural cooperatives/associations and examine the sources of information on government services and agricultural support utilized by the respondents. The findings will contribute to informed decision-making by policymakers, stakeholders, and development partners to devise targeted strategies aimed at fostering sustainable rural development and a prosperous agricultural sector in the region.

## Materials and methods

### Research Design

This study adopts a cross-sectional research design to establish a baseline of agriculture performance and rural development indicators in Quirino Province, Philippines. The research involves data collection from a sample of two hundred (200) farmers and fishers residing in the region. The primary data collection method utilizes structured questionnaires to capture essential insights into agricultural practices, socio-economic characteristics of farmers, and the overall rural development landscape. The research employs a quantitative approach, utilizing

statistical analysis through the Statistical Package for the Social Sciences (SPSS). Descriptive statistics, such as percentages, means, and standard deviation, will be used to derive meaningful findings from the gathered data. The survey will cover various aspects, including crop yields, livestock production, access to modern agricultural technologies, and sources of agricultural information. By examining gender distribution and the involvement of government officials and staff as primary information sources, the study aims to understand the role of government intervention in shaping agricultural policies. Furthermore, the research will explore the potential of Information and Communication Technologies (ICTs) in disseminating agricultural knowledge. The insights gained from this study will serve as a crucial starting point to inform policymakers, stakeholders, and local communities about the current state of agriculture and rural development in Quirino Province, guiding them in making informed decisions and devising targeted strategies for sustainable development and enhanced agricultural productivity.



**Fig. 1.** Map of the Philippines Highlighting Province of Quirino showing the location of the study (Source: [www.discoverthephilippines.com/quirino-province-philippines](http://www.discoverthephilippines.com/quirino-province-philippines))

### Participants

Participants in the research consisted of two hundred (200) farmers from Quirino Province, selected using a purposeful sampling approach with a site selection technique. To be eligible for inclusion, respondents had to meet specific criteria: they were required to be at least 18 years old, have resided in the province for more than five years, and have been actively engaged in farming for a minimum of three years before

participating in the survey. Prior to their participation, informed consent was obtained from all respondents, ensuring their voluntary involvement in the study. They were encouraged to candidly share their profile data, and ethical considerations were carefully adhered to. As part of ethical safeguards, participants were informed that the interviews would be video-recorded, and principles of autonomy, confidentiality, anonymity, and reciprocity were strictly observed throughout the research process.

#### *Instruments and Procedures*

The research instrument utilized in this study comprised items aimed at gathering information about the respondents' personal traits and experiences. Initially, the questions were drafted in English by the researchers and then translated into Ilokano, the local language, during the actual interviews. Group discussion questions for the grand tour were based on a Structured Interview Guide, which was distributed to participants before the meeting. To ensure accuracy and completeness, all interviews were meticulously recorded using both a tape recorder and a digital camera. Prior to its implementation in the field, a validation process of the instrument was conducted to identify and address any potential defects in the questions. Necessary adjustments were made based on the validation results. Importantly, the respondents included in the research were not part of the pre-testing activity, ensuring the independence and reliability of their responses. This rigorous approach to instrument development and validation enhances the credibility and robustness of the data collected, contributing to the overall validity of the research findings. It also demonstrates the researchers' commitment to maintaining methodological rigor and ethical considerations in the study.

#### *Data Analysis*

The survey conducted in Quirino Province, Philippines, aimed to establish baseline indicators for agriculture performance and rural development. Through the gathering of comprehensive data, the research sought to gain valuable insights into the

experiences and viewpoints of the respondents regarding various themes. To further enhance the analysis, the collected data was processed using SPSS, powerful statistical software. By leveraging percentages, means, and standard deviation, the researchers were able to present the findings in a more accessible and comprehensive manner, effectively highlighting the prevalence of different responses and shedding light on the central tendencies and variations within the data. This rigorous data analysis not only provided a solid foundation for understanding the current agricultural and rural development situation in Quirino Province but also enabled policymakers and stakeholders to make informed decisions, design targeted interventions, and formulate effective strategies to promote sustainable development and improve the lives of rural communities in the region.

#### **Results and discussion**

Table 1 presents the age and sex distribution of the respondents in the survey. Out of the 200 participants, the largest group, comprising 88 individuals or 44.0% of the total, falls within the age range of 46-60. The second most significant group consists of 66 respondents or 33.0% who are aged between 31-45. The age group of 61 and above represents 33 individuals or 16.5% of the sample, while the smallest group is that of 15-30 years old, with 13 respondents accounting for 6.5%. The data suggests that a substantial proportion of the respondents are in their middle adult years, particularly between the ages of 46 and 60, indicating that there is a reliance on individuals in this age bracket with farming skills and enthusiasm for agricultural activities. However, it is important to consider the implications of the predominance of older farmers in the agricultural sector. The statistics indicate that the agricultural workforce is aging more rapidly compared to other industries in the Philippines. This demographic trend raises concerns about succession planning and the need to attract younger individuals to farming. Given that younger workers often opt for nonfarm occupations, addressing this farmer aging issue becomes crucial for

sustaining and expanding agricultural activities in the region. Encouraging youth involvement and creating opportunities for them in the agricultural sector could potentially mitigate the effects of an aging farmer population and ensure the continuity and development of the farming industry.

