

# Farming Practices in the Municipality of Irosin, Sorsogon

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## ABSTRACT

Farming is the main livelihood in Irosin, Sorsogon. Yet farmers remain in the poverty line despite the area is known in the region as a rice granary. However, farmers still fall into poverty line despite the town is widely known in the region as a rice granary. This was a descriptive mixed-method study. Surveys were conducted among 1,203 farmers from 19 barangays to profile farmers' current socio-demographic characteristics, to document their current farming systems, and to compare the comparative advantage of single farming systems with integrated farming systems. The study shows an ageing workforce and few young farmers. Rice remains the dominant economic activity of farmers (76%). Some 30.51% of farmers have moved to Integrated Farming Systems (IFS), which use a mix of crop and livestock or chicken, or high value crops. These farmers are economically more resilient, earn more on average, and less likely to be on social-security schemes such as 4Ps. The study notes a high degree of specialisation as 69.41% of farmers engaged only in single farming, which is easier to manage for older farmers. But it also suggests farmers need to transition to integrated farming for sustainability and to engage new generations of farmers. The study argues that although single farming provides ease of management for an ageing sector, for sustainability and to bring young people into the sector there needs to be a shift towards integrated systems.

**Keywords:** Farming Activities, Single FARMING, Integrated Farming Systems (IFS), Socio-demographic Profile, Aging Workforce

## INTRODUCTION

Agriculture is a significant sector in terms of economic development and food security of the world. It gives people a means of livelihood and plays a great role in economic development in an area. In 2023, the Philippine Statistics Authority recorded the 0.7 percent average growth rate in agriculture and fisheries annually. It is motivated by the augmented production of fruits and rice crop, livestock and poultry in farming (Philippine Statistics Authority, 2024).

DA Secretary Laurel stated that the agricultural sector is a positive contributor to the economic growth, making up a 25 percent growth in the labor force as of November 2023. He also emphasized how the government advocated the modernization of agriculture, food security, mechanization and adoption of new technologies in the farming activities to boost the income of the farmer and reduce the production cost. (DA-AFID, 2024). To this end, a report on the Bicol Regional Development 2023 indicated the plans that had been taken by the Bicol region in ensuring that agriculture was productive and modernized. Farming activities diversification was one of the strategic frameworks of maximizing production and agricultural modernization. Nevertheless, it is important to recognize that the report focuses on regional development and does not account for the complete scope of the issue. However, it should be noted that the report dwells on regional development and fails to consider the full extent of the problem.

Irosin is a municipality in the Bicol Region of Philippines and the economy of the town is heavily dependent on agriculture. The agricultural business is the backbone of the town economy as it has managed to sustain the people and has been one of the largest incomes of the Irosanons. Mountains, lakes, fields and bodies of water surround the topography of Irosin and this offers a good climate and a rich fertile land that is very favorable to farming and crop production.

The municipality is among the biggest rice producers in the province and the rice granary of the province of Sorsogon. The statistics indicated that there was a decrease in the production of play in 2021 (20,313 metric tons) and 2022 (18,583 metric tons). (PhilRice.gov.ph, 2023). The rice cultivation process is seasonal and thus farmers can use alternative farming activities including animal rearing, high-value crop production, inland fishing, and coconut cultivation to wait until the season is ready. Irosin, Sorsogon, a country with a rich agricultural background and variety of ecosystems is a perfect place to apply alternative farming techniques. Adoption of these sustainable practices has the potential to improve the livelihoods of the locals, food security and environmental protection.

Organic farming has two advantages in food security and environmental protection. A study was carried out by Reganold et al. (2016) enumerated the benefits of organic farming. Organic farms are healthier, more biodiverse, and less greenhouse gasses. Organic farming involves the use of indigenous knowledge and natural resources in Irosin. Avoiding synthetic fertilizers and pesticides is one of the major elements of organic farming. Organic farmers are able to make their soil healthier and increase biodiversity using organic fertilizer and pesticides. Organic farming has the potential to enhance resilience and productivity of crops according to the study and approach of the region. The Department of Agriculture in the Bicol Region began a program that indicated how the use of organic fertilizers could enhance the soils and agricultural production.

The Organic Agriculture Program of the Bicol University College of Agriculture and Forestry has shown that in a section of the region, organic vegetable agriculture has been successful, which encourages sustainable practices and training of local farmers. Ferguson and Lovell (2014) examine the principles and practices of permaculture and highlight that it can be used to solve sustainability challenges in the agricultural sector. Although, the study conducted by Pretty et al. (2005) showed that sustainable farming techniques, such as integrated farming techniques can play a major role in enhancing food security and livelihoods and lowering environmental consequences. Integrated farming practices in Irosin, Sorsogon can result in sustainable agricultural development, better livelihoods and environmental protection.

The combined farming activities would create additional livelihood (Tiwari et al. 2014) and increase farm income that would enable the farmers to sustain their daily lives. Priyanu et al. (2020) validate the fact that an integrated farming system can have a chance to enhance social capital and sustainable agriculture. Nevertheless, even though agriculture is the major source of income and livelihood to many Irosanon farmers, the sector does not add high economic value to ameliorate the economic conditions of the farmers (AER 2023). As a matter of fact, the poverty incidence in the Bicol region has grown to 29.6 in the first quarter of 2023 as compared to 26.2 in 2021 according to the recent PSA 1 st quarter report 2023 (PSA, 2023).

This study aims at collecting and analyzing data of agricultural farmers based on their profile so as to gain a better insight into their problems and opportunities. The conclusions of the study will be of benefit to the academic institutions because the study will provide the information which will be useful to undertake the future research projects to understand the agriculture industry and will assist in designing the courses and programs that will be relevant to the needs of the agricultural industry and will enable the production of the trained labor force. Thirdly, the research can be used in developing practical solutions to the needs of the farmers by promoting community participation and partnership between academic institutions and players in the agricultural sector.

### **Objectives/purpose of the Study**

This research looks into the Farming Activities in Irosin, Sorsogon. Particularly, this sought answers to the following sub-problems:

What is the socio-demographic profile of farmers in Irosin, Sorsogon.

1.1 Age

1.2 Sex

1.3 Income

#### 1.4 Educational attainment

2. What are the farming activities and practices of the farmers in Irosin.
3. What are the comparative advantages of the farming practices in Irosin.
4. What are the challenges encountered by the farmers in Irosin

## METHODOLOGY

The research design that was used was descriptive research design to describe the situation of farming in Irosin. The mixed-methods approach employed in the research results in the so-called triangulation which gave a detailed analysis of the data. The research used survey questionnaires to get information on the farming activities and practices as well as demographic profile of the farmers. Although the semi structured interviews were used to elicit the personal challenges and their perceived benefits of their farming practices. The sample should be active farmers who are living in 19 sample barangays in Irosin. The criteria made sure that the data collected is representative to the real agricultural landscape of the area and not the one that represents the general population. The study used frequency and percentage in determining the profile, farming activities and practices among the 19 barangays. Although thematic analysis was applied to the interview transcripts, in which recurring patterns were coded, to give thematic explanation to the survey findings.

## RESULTS AND DISCUSSION

### Age Profile of the farmers

The statistics give a clear picture of the average farmer of the surveyed chosen areas of Irosin. In the study, 1203 farmers in 19 barangays were selected. Many of the respondents belong to the 50s to 60s and 61s- 70s age group indicating that they are in their middle age and most of them are registered as senior citizens. Young farmers (e.g. between 30s and 20s) are very few. The agricultural population is getting older. This means that the agricultural sector is prone to crisis whereby the aging workforce is not replaced by the younger generations in the same numbers.

**Table .1 Farming Activities by Age Group**

| Age Group    | Total Respon | Rice Farmin | HVC Farmi  | Coconut Fa | Livestock/P | Inland Fis |
|--------------|--------------|-------------|------------|------------|-------------|------------|
| <b>20-29</b> | 43           | 21          | 2          | 6          | 18          | 5          |
| <b>30-39</b> | 131          | 93          | 11         | 17         | 35          | 9          |
| <b>40-49</b> | 259          | 192         | 21         | 39         | 87          | 19         |
| <b>50-59</b> | <b>339</b>   | <b>272</b>  | <b>40</b>  | <b>76</b>  | <b>89</b>   | <b>25</b>  |
| <b>60-69</b> | 274          | 216         | 38         | 55         | 82          | 12         |
| <b>70-93</b> | 157          | 127         | 13         | 37         | 27          | 6          |
| <b>Total</b> | <b>1,203</b> | <b>921</b>  | <b>125</b> | <b>230</b> | <b>338</b>  | <b>76</b>  |

In this region, a large proportion of the farmers are aged 40-69 years constituting approximately 72.5% of the sampled. The members of this group are the individuals in their 50s who are the main labor force in the agricultural industry, assuming most of the hard labor and contributing significantly to ensuring that the farming activities in the community run smoothly. Their experience and strength enable them bear responsibilities that may be too demanding to the youngest and the oldest farmers.