**Table 1.** Age of respondents.

Age	Frequency (n=200)	Percent (%)
46-60	88	44.0
31-45	66	33.0
61 and above	33	16.5
15-30	13	6.5
Total	200	100.0
Mean	2.71	48.90
Standard Deviation	0.82	11.71

The mean age of 2.71 and a standard deviation of 0.82 provide additional insights into the age distribution of the respondents. The relatively low standard deviation suggests that the data is not widely dispersed and that the majority of respondents fall close to the mean age, further emphasizing the concentration of individuals in their middle adult years. While the survey indicates a strong presence of middle-aged respondents with farming expertise and interest, it also highlights the challenges posed by an aging agricultural workforce. To address this issue and promote sustainable rural development, efforts should be made to attract and engage younger generations in agriculture, ensuring a balanced and vibrant agricultural sector for the future. Efforts to encourage youth involvement in agriculture and create opportunities for them within the sector are crucial in addressing the farmer aging issue (Valdez *et al.*, 2022; Hossain *et al.*, 2019). Policy interventions and initiatives that promote agricultural education and training, offer financial incentives, and support innovative farming practices can attract younger generations to farming (Arbuckle & Lasley, 2018; Umar *et al.*, 2016). Additionally, fostering partnerships between educational institutions, government agencies, and agricultural organizations can help build a sustainable pipeline of young farmers

and revitalize the agricultural sector (VonHaden *et al.*, 2015; Saruchera *et al.*, 2014). By drawing on insights from existing literature, policymakers can design targeted strategies to overcome the challenges associated with an aging agricultural workforce and create a vibrant and prosperous agricultural sector that can support the region's economic growth and food security.

As to the gender distribution of the respondents, shown in Table 2, indicates that there were slightly more female participants (50.5%) compared to male participants (49.5%). This finding is noteworthy, as it challenges the traditional notion that rice growing, and agriculture in general, is exclusively a male-dominated activity. However, despite the near-equal representation in this survey, it is essential to consider the broader context, where gender disparities in the agricultural sector persist due to cultural norms, societal expectations, and unequal access to resources and opportunities (FAO, 2011; Kabeer, 2016). The prevalent portrayal of males as farmers and females as their assistants in charge of child care and household duties is indicative of deeply ingrained gender stereotypes that have implications for gender roles and opportunities within the agricultural industry (Doss *et al.*, 2015). These stereotypes contribute to gender inequalities, limiting women's participation in decision-making processes, access to agricultural resources, and control over income and assets (FAO, 2011; Meinzen-Dick *et al.*, 2011).

**Table 2.** Sex of respondents.

Sex	Frequency (n=200)	Percent (%)
Female	101	50.5
Male	99	49.5
Total	200	100

The findings from Table 3, which reveals the marital status of the respondents, demonstrate that the majority of participants are married (88%), followed by widow/widowers (5.5%), single (5%), and separated (1.5%). This suggests that having family responsibilities may influence individuals' engagement in farming activities. Married respondents may be more motivated to participate in agriculture as they have the responsibility to support

their families and ensure a stable source of income. On the other hand, widows and widowers might continue farming to sustain their livelihoods after the loss of their spouses, while single and separated individuals may have different economic priorities or constraints. The implications of these findings are multifaceted. Addressing gender disparities in agriculture is crucial for achieving sustainable rural development and promoting inclusive economic growth (FAO, 2011; Kabeer, 2016). Encouraging women's participation in agriculture and providing them with equal access to resources, training, and decision-making opportunities can contribute to improved agricultural productivity and food security (Doss *et al.*, 2015; Meinzen-Dick *et al.*, 2011). Furthermore, recognizing and supporting the role of women in farming can lead to more equitable and sustainable agricultural practices (Kabeer, 2016; Kushwaha *et al.*, 2020).

**Table 3.** Civil status of respondents.

Civil Status	Frequency (n=200)	Percent (%)
Married	176	88
Widowed	11	5.5
Single	10	5
Separated	3	1.5
Total	200	100

The sex and marital status distribution of the survey respondents highlights important considerations for promoting gender equality and sustainable rural development in the context of agriculture. Efforts to challenge gender stereotypes empower women in farming, and support farming households can contribute to a more equitable and prosperous agricultural sector and enhance the overall well-being of rural communities. Moreover, acknowledging the impact of family dynamics on agricultural engagement can inform targeted interventions and policies that support farming households and strengthen rural livelihoods (Rola-Rubzen & Hardaker, 2010; Kushwaha *et al.*, 2020). Strategies that promote sustainable agricultural practices, provide access to financial services, and offer social safety nets can assist farming families in overcoming challenges and building resilience in the face of

economic and environmental uncertainties (Rola-Rubzen & Hardaker, 2010).

Table 4 presents the educational attainment of the respondents in the survey, providing valuable insights into the level of education among those engaged in agriculture in Quirino Province. The data reveals that the highest percentage of respondents, constituting 29% of the total, are high school graduates. This suggests that a significant portion of individuals employed in agriculture have completed their secondary education, indicating a reasonable level of literacy and knowledge. Following high school graduates, the next most prevalent educational attainment is college graduates, comprising 18% of the respondents. Other educational categories include some high school (14%), some college (12.5%), elementary graduates (11.5%), some elementary (7.5%), vocational (6.5%), and post-graduate (0.5%). The smallest percentage of respondents (0.5%) reported having no formal education. The data in Table 4 underscores the importance of education in the agricultural sector. The majority of respondents have acquired at least a high school education, indicating that there is a significant emphasis on formal education among those engaged in farming and fishing activities. A higher level of education can have positive implications for agricultural productivity, as it equips farmers and fishers with improved problem-solving skills, critical thinking abilities, and the capacity to adopt modern farming practices (Gebremedhin *et al.*, 2009; Huffman & Rousu, 2021).

**Table 4.** Educational attainment of respondents.

Educational Attainment	Frequency (n=200)	Percent (%)
College Graduate	36	18
Elementary Graduate	23	11.5
High School Graduate	58	29
None	1	0.5
Post graduate	1	0.5
Some College	25	12.5
Some Elementary	15	7.5
Some High School	28	14
Vocational	13	6.5
Total	200	100

Educational attainment can also influence access to agricultural knowledge and information. More educated farmers may have greater familiarity with modern agricultural technologies, access to relevant training programs, and a better understanding of market dynamics, leading to more informed decision-making (Kassie *et al.*, 2015; Sadoulet & de Janvry, 2017). Moreover, higher education can foster entrepreneurship and innovation in the agricultural sector, encouraging the adoption of sustainable and climate-smart agricultural practices (Swinton *et al.*, 2020; Fuglie & Rada, 2019). It is essential to note that educational attainment alone may not be sufficient to address all challenges faced by farmers and fishers. Access to resources, credit facilities, and support services also play crucial roles in enhancing agricultural productivity and livelihoods (Akramov & Asante-Addo, 2018; Ragasa *et al.*, 2020). Addressing existing disparities in access to education and resources, especially for marginalized groups, is essential to ensure inclusive and sustainable agricultural development (Nkonya *et al.*, 2016; Flutschner *et al.*, 2017).