Rice is the most predominant crop in all the age groups and this fact highlights its significance as an economic subsistence and as a cultural heritage in the society. Rice cultivation is the most important part of local agriculture as it is practiced by approximately 76.5% of all respondents. The loyalty to rice cultivation is still great even in the oldest and experienced farmers-more than 80% of all persons at 70 years and older still are at work in the rice fields. This implies that rice production is not only a vocation but also a lifestyle that is maintained over generations and gives continuity and permanence to the community.

The second most common agricultural activities are livestock and poultry farming. Interestingly, although the older farmers dominate most categories in terms of numbers, it is the young farmers aged 20 to 29 years those who get most involved in animal rearing. The youths are more likely to be involved in livestock as about 42 percent of all young farmers are at this age bracket and it is thus the most preferred secondary agricultural activity among the young farmers. This may suggest that animal rearing is perceived to be more open or even more profitable to new entrants into the farming industry or maybe it uses less land and capital compared to crop farming, which makes it attractive to those who are new in the field.

Fifties farmers are however distinguished by their versatility. They also lead in the production of high-value crops, coconut growing, and inland fishing on top of being the leaders in rice production. This trend implies that the more experienced and resource endowed the farmers, the more they will tend to diversify their operations. This diversification may be motivated by the necessity to gain more money, reduce risk or keep up with the emerging market needs and environmental changes. It is indicative of a certain degree of entrepreneurialism and flexibility that is critical in the strength of the agricultural sector.

An interesting aspect of the data is that there are few youths venturing into agriculture. The number of respondents in the 20-29 age bracket is 43 out of 1,203 which shows that there is a major demographic gap. This lack of younger farmers is indicative of a larger social and economic trend, in which younger generations are looking more and more to non-agricultural opportunity, be it in cities or in other sectors that are better paying, or more secure, or simply have a different lifestyle. When this trend is sustained, it might have a lasting effect on sustainability of rural population and the future of local food production. The population of the agricultural sector, especially the farming population, is aging, and this might cause knowledge transfer and innovation difficulties, as well as keep the industry productive, which underlines the urgency of the necessity of policies and programs that will help to lure and keep young people in the agricultural sector.

## Gender Participation

The statistics demonstrate that there is a high male ownership or headship in the farms. Most of the respondents who identified themselves as the household head and the chief farmer are Male. Nevertheless, the number of female farmers is quite high, particularly when it comes to widows who have inherited the farm or when the respondent is a widow.

**Table 2. Gender Distribution in Farming Activities**

| Farming Activity  | Female / Babayi | Male / Lalaki | Total |
|-------------------|-----------------|---------------|-------|
| Rice Farming      | 299             | 622           | 921   |
| Livestock/Poultry | 143             | 195           | 338   |
| Coconut Farming   | 81              | 149           | 230   |
| High Value Crop   | 56              | 69            | 125   |
| Inland Fishing    | 19              | 57            | 76    |

This is most evident in Rice Farming whereby men are more than twice as many as women are. Gender participation in livestock/ poultry indicated the greatest relative participation of women as compared to other. Women constitute about 42.3 of the entire livestock rears, implying that this is one of the major areas where agriculture is done by women. Rice Farming is the major activity in both sexes, then there is Livestock and Coconut. This unbroken ranking indicates that these three industries are the main support of the agricultural economy in the area irrespective of sex.

Conversely, Inland Fishing and High Value Crops have the least level of engagement. Inland Fishing is also significantly male dominated with only 19 female respondents (about a quarter of the sector) taking part meaning that agricultural support programs that include training or credit programs should be designed in a gender inclusive way so as to capture female farmers.

## Income

The following pie charts represent the percentage distribution of gross income among respondents for Rice, Coconut, and High-Value Crop (HVC) farming, inland fishing and livestock/poultry raising based on the provided data.

Table 3. Distribution of Income per Activity

| Activity               | Income Bracket (PHP) | No. of Respondents |
|------------------------|----------------------|--------------------|
| rice farming           | 25,000 to 30,000     | 357                |
|                        | 30,001 to 62,000     | 281                |
|                        | 62,001 to 91,000     | 162                |
|                        | above 91,000         | 86                 |
| Coconut Farming        | Below 30,000         | 111                |
|                        | 30,000 to 50,000     | 45                 |
|                        | 50,000 to 72,000     | 22                 |
|                        | Above 80,000         | 10                 |
| High-Value Crops (HVC) | Less than 10,000     | 57                 |
|                        | 10,000 to 15,000     | 22                 |
|                        | 31,000 to 62,000     | 10                 |
|                        | Above 92,000         | 3                  |
| Inland Fishing         | Above 10,000         | 48                 |
|                        | 5,001 - 10,000       | 4                  |
|                        | 3,001 - 5,000        | 13                 |
|                        | 1,000 - 3,000        | 12                 |
|                        | Less than 1,000      | 2                  |
| Livestock & Poultry    | Above 10,000         | 126                |
|                        | 5,001 - 10,000       | 68                 |
|                        | 3,001 - 5,000        | 52                 |
|                        | 1,000 - 3,000        | 92                 |

The majority of rice farmers (approximately 40.3 percent) earn 25,000 to 30,000 PHP annually, which they usually do on small tracts of only 0.20 to 0.33 hectares. Only 1.7% make it to the top bracket, earning between 183000 and 275k PHP. Neither does Coconut farming pay much better to most. Almost 60 percent of coconut farmers earn below 30,000 PHP per year with only 5.3 percent earning above 80,000 PHP. The high-value crops do not contribute to incomes to a great extent. They are merely additional to rice or coconut incomes of most of them. The figures reveal that 61.9 percent of high value crop farmers have incomes below 10,000 PHP/year and only 3.3 percent have incomes above 92,000 PHP/year.

The situation is a little different with fishing, capture and aquaculture. The middle income, 53.3 percent, earns above 10,000 PHP annually, but the large segment, 14.4 percent, is between 3,001 and 5,000 PHP, and 13.3 percent earns less than 3,000 PHP. Incomes are more distributed with poultry and livestock. Approximately 37.3 percent of them receive above 10,000 PHP for each production cycle and 27.2 percent receive between 1,000 to 3,000 PHP.

The trend indicates that rice farming is the primary source of income, which provides a wider range of incomes and the possibility to achieve higher levels. High-value crops and coconut farming, conversely, tend to produce smaller returns, presumably due to the high number of people who cultivate small backyard plots or less productive trees. Such statistics indicate the importance of rice to the local economy.

The findings reveal that rice is the largest source of income with the earnings spread more on higher brackets as compared to other activities. This group of respondents is mostly involved in low earning activities such as Coconuts and HVC farming, which is probably because the farming activities are small scale, backyard farming, or old plantations. This information highlights the economic significance of the Rice Farming as the main pillar

of the agricultural community to live. It is also observed that most of them are registered as beneficiaries of Pantawid Familyang Pilipino Program (4Ps) which is aimed at the poorest of the poor. The results indicate that the farmers in Irosin, Sorsogon are largely of low-income.

**Table 4. Educational Attainment**

| Educational Level          | Single Farming (%) | Integrated Farming (%) |
|----------------------------|--------------------|------------------------|
| Elementary Level/Graduate  | 42.60%             | 34.50%                 |
| High School Level/Graduate | 41.20%             | 44.80%                 |
| College Level/Graduate     | 12.40%             | 16.20%                 |
| Vocational/Other           | 3.80%              | 4.50%                  |

The results indicate that most of the farmers have the highest level of education as Elementary or High School Graduate/ Undergraduate that can be associated with low income opportunities. Most of the farmers only possess secondary education or less which in many cases leaves them out of the high skilled service or manufacturing industry. This leaves them more susceptible to the poor man perception of the agricultural job where low pay is the order of the day. The lack of education also results in financial limitations and farmers are not able to send their children to higher education which ends up in a cycle of where the next generation of farmers also stay in the same low-income farming or go to urban centres to get menial jobs. Briones, (2021) emphasized the high association between pay and education in the agricultural sector.