**Table 5.** Respondents' response if they own the land where their house is located.

Residential Home Land Ownership	Frequency (n=200)	Percent (%)
Yes	166	83
No	34	17
Total	200	100
Respondents' response whether they receive remittances from relatives living in the Philippines	Frequency (n=200)	Percent (%)
No	164	82
Yes	36	18
Total	200	100

Table 5 provides valuable information about the respondents' land ownership status and their receipt of remittances from relatives, both within and outside the country. The data reveals that a significant majority of the participants (83%) own the land where their house is located, indicating a relatively high level of land ownership among those engaged in agriculture in Quirino Province. Land ownership is a critical factor for agricultural development, as it

provides farmers with a sense of security, incentivizes long-term investments in land improvements, and facilitates access to credit and support services (Place *et al.*, 2002; Jayne *et al.*, 2014).

**Table 6.** No. of children of the respondents below the age of 21 years and no. of children attending school.

Variable	Frequency (n=200)	Percent (%)
Number of respondent's children below 21 years old		
0	67	33.5
1	44	22
2	52	26
3	27	13.5
4	5	2.5
5	5	2.5
Total	200	100
Mean		1.37
SD		1.28
Number of respondents' children below 20 years old attending school		
0	65	32.5
1	51	25.5
2	49	24.5
3	23	11.5
4	6	3
5	4	2
6	1	0.5
8	1	0.5
Total	200	100
Mean		1.38
SD		1.36

This high percentage of land ownership suggests a degree of stability and autonomy among farming and fishing households, potentially contributing to increased agricultural productivity and rural development in the region. The data also highlights the prevalence of self-sufficiency among the respondents, as a significant majority (82%) reported not receiving remittances from relatives living in the Philippines. Remittances can be an important source of income for rural households, supporting poverty reduction and enhancing access to education and

healthcare (Taylor, 1999; Adams & Page, 2005). The relatively low dependence on remittances in this context may indicate a degree of economic resilience and self-reliance among farming and fishing communities in Quirino Province. However, it is important for policymakers and development agencies to ensure that access to remittances and other financial support mechanisms is available to those who may need it, particularly during times of economic or environmental challenges. The findings from Table 5 suggest a positive trend of land ownership and self-sufficiency among the respondents in Quirino Province. The high percentage of land ownership may contribute to fostering sustainable agricultural practices and enhancing rural livelihoods. Additionally, the limited reliance on remittances indicates a certain level of economic autonomy within the farming and fishing households. These insights can inform targeted interventions and policies that further strengthen land tenure security and support economic resilience in the agricultural sector.

Table 6 provides insights into the number of children of the respondents below the age of 21 years and the number of children attending school. The data reveals that the majority of respondents have one or two children below the age of 21 years, with 22% having one child and 26% having two children in this age group. Additionally, 33.5% of the respondents reported not having any children below the age of 21 years. The mean number of children in this age group is 1.37, with a standard deviation of 1.28, indicating that the data is moderately dispersed around the mean. Regarding the number of children attending school below the age of 20 years, the data shows that the majority of respondents have either no children or one child attending school, with 32.5% reporting no children attending school and 25.5% having one child attending school. Furthermore, 24.5% of the respondents have two children attending school. The mean number of children attending school in this age group is 1.38, with a standard deviation of 1.36, suggesting a moderate level of variability in the data.

**Table 7.** Respondents’ response if they have a government ID.

Respondents who have a government ID	Frequency (n=200)	Percent (%)
Yes	195	97.5
No	5	2.5
Total	200	100.0
List of respondents’ government ID	Frequency (n=200)	Percent (%)
Others	172	64.9
PhilHealth	37	14.0
Driver's	29	10.9
SSS	9	3.4
GSIS	8	3.0
UMID	7	2.6
PRC Lice	3	1.1
Total	265	100.0
Others	172	64.9

\*Others include Voter’s ID, Senior Citizen ID, TIN ID, Employee’s ID, and Passport

\*Multiple responses.

The findings from Table 6 may have implications for rural development and education in Quirino Province. The relatively low percentage of respondents reporting having more than two children attending school could suggest potential challenges in accessing education for some families. Ensuring access to quality education for all children, particularly in rural areas, is crucial for fostering human capital development and driving economic growth (Han, 2019; World Bank, 2018). Investment in educational infrastructure, teacher training and targeted educational support programs may be necessary to improve educational outcomes and promote social and economic development in the region. Additionally, the data showing a considerable proportion of respondents not having any children below the age of 21 years could have implications for future labor supply in the agricultural sector. As the current farming workforce ages, it is essential to encourage the younger generation’s interest and involvement in agriculture (Bakari *et al.*, 2020; Syarif *et al.*, 2021).



Policies that promote youth engagement in farming and provide opportunities for agricultural training and entrepreneurship can contribute to a sustainable agricultural workforce and ensure the continuity of the farming industry in Quirino Province.

Table 7 provides information on the possession of government IDs among the respondents. The data reveals that a significant majority of participants (97.5%) reported having a government ID, indicating a high level of identification and registration among the respondents in Quirino Province. Government IDs play a crucial role in facilitating access to various services and benefits, including social welfare programs, healthcare, and financial services (Baird *et al.*, 2016; Handa *et al.*, 2016). The high percentage of respondents with government IDs suggests a certain level of formal inclusion in government systems, which can enhance their access to government services and programs. Moreover, having government-issued identification is essential for verification and authentication purposes, which can help in reducing fraud and ensuring that assistance and resources are directed to the intended beneficiaries (Sarpong *et al.*, 2019; Dupas *et al.*, 2018).