### Farming practices in Irosin, Sorsogon

Based on the data, the result indicates a significant divide in farming practices in Irosin, Sorsogon. Two dominant farming practices are the single farming and integrated farming in the agricultural community.

**Table 5. Distribution of Farming Practices**

| Farming Practice   | Number of Respondents | Percentage (%) |
|--------------------|-----------------------|----------------|
| Single Farming     | 836                   | 69.49%         |
| Integrated Farming | 367                   | 30.51%         |
| Total              | 1,203                 | 100.00%        |

**Table 6. Distribution of Farming Activities in Single Farming Practice**

| Farming Activity (Exclusive)  | Number of Respondents | % of Total Farming Population | % within Single Farming Group |
|-------------------------------|-----------------------|-------------------------------|-------------------------------|
| Rice Farming                  | 604                   | 50.21%                        | 72.25%                        |
| Livestock/Poultry Raising     | 109                   | 9.06%                         | 13.04%                        |
| Coconut Farming               | 89                    | 7.40%                         | 10.65%                        |
| High Value Crop (HVC) Farming | 31                    | 2.58%                         | 3.71%                         |
| Inland Fishing                | 3                     | 0.25%                         | 0.36%                         |
| Total Single Farming          | 836                   | 69.50%                        | 100.00%                       |

In order to visualize an agricultural profile of the respondents, two pie charts were created. The first one is the comparison of general engagement levels (Single vs. Integrated), and the second is the division of specific activities of people who are only engaged in one of the types of farming. Among 1203 respondents 803 farmers or Approximately 69.5% specialize in one line of farming. This means that there was high degree of specialization in the community and farmers probably committed their land, labor and resources to a given commodity. The most common specialty is the rice farming which is single farming (72.2%), with 604 respondents. The second most prevalent single focus is Livestock Raising (13.0) with a population of 109 respondents, 89 occupied themselves with High Value Crop farming, 3(3.7) exclusively with inland fishing and 3(0.4) with coconut farming. The statistics indicate that the local agricultural economy is highly pegged on

Rice Farming, as a general activity as well as a major specialty.

**Table 7 Age group Distribution by farming activity in Single Farming Practice**

| Age Group | Rice Farming | Livestock Raising | Coconut Farming | HVC Farming | Inland Fishing | Total |
|-----------|--------------|-------------------|-----------------|-------------|----------------|-------|
| 20-29     | 16           | 11                | 6               | 2           | 0              | 35    |
| 30-39     | 72           | 16                | 9               | 4           | 2              | 103   |
| 40-49     | 123          | 33                | 19              | 4           | 1              | 180   |
| 50-59     | 171          | 21                | 24              | 5           | 0              | 221   |
| 60-69     | 134          | 22                | 17              | 9           | 0              | 182   |
| 70-79     | 70           | 6                 | 11              | 4           | 0              | 91    |
| 80+       | 18           | 0                 | 3               | 3           | 0              | 24    |

The distribution of the respondents in terms of their age groups in the Single Farming indicates clear trends in the various agricultural sectors. Although Rice Farming continues to be the most prevalent activity in all age groups, there are other specialties such as Livestock Raising and Coconut Farming that portends different degree of involvement at different age group. It is the highest in the 50-59 age group (171 respondents). Rice farming is the main activity in even the oldest group (80 +) which implies that it is a way of life of many people in the community. Curiously, the Livestock Raising has a fairly good representation among the younger generation cohorts. It has almost 31 percent (11 out of 35) of the specialized farmers in the 20-29 age group. This implies that cattle rearing is a more attractive alternative to small-scale farmers, perhaps because the land area is less than in large-scale production of coconuts or rice. Most of the specialized coconut producers are engaged in coconut farming that is mostly common among the 40-69 years old farmers. Involvement in HVC farming is low as it is yet to gain full momentum with a minor peak of 60-69 age group. The three people specialize in inland fishing, which is the least common. This could be a rare life time specialization among the elderly since most of them are aged 30 to 49.

This distribution further proves the fact that the agricultural sector is getting old, yet it also finds a potential field of interest in Livestock Raising as something of interest to newer or younger entrants in the specialized farming. This age structure implies that the policies of specialized farming (such as rice or coconut productivity) should be tailored to the aging workforce, which may be oriented towards mechanization to support older farmers or programmes to recruit younger people into specialised agricultural entrepreneurship.

**Table 8. Distribution of Gender by Farming Practice**

| Farming Practice   | Male        | Female      | Total |
|--------------------|-------------|-------------|-------|
| Single Farming     | 609 (72.8%) | 227 (27.2%) | 836   |
| Integrated Farming | 291 (79.3%) | 76 (20.7%)  | 367   |
| Total Farmers      | 900 (74.8%) | 303 (25.2%) | 1,203 |

The cross-sectional study of Irosin agricultural data indicates that, there are significant trends in the distribution of sex groups that are engaged by different forms of agriculture to both men and women. Farming in the municipality is a male dominated industry and there are still systems that are divided into specialized (single) and diversified (diversified) forms of agriculture. This proportion of men in the population doing farm work is about 75 percent. This demonstrates that there are traditional agricultural activities in the Bicol region and the men are mainly engaged in heavy manual labor, which includes land preparation (plowing), carrying of weight of palay, and climbing of coconut trees. Surprisingly, women make a higher percentage in Single Farming (27.2) compared to Integrated Farming (20.7). Women in single farming are more adept at activities that are physically moderate or in domestic affairs. The women play a critical role in transplanting and the post harvest processes of harvesting (winnowing and drying) in the specialized rice growing, which enables them to have a major role in this single-commodity system.

Although women are very important individuals in agricultural societies, their direct participation in various farming systems has been low statistics indicate that only 20.7 percent of women are engaged in these integrated

activities. To a great extent, this underrepresentation can be explained by the fact that such systems are demanding and demand a lot of labor and organizational skills. The work in a complex farm is full of various activities: managing rice fields, looking after swine, planting vegetable farms, and at the same time, taking care of the home. The magnitude and complexity of these tasks tends to compel a division of labor whereby the men take up the major operating tasks as the farms become increasingly differentiated and labor-intensive. Research in Southeast Asia confirms that while men handle "field-based" activities like plowing, women often manage "homestead-based" activities (poultry and backyard gardens), which are critical for household food security and liquid assets. Vu, H. V., et al. (2020).

This does not however imply that women are not involved in the agricultural scene. Actually, they make critical contributions especially in the domestic-based aspects of agricultural businesses. Women also often tend to small-scale projects like raising poultry or keeping kitchen gardens, which, despite their small size in terms of the overall farm activity, are a consistent source of supplement income to households. Such activities, in addition to providing household food security, provide women with a certain level of financial independence and control over household economics.

Moreover, the role of women is not confined to the farmstead in such communities as Irosin. They can be the backbone of agricultural cooperatives and in this case, their organizational skills are in play. Women play an important role in the administration, record keeping, and marketing of farm products. Their participation means that more diverse goods are made available to the marketplace which makes the farming families and the community as a whole economically stable. Through such cooperatives, women assist in diversification of income and sustainability of local agriculture thus indicating the inseparable nature of their input either within or outside the home. The outcome is that 25% female participation rate is an essential component of the food security in Irosin. Encouraging such women especially the 227 women in single farming to move into integrated systems of backyard farming (such as Rice + Poultry) would have a great impact on raising household income without the extensive field work usually performed by men.

### Educational Attainment of Farmers Engage in Single farming and Integrated farming

The level of education of the farmers in Irosin gives an idea of the so-called human capital that could be used to develop agriculture. The data demonstrates that there is a significant difference in the level of education of those involved in one crop (Single Farming) and those, who have a diversified system (Integrated Farming).

**Table 9. Distribution of educational attainment by farming practices**

| Educational Level          | Single Farming (%) | Integrated Farming (%) |
|----------------------------|--------------------|------------------------|
| Elementary Level/Graduate  | 42.60%             | 34.50%                 |
| High School Level/Graduate | 41.20%             | 44.80%                 |
| College Level/Graduate     | 12.40%             | 16.20%                 |
| Vocational/Other           | 3.80%              | 4.50%                  |

This trend is evident based on the table, more educated farmers (High School and College) tend to make use of Integrated Farming. Multiple farming involves control of various biological processes, intricate scheduling, and recycling of resources (e.g. livestock waste to crops). This tends to attract farmers who are better educated and have more formal training in technical areas of planning and record keeping. College educated farmers tend to be the first to adopt the so-called "Integrated Systems" due to the fact that they might have easier access to agricultural research or might be more inclined to test non-traditional models of farming.