The data on the list of respondents' government IDs shows that the majority of respondents who possess a government ID have identification documents other than the more commonly known IDs like PhilHealth, Driver's License, SSS, GSIS, and UMID. The category labeled as "Others" includes IDs such as Voter's ID, Senior Citizen ID, TIN ID, Employee's ID, and Passport. The prevalence of diverse government IDs among the respondents signifies the importance of different identification systems in the Philippines. Each type of government ID may have specific benefits and functions, and individuals may hold multiple IDs for various purposes (Abdelaziz & Cruz, 2020; Isip-Tan *et al.*, 2017). Understanding the various forms of identification used by the respondents can be valuable for policymakers and service providers in designing more targeted and accessible services and programs for the rural population. The high percentage of respondents with

government IDs suggests a level of formal inclusion in government systems, which can facilitate their access to services and resources. Policymakers and development agencies can leverage this data to streamline and improve the delivery of social assistance and other services by using government-issued IDs for verification and targeting purposes. Additionally, recognizing the diversity of government IDs among the respondents underscores the need for efficient data integration and coordination among government agencies to ensure seamless access to services and benefits for the rural population.

Table 8 provides insights into the respondents' membership status in the Social Security System (SSS) and any farmers, livestock raisers, or fisher association/cooperative. The data indicates that a significant majority of participants (88.0%) reported not being members of the SSS, while only 12.0% stated that they are members of the system. The SSS is a social insurance program in the Philippines that provides benefits and financial protection to members and their beneficiaries in times of contingencies, such as sickness, disability, maternity, and retirement (Pagaduan, 2015; Rivera, 2019). The relatively low percentage of respondents being members of the SSS may imply limited access to social security benefits and financial protection for many individuals engaged in agriculture in Quirino Province. Ensuring better awareness and accessibility to social security programs like the SSS could provide a safety net for farmers and fishers during times of economic or health-related challenges. Regarding membership in farmers, livestock raisers, or fisher association/cooperative, the data shows that 61.5% of respondents reported being members, while 38.5% stated not being members of any such association or cooperative. Being part of these agricultural associations or cooperatives can offer various benefits, including access to shared resources, technical assistance, market linkages, and collective bargaining power (Sartie *et al.*, 2017; Rao & Qaim, 2020). The relatively high percentage of respondents being members of these associations or cooperatives may indicate the recognition of the advantages they

offer to farmers and fishers in terms of strengthening their capacity, resilience, and economic opportunities. Encouraging and supporting the establishment and functioning of these agricultural organizations could further enhance the collaboration and collective efforts of farmers and fishers in Quirino Province, contributing to sustainable agricultural development in the region.

**Table 8.** Respondents’ response if they are members of the Social Security System.

Respondents’ response if they are members of the Social Security System	Frequency (n=200)	Percent (%)
No	176	88.0
Yes	24	12.0
Total	200	100.0
Respondents’ response if they are members of any farmers, livestock raisers, or fisher association/cooperative	Frequency (n=200)	Percent (%)
Yes	123	61.5
No	77	38.5
Total	200	100.0

The low percentage of respondents being members of the SSS suggests the need for targeted efforts to raise awareness about social security benefits and facilitate enrollment among agricultural workers. Strengthening social security coverage can protect vulnerable farmers and fishers from financial risks and enhance their overall well-being (Mitra & Rao, 2018; Vera-Sanso & Thakur, 2020). Additionally, the relatively high percentage of respondents being members of agricultural associations or cooperatives highlights the potential of collective action in addressing common challenges and pursuing shared objectives in the agricultural sector. Policymakers and development agencies can support these associations and cooperatives through capacity-building programs, technical assistance, and access to financial resources, fostering a more inclusive and resilient agricultural community in Quirino Province. Improving access to social security benefits can offer financial protection to agricultural workers, while

strengthening agricultural associations or cooperatives can enhance collaboration and collective efforts for sustainable agricultural development. Policymakers should consider targeted interventions that address the specific needs and challenges of the agricultural sector, empowering farmers and fishers to thrive in their livelihoods and contribute to the region's rural development.

**Table 9.** Reasons for Not Joining Any Cooperative/ Association

Respondents’ reason for not joining any cooperative/association	Frequency (n=200)	Percent (%)
Not aware of cooperative/association in the barangay	20	26.0
Lack of information on how to be part of the association/cooperative	18	23.4
Not interested	16	20.8
Not familiar of association/cooperative	6	7.8
No Association/Cooperative within the community	4	5.2
No cooperative near in the municipality	4	5.2
No time to join the association/cooperative	3	3.9
No near farmers association here in the barangay	2	2.6
Not Registered	2	2.6
Application form does not submit yet	1	1.3
Plan to apply	1	1.3
Total	77	100.0

Table 9 presents the reasons for not joining any cooperative/association among the respondents. The data reveals several factors contributing to the low membership in agricultural cooperatives or associations in Quirino Province. The most common reason cited by respondents are not being aware of the existence of such cooperatives or associations in their barangay (26.0%), followed closely by a lack of information on how to become a member (23.4%). These findings highlight the importance of improving

communication and outreach efforts to raise awareness about the benefits and opportunities offered by agricultural cooperatives or associations. Providing clear and accessible information on the membership process and requirements can encourage more farmers and fishers to join and actively participate in these organizations. Additionally, a significant portion of respondents reported not being interested in joining (20.8%), indicating that there may be a need to address misconceptions or barriers that hinder their engagement in collective action. Tailored approaches that address the specific concerns and motivations of potential members could help overcome these barriers and foster a culture of cooperation and collaboration among farmers and fishers in the region.