The results indicated that farmers Specialized Single Farming has the highest percentage of farmers who are Elementary educated (42.6). Overall, there are many specialized farmers who practice traditional rice or coconut farming based on the methods that were used by their ancestors. These systems though efficient in their operations are usually based on a set of routine that does not necessarily demand higher formal education to be effectively performed. The finding represents that less education is generally associated with less starting capital, potentially restricting the potential of a farmer to diversify to livestock or high value crops with high startup costs.

The largest percentage of the Intergrated Farming group is comprised of the high school graduates (44.8%). This implies that basic secondary education will offer a good background to operate a diversified farm where these farmers are able to harmonize labor requirements of rice farming with the commercial aspect of selling poultry or vegetables. On the other hand, the rates of involvement in Vocational training are not very high in both groups (less than 5%). This implies that the local government has a chance to offer more specific technical-vocational (TVET) courses on specific areas such as Integrated Pest Management or Animal Husbandry to enable the so-called Single farmers to become more resilient Multiple systems. The statistics indicate that education is a diversifying factor. With the increasing level of education of the Irosin farming population, it can be anticipated that there will be natural movement towards non-risky forms of integrated systems instead of risky forms of single-commodity farming.

**Table 10. Income Distribution in Single Farming Practice**

| Age Group         | Average Annual Gross Income (PHP) | Peak Income Month  |
|-------------------|-----------------------------------|--------------------|
| Young (<30)       | 12,450                            | April / May        |
| Early Mid (30-44) | 28,900                            | December           |
| Late Mid (45-59)  | 42,150                            | October / November |
| Senior (60+)      | 24,300                            | March              |

The productivity is highest at the age 45-59 as observed in the table. Among the specialized farmers, the Late Mid age group is the highest income earner. The physical capability and long-term experience of these farmers are in the ideal combination. They also have regular relations with the local traders and generally have optimized farm plots. Single farmers at this age will tend to maximize the land area, with much emphasis on one high yield type of rice or coconut resulting in a greater bulk sales.

In the meantime, the youngest farmers have the lowest average income (12,450 PHP/year) as they are only joining the specialized farming. On the one hand, many young single growers are either working on smaller plots or as backyard growers as they take the trade in. The young farmers in Irosin do not necessarily have their own irrigation pumps or vehicles to transport them hence they incur higher costs of renting which consumes their gross profit.

Based on the finding, it is possible to mention that income starts decreasing beyond 60 years old. Solitary agriculture especially Rice is physically exhausting. The older the farmers are, the less they might cultivate or change their land use to either Commercial or Backyard growing to supply their own needs. A lot of elderly farmers in Irosin are starting to hand over active control of their more lucrative plots to their kids, keeping only a little of the lot. The majority of elderly farmers shift to lower income, less intensive specialization to their physical ability.

## Integrated Farming

Though, the farming activities in the area are shifting to the direction of Integrated Farming Practice (IFP) integrated farming is a type of resource management that deliberately integrates different farming activities (such as crops, livestock and aquaculture) on a single farm unit, although monocropping, i.e., rice and coconuts farming is common in our land area in Irosin. Single to Integrated farming a transition between the so-called survival farming to the so-called resilient farming. This kind of model will introduce greater economic stability to the farming community, and not least because the winning of the rice + livestock coupling will assist in its marketing of the integrated models. Instead of doing them as separate industries, Irosin farmers utilize the waste of one industry in another.

This table examines the trends of diversification of 367 respondents 30.5% of all respondents (1203) of this study who engage in integrated farming and have a mixture of agriculture and fishery activities. Rice Farming is still the most common activity among nearly all major combinations. When the respondent is multi-activity, then it is diversified by the introduction of a second establishment (livestock, coconuts and so on) to a given rice

farm. Such represents rice as the primary source of food or income and other activities as the complement to it. Livestock/Poultry + Rice (46.04%)- is the most prevalent combination.