The data from Table 9 has important implications for promoting collective action and enhancing the role of agricultural cooperatives or associations in rural development. Policymakers and development agencies should prioritize efforts to increase awareness and knowledge about existing cooperatives or associations in local communities. Utilizing various communication channels, such as community meetings, radio programs, and social media, can effectively disseminate information about the benefits and opportunities offered by these organizations (Gebremedhin & Swinton, 2003; Alemu *et al.*, 2017). Additionally, providing training and capacity-building programs on cooperative management and leadership skills can empower interested individuals to take an active role in the organizations. Addressing the lack of interest reported by some respondents may require identifying and addressing underlying reasons for reluctance, such as concerns about autonomy or perceived benefits. Highlighting successful case studies of agricultural cooperatives and showcasing their positive impact on farmers' livelihoods can serve as a motivational tool to encourage more individuals to participate (Kirsten *et al.*, 2015; Kruseman *et al.*, 2019). Ultimately, fostering a supportive environment for cooperative development and participation can contribute to strengthening the resilience and productivity of the agricultural sector in Quirino

Province. By raising awareness, providing accessible information, and offering capacity-building support, policymakers and development agencies can facilitate greater collective action and cooperation among farmers and fishers. Emphasizing the benefits and success stories of existing cooperatives can encourage more individuals to join and actively contribute to the sustainable development of the agricultural sector.

**Table 10.** Respondents' response if they are registered in the Registry System for Basic Sectors in Agriculture

Variable	Frequency (n=200)	Percent (%)
Respondents' response if they are registered in the RSBSA		
Yes	190	95.0
No	10	5.0
Total	200	100.0
Year of Registration in the RSBSA		
2019	141	74.2
2020	36	18.9
2021	10	5.3
2018	3	1.6
Total	190	100.0
Reasons why they are not registered in the RSBSA		
Not informed that there is RSBSA	5	50.0
Not familiar with RSBSA	3	30.0
Have not yet applied to RSBSA	1	10.0
Lack of information on how to register	1	10.0
Total	10	100.0

Table 10 provides insights into the registration status of respondents in the Registry System for Basic Sectors in Agriculture (RSBSA) and the reasons for not being registered. The data indicates that a significant majority of participants (95.0%) claimed to be registered in the RSBSA, signifying a relatively high level of awareness and engagement with the system among farmers and fishers in Quirino Province. The RSBSA is a government initiative

aimed at identifying and registering basic sectors in agriculture to improve access to social services and support (Agricultural Training Institute, 2020; Department of Agriculture, 2015). The relatively high percentage of registered respondents suggests a degree of formal recognition and inclusion in government agricultural programs and initiatives. This formal recognition can provide better access to resources, services, and assistance for the registered farmers and fishers, contributing to their overall welfare and livelihood enhancement. However, it is crucial to ensure that the registration process remains accessible and well-communicated to reach out to more potential beneficiaries who might not be aware of the RSBSA.

For the respondents who claimed not to be registered, the data reveals various reasons contributing to their non-registration. The most common reason cited by non-registered respondents is not being informed about the RSBSA (50.0%), followed by not being familiar with the system (30.0%), and not yet applying for registration (10.0%). These findings underscore the need for improved information dissemination and awareness-raising efforts to reach out to potential beneficiaries who might not be aware of the RSBSA or its benefits. Simplifying the registration process and providing clear guidelines on how to register could address the lack of familiarity and encourage more individuals to participate. Moreover, understanding the reasons behind non-registration can help policymakers and development practitioners design targeted interventions to address barriers and increase the coverage and impact of the RSBSA in Quirino Province.

These results highlight the importance of communication and outreach strategies to maximize the potential benefits of the RSBSA for farmers and fishers in Quirino Province. By enhancing awareness about the system and its advantages, policymakers can increase the number of registered individuals and extend the reach of government support and services to more agricultural stakeholders. Targeted efforts to address the reasons for non-registration can be

instrumental in overcoming barriers and increasing participation in the RSBSA (Blom *et al.*, 2020; Inagaki *et al.*, 2018). Additionally, continuous monitoring and evaluation of the registration process can help identify areas for improvement and ensure that the system remains effective and accessible to all eligible beneficiaries. This finding underscores the significance of awareness-raising and accessibility in maximizing the benefits of the RSBSA for farmers and fishers in Quirino Province. By improving information dissemination and addressing barriers to registration, policymakers can enhance the formal inclusion and support for agricultural stakeholders. Targeted efforts to reach out to potential beneficiaries who are not registered can lead to a more inclusive and impactful implementation of the RSBSA, contributing to sustainable rural development in the region.

**Table 11.** Respondents' Main Source of income

Main source of income	Frequency (n=200)	Percent (%)
Farming	189	94.5
Farm labor	6	3.0
Fishing	1	.5
Others	2	1.0
Poultry/Livestock raising	2	1.0
Total	200	100.0

Table 11 presents the main source of income for the respondents in the survey. The data shows that the majority of participants (94.5%) rely on farming as their main source of income. This high percentage highlights the significance of agriculture as the primary economic activity in Quirino Province, with most individuals engaged in farming to sustain their livelihoods. Agriculture plays a crucial role in the livelihoods of rural communities, providing employment, income, and food security (Reardon *et al.*, 2009; Barrett *et al.*, 2017). The heavy reliance on farming as the main source of income underscores the importance of supporting and enhancing agricultural productivity and efficiency in the region.

Strengthening agricultural practices, providing access to modern technologies, and promoting sustainable farming methods can help farmers improve their income and contribute to rural development in Quirino Province.

**Table 12.** Information source on government services, programs, and projects (in general)

Information source on government services, programs, and projects (in general)	Frequency (n=200)	Percent (%)
Barangay officials and employees	193	38.4
Municipal/City Government employees	125	24.9
Someone you know who has used the service	42	8.3
Television (TV)	40	8.0
Radio	38	7.6
NGO, Association, or cooperative	24	4.8
Internet, social media (FB, Twitter)	19	3.8
Promo materials/ leaflets	16	3.2
Billboards/Signs	5	1.0
Newspaper/Magazines	1	.2
<b>Total (*Multiple response)</b>	<b>503</b>	<b>100.0</b>
B2. Information source on agricultural services from the government	Frequency (n=200)	Percent (%)
Barangay officials and employees	192	31.1
Billboards/Signs	1	.2
DA official	156	25.2
Internet, social media (FB, Twitter)	12	1.9
Municipal agriculturist	129	20.9
Newspaper/Magazines	1	.2
NGO, association, or cooperative	26	4.2
Private enterprise/agent	3	.5
Promo materials/ leaflets	17	2.8
Radio	22	3.6
Someone you know who has NOT used the service	1	.2
Someone you know who has used the service	38	6.1
Television	20	3.2
<b>Total</b>	<b>618</b>	<b>100.0</b>

The low percentage of respondents (4.5%) who rely on other sources of income, such as farm labor, fishing, poultry/livestock raising, or other activities,

suggests that farming remains the dominant economic activity in the region. While diversification of income sources can offer resilience to rural households (Ellis, 1998; Jayne *et al.*, 2014), the data indicates that the agricultural sector remains central to the economic well-being of the respondents. However, exploring opportunities to support and enhance other income-generating activities can further contribute to improving overall livelihoods and reducing vulnerability to economic shocks. Policymakers and development practitioners can consider targeted interventions that promote income diversification while maintaining a focus on agricultural development to achieve balanced and sustainable rural growth. The data underscores the critical role of farming as the main source of income for the majority of respondents in Quirino Province. Enhancing agricultural productivity and supporting farmers in adopting modern and sustainable practices are crucial for improving their income and livelihoods. At the same time, exploring opportunities to diversify income sources and promote other economic activities can offer additional avenues for rural development and enhance the resilience of households in the region.

Table 12 provides valuable insights into the sources of information on government services, programs, and projects (in general) as well as agricultural services from the government for the respondents. The data indicates that the most common source of information on government services, programs, and projects (in general) is barangay officials and employees (38.4%), followed by municipal/city government employees (24.9%). These findings highlight the essential role of local government units (LGUs) in disseminating information and engaging with the community about government initiatives and services. The prominence of barangay officials and employees as information sources suggests that they serve as vital channels for delivering information to the grassroots level. This underscores the importance of strengthening communication and collaboration between LGUs and the community to ensure effective and efficient delivery of government services. It also

suggests that LGUs play a critical role in facilitating the accessibility of government services and programs to the people, particularly in rural areas where access to information might be limited (Kamiyama *et al.*, 2004; Bernard *et al.*, 2020). Regarding information on agricultural services from the government, barangay officials and employees also emerged as the primary source of information (31.1%), followed by DA officials (25.2%) and municipal agriculturists (20.9%). These findings highlight the local-level involvement of government officials in disseminating information on agricultural services and programs to farmers and fishers. Strengthening the capacity of local government officials in the agricultural sector can lead to better coordination and support for farmers in accessing government services and agricultural development initiatives (Umali *et al.*, 2019; Reyes *et al.*, 2020). Additionally, the data shows that television and radio are other significant sources of information on both general government services and agricultural services. This emphasizes the importance of utilizing mass media as effective communication channels to reach a broader audience and increase awareness of government programs and services (Ashraf *et al.*, 2021; Kirui *et al.*, 2018).

These findings suggest that effective information dissemination and communication strategies are crucial for ensuring that government services and agricultural initiatives reach the intended beneficiaries. Strengthening the capacity of barangay officials and employees and other local government personnel can improve their role as information conduits between the government and the community. Moreover, utilizing various communication channels, including mass media and the internet, can enhance the visibility and accessibility of government services and agricultural programs to a wider audience. Investing in information and communication technology (ICT) infrastructure and training can play a significant role in bridging information gaps and enhancing agricultural extension services (Fungo & Muchenje, 2019; Mustapha *et al.*, 2016). Ultimately, effective communication and information dissemination can

contribute to increased awareness and participation in government initiatives, leading to improved agricultural productivity and rural development in Quirino Province.

**Table 13.** Respondents' response whether they received goods or services from NGOs and Development Partner Organization and what goods or services they received.

Variable	Frequency (n=200)	Percent (%)
B4. Respondents' response whether they received goods or services from NGOs		
No	188	94.0
Yes	12	6.0
Total	200	100.0
B5. Goods or services received from NGOs		
Biological control agents	1	2.0
Fertilizers	1	2.0
Information, Education, and Communication (IEC) materials	1	2.0
Others	34	69.4
Seeds	7	14.3
Training	5	10.2
Total	49	100.0
Respondents' response whether they received goods or services from Development Partner Organization		
No	197	98.5
Yes	3	1.5
Total	200	100.0
Goods or services received from Development Partner Organization.		
Seeds	2	50.0
Fertilizers	1	25.0
Training	1	25.0
Total	4	100.0

Table 13 presents information on whether respondents received goods or services from Non-Governmental Organizations (NGOs) and Development Partner Organizations, as well as the types of goods or services they received. The data reveals that a small percentage of respondents reported receiving goods or services from NGOs, with

only 6.0% indicating that they have benefited from such support. Similarly, a very limited number of respondents (1.5%) reported receiving goods or services from Development Partner Organizations. This suggests that the majority of respondents have not directly benefited from assistance provided by these organizations. However, it is important to note that a considerable proportion of respondents (69.4%) who received goods or services from NGOs did not specify the exact type of assistance received, indicating that there may be various forms of support being provided, but they are not detailed in the survey. The types of assistance mentioned by respondents include seeds, training, biological control agents, fertilizers, and Information, Education, and Communication (IEC) materials. The low percentage of respondents who reported receiving goods or services from both NGOs and Development Partner Organizations may reflect the need for further outreach and engagement with these organizations to maximize their impact on rural development in Quirino Province.

The data from Table 12 raises important implications for the engagement of NGOs and Development Partner Organizations in rural development initiatives. While a relatively small percentage of respondents reported receiving assistance from these organizations, it is essential to explore ways to increase the reach and effectiveness of their support. NGOs and Development Partner Organizations play a significant role in implementing development programs, especially in rural areas where access to resources and services may be limited (Mitra *et al.*, 2018; Saito *et al.*, 2020). By providing agricultural inputs such as seeds and fertilizers, offering training and capacity-building programs, and disseminating IEC materials, these organizations can contribute to enhancing agricultural productivity and rural livelihoods (Chen *et al.*, 2017; de Brauw *et al.*, 2019). However, the relatively low percentage of respondents benefiting from such support suggests the need for improved awareness and accessibility of assistance programs. Strengthening partnerships and collaboration between NGOs, Development Partner

Organizations, and local government units can facilitate the effective delivery of services and ensure that assistance reaches those who need it the most (Dearden *et al.*, 2018; Li & Xu, 2018). Moreover, there may be a need for increased transparency and information dissemination about the types of assistance available, which may encourage more individuals to engage with these organizations and leverage the benefits they offer for agricultural and rural development.

### Summary

This study adopts a cross-sectional research design to establish a baseline of agriculture performance and rural development indicators in Quirino Province, Philippines. The research involves data collection from a sample of two hundred (200) farmers and fishers residing in the region. The primary data collection method utilizes structured questionnaires to capture essential insights into agricultural practices, socio-economic characteristics of farmers, and the overall rural development landscape. The age and sex distribution of the respondents in the survey. Out of the 200 participants, the largest group, comprising 88 individuals or 44.0% of the total, falls within the age range of 46-60. The second most significant group consists of 66 respondents or 33.0% who are aged between 31-45. The age group of 61 and above represents 33 individuals or 16.5% of the sample, while the smallest group is that of 15-30 years old, with 13 respondents accounting for 6.5%. As to the gender distribution, it indicates that there were slightly more female participants (50.5%) compared to male participants (49.5%). This finding is noteworthy, as it challenges the traditional notion that rice growing, and agriculture in general, is exclusively a male-dominated activity. The marital status of the respondents, demonstrate that the majority of participants are married (88%), followed by widow/widowers (5.5%), single (5%), and separated (1.5%). This suggests that having family responsibilities may influence individuals' engagement in farming activities. The data reveals that the highest percentages of respondents, constituting 29% of the total, are high school

graduates. This suggests that a significant portion of individuals employed in agriculture have completed their secondary education, indicating a reasonable level of literacy and knowledge. respondents' land ownership status and their receipt of remittances from relatives, both within and outside the country. The data reveals that a significant majority of the participants (83%) own the land where their house is located, indicating a relatively high level of land ownership among those engaged in agriculture in Quirino Province. the number of children of the respondents below the age of 21 years and the number of children attending school. The data reveals that the majority of respondents have one or two children below the age of 21 years, with 22% having one child and 26% having two children in this age group. Additionally, 33.5% of the respondents reported not having any children below the age of 21 years. The mean number of children in this age group is 1.37, with a standard deviation of 1.28, indicating that the data is moderately dispersed around the mean. Regarding the number of children attending school below the age of 20 years, the data shows that the majority of respondents have either no children or one child attending school, with 32.5% reporting no children attending school and 25.5% having one child attending school. On the possession of government IDs among the respondents. The data reveals that a significant majority of participants (97.5%) reported having a government ID, indicating a high level of identification and registration among the respondents in Quirino Province. respondents' membership status in the Social Security System (SSS) and any farmers, livestock raisers, or fisher association/cooperative. The data indicates that a significant majority of participants (88.0%) reported not being members of the SSS, while only 12.0% stated that they are members of the system. the reasons for not joining any cooperative/association among the respondents. The data reveals several factors contributing to the low membership in agricultural cooperatives or associations in Quirino Province. The most common reason cited by respondents is not being aware of the existence of such cooperatives or associations in their barangay (26.0%), followed closely by a lack of

information on how to become a member (23.4%). the registration status of respondents in the Registry System for Basic Sectors in Agriculture (RSBSA) and the reasons for not being registered. The data indicates that a significant majority of participants (95.0%) claimed to be registered in the RSBSA, signifying a relatively high level of awareness and engagement with the system among farmers and fishers in Quirino Province. the main source of income for the respondents in the survey. The data shows that the majority of participants (94.5%) rely on farming as their main source of income. This high percentage highlights the significance of agriculture as the primary economic activity in Quirino Province, with most individuals engaged in farming to sustain their livelihoods. the sources of information on government services, programs, and projects (in general) as well as agricultural services from the government for the respondents. The data indicates that the most common source of information on government services, programs, and projects (in general) is barangay officials and employees (38.4%), followed by municipal/city government employees (24.9%). information on whether respondents received goods or services from Non-Governmental Organizations (NGOs) and Development Partner Organizations, as well as the types of goods or services they received. The data reveals that a small percentage of respondents reported receiving goods or services from NGOs, with only 6.0% indicating that they have benefited from such support. Similarly, a very limited number of respondents (1.5%) reported receiving goods or services from Development Partner Organizations.

### Conclusion

The cross-sectional research conducted in Quirino Province, Philippines, aimed to establish a baseline of agriculture performance and rural development indicators among farmers and fishers in the region. This baseline survey reveals key insights on farmers and fishers in Quirino Province, Philippines. It highlights challenges of an aging workforce, gender disparities, and low cooperative membership. In particular, the findings indicate that a significant



proportion of respondents are in the middle-aged group (46-60 years), highlighting the reliance on individuals with farming expertise in this age bracket. However, the data also raises concerns about the aging agricultural workforce, emphasizing the need to attract and engage younger generations in agriculture for the sector's continuity and growth. The near-equal representation of male and female participants challenges the notion of agriculture being exclusively male-dominated. Nonetheless, gender disparities persist, and efforts to empower women in farming and promote gender equality in the agricultural sector are essential for sustainable rural development. The majority of respondents are married, which suggests that family responsibilities may influence their engagement in farming activities. Addressing the needs of farming households is crucial for strengthening rural livelihoods and ensuring the sector's resilience. The relatively high percentage of high school graduates among respondents indicates a reasonable level of literacy and knowledge. However, addressing disparities in access to education and resources is crucial to further enhance agricultural productivity and livelihoods. The study also revealed a significant level of land ownership among those engaged in agriculture, indicating the importance of land tenure security for farmers and fishers. While most respondents rely on farming as their main source of income, the low membership in agricultural cooperatives or associations suggests that there are challenges in organizing and mobilizing farmers and fishers into collective groups. Addressing the factors contributing to low membership is vital for fostering collaboration and access to support systems. The high level of government ID possession and registration in the Registry System for Basic Sectors in Agriculture (RSBSA) reflect the respondents' awareness and engagement with government systems and services. Furthermore, the study highlighted the limited support received from Non-Governmental Organizations (NGOs) and Development Partner Organizations, indicating potential areas for increased collaboration and support for agricultural development in the region. This baseline survey provides valuable insights into the demographic and

socio-economic characteristics of farmers and fishers in Quirino Province, Philippines. The findings underscore the importance of addressing the challenges posed by an aging agricultural workforce, gender disparities, and limited membership in agricultural cooperatives. Policy interventions and initiatives that promote youth involvement, gender equality and access to education, and support for farming households are crucial for fostering sustainable rural development and ensuring a vibrant and prosperous agricultural sector in Quirino Province. Collaboration between government agencies, NGOs, and development partners is essential to address the identified gaps and support the growth and resilience of the agricultural community in the region.

### **Practical Recommendations and Policy Implications**

Quirino Province can create an enabling environment for sustainable agricultural development, economic growth, and improved livelihoods for farmers and fishers. Collaboration between government agencies, NGOs, and community stakeholders is essential in driving positive change and achieving the goals of rural development in the region. Based on the findings of the baseline survey in Quirino Province, the following recommendations are proposed to address the identified challenges and promote sustainable rural development in the agricultural sector along :

- (1) Promotion of Youth Involvement and Education by developing targeted programs and incentives to attract and engage young individuals in agriculture. Collaborate with educational institutions to offer agricultural training and courses that equip young farmers with modern farming techniques and business skills;
- (2) Empowerment of Women in Agriculture by Implement policies and initiatives that promote gender equality in the agricultural sector. Provide women farmers with equal access to resources, training, and leadership opportunities, enabling them to play a more significant role in decision-making processes;
- (3) Enhancement of Agricultural Cooperative Membership by Working with local communities and cooperative organizations to raise awareness about the benefits of cooperative

membership. Offer capacity-building programs to strengthen cooperative governance and management, fostering collaboration and collective action among farmers and fishers; (4) Supporting Sustainable Farming Practices by Promoting the adoption of sustainable and climate-smart agricultural practices through training and financial incentives. Encourage the use of technology and environmentally friendly farming methods to enhance productivity and resilience; (5) Strengthening Access to Resources and Services by addressing disparities in access to education, credit facilities, and support services. Provide targeted support to marginalized groups to enhance their agricultural productivity and livelihoods; (6) Fostering Collaboration among Stakeholders by Facilitating collaboration between government agencies, NGOs, development partners, and local communities. Create platforms for knowledge sharing and coordination to optimize the impact of agricultural development initiatives; (7) Expanding NGO and Development Partner Support by Engaging with NGOs and development partners to increase support for farmers and fishers. Collaborate on projects that address specific needs, such as training, technology adoption, and market linkages; (8) Enhancing Information Dissemination by Improving the dissemination of information on government services, programs, and support. Utilize various communication channels, including local government units and agricultural extension workers, to ensure that information reaches the target beneficiaries; (9) Strengthening Land Tenure Security by Working with relevant authorities to ensure secure land tenure for farmers and fishers. Provide legal assistance and support to protect land rights and prevent land disputes; and (10) Conducting Periodic Surveys to monitor changes in agriculture performance and rural development indicators. This will enable policymakers and stakeholders to assess the impact of interventions and make informed decisions for continuous improvement.

### **Implications of the study to Higher Education Institutions**

The findings of this baseline survey have significant implications for higher education institutions (HEIs)

in Quirino Province and beyond. As the agricultural sector plays a vital role in the region's development, HEIs have a crucial role to play in equipping the future workforce with the necessary skills and knowledge to address the challenges identified in the study. First and foremost, HEIs should design and offer relevant and innovative agricultural programs that cater to the needs of both the aging workforce and the younger generation. These programs should encompass modern farming practices, sustainable agricultural techniques, and the use of Information and Communication Technologies (ICTs) in agriculture. By doing so, HEIs can bridge the gap between traditional agricultural practices and emerging technologies, preparing students to be adaptable and forward-thinking in their approach to farming. Moreover, HEIs should actively promote gender equality in their agricultural programs, encouraging and supporting women's participation in the sector. By fostering a diverse and inclusive learning environment, HEIs can help break gender barriers and empower women to take on leadership roles in agriculture. Additionally, HEIs should collaborate closely with government agencies, NGOs, and development partners to identify research needs and facilitate the transfer of knowledge and technology to local farmers and fishers. Through joint research projects, extension services, and knowledge-sharing initiatives, HEIs can play a vital role in enhancing agricultural productivity, promoting sustainable rural development, and uplifting the livelihoods of farming communities in Quirino Province. By aligning their efforts with the real-world challenges faced by the agricultural sector, HEIs can make a significant impact on the region's overall development trajectory and contribute to building a resilient and prosperous agricultural community.

### **Limitations of the Study and Future Research Directions**

While the baseline survey provided valuable insights, it has certain limitations. Firstly, its cross-sectional design restricts the ability to establish causality or track changes over time. The sample size of 200 may not fully represent the diverse population of Quirino Province, warranting future research with larger and

more varied samples. Additionally, relying solely on structured questionnaires might have limited the depth of insights; incorporating qualitative approaches like interviews could offer more nuanced perspectives. The study focused on demographic and socio-economic aspects, but other factors such as climate change, market access, and technology adoption are crucial in agriculture and rural development. Future research should explore these dimensions for a holistic understanding. As agriculture evolves, ongoing research is needed to assess the impact of policy interventions on productivity and rural development in Quirino Province. Lastly, evaluating the long-term effects of empowering youth and promoting gender equality in agriculture would help gauge the sustainability of these efforts in contributing to the region's overall development goals.

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