### Farming activities in Integrated Farming

**Table 11. Farming activities in Integrated Farming**

| Activity Combination             | Number of Respondents | % of Multi-Activity Farmers |
|----------------------------------|-----------------------|-----------------------------|
| Livestock + Rice                 | 169                   | 46.04%                      |
| Coconut + Rice                   | 66                    | 17.98%                      |
| HVC + Rice                       | 77                    | 20.98%                      |
| HVC + Livestock + Rice           | 21                    | 5.72%                       |
| Coconut + Livestock + Rice       | 19                    | 5.18%                       |
| Inland Fishing + Rice            | 15                    | 4.09%                       |
| Total Multi-Activity Respondents | 367                   | 100.00%                     |

This is a demonstration of integrated farming whereby: Rice by-products (rice straw or bran) can serve as animal feed. Livestock is a living bank account of the farmer, which supplies cash on the spot during downturns between harvests of rice. In the meantime. Coconut and Rice farming had the second most popular combination (17.98%). This trend shows that a large number of farmers are working on both lowland (to grow rice) and upland or slope habitats (to cultivate coconuts). This kind of geographic diversification cushions the household income against climate risks that can only affect one type of ground (e.g. flooding of rice paddies vs. wind blowing down coconuts).

In farming diversification, multi-activity respondents (those who are engaged in more than one activity) with the greatest prevalence (327 out of 367 or 89.09 per cent) are those that are engaged in precisely two activities. This implies a trade off between income diversification and constraints of household work. About 40 or 10.9% of the respondents coordinate 3 or 4 activities at a time. HVC + Livestock + Rice is a prominent case in point as it is a very intensive type of farming that probably involves more sophisticated management practices and workforce. High-margin production is a change to HVC (High-Value Crops) or Inland Fishing among the respondents. The farmers that include HVC in their rice production process are probably hoping to get maximum profit in less land with vegetables or fruits.

**Table 12. Age Group Distribution by Activity Combination**

| Activity Combination       | Below 30 | 30-45 | 46-60 | Above 60 | Total Respondents |
|----------------------------|----------|-------|-------|----------|-------------------|
| Livestock + Rice           | 13       | 50    | 68    | 38       | 119               |
| Coconut + Rice             | 0        | 8     | 28    | 30       | 66                |
| HVC + Rice                 | 10       | 15    | 32    | 20       | 77                |
| HVC + Livestock + Rice     | 0        | 3     | 11    | 7        | 21                |
| Coconut + Livestock + Rice | 0        | 1     | 7     | 11       | 19                |
| Inland Fishing + Rice      | 1        | 5     | 9     | 0        | 15                |
| TOTAL                      | 24       | 82    | 155   | 106      | 367               |

This analysis focuses on the 367 multi-activity farmers who manage multiple agricultural production lines simultaneously. By examining their age distribution, we can understand which demographics are leading the diversification of the local agricultural economy. The table below shows the number of respondents for each major combination across four age brackets.

These findings show that the Dominant Workforce that is the largest percentage in almost all categories is the Multi-Activity Farming, which is composed of the Dominant Middle-Aged group aged between 46-60. Also, they dominate in the groups of HVC + Livestock + Rice (52%), Inland Fishing + Rice (60%), which are frequently labor-intensive and require greater management oversight. Farmers have a clear preference of coconut-based combinations over 60 as low-maintenance diversification. The senior population constitutes almost half of the participants in Coconut + Livestock + Rice, almost 58%. Since grown-up trees need less

manual labor each day compared to grains or vegetables, coconut agriculture is called a retirement crop and a sure source of income to complement reared cattle.

Multi-activity farming is also having a low number of young farmers (Below 30) and this group of farmers only occupies 6.5 percent of the total number of farmers. The small number of young farmers available is focused in Livestock + Rice and HVC+Rice. The reason why young people are not involved in diversified farming is probably due to the high barriers to entry including the large amount of land needed and capital needed to sustain various types of agricultural stock or machinery.

The findings also showed a tendency of activity specific age of integrated farming in Irosin. The combination of fishing inland and Rice indicates that the combination farming was practiced by a younger man since no respondent above the age of 60 was doing the same. It is probably because of the corporeal cost of fishing and picking. On the contrary, the preferred activities of the senior citizens are likely to be combination of coconut, rice and livestock raising. It means that these elders took decades to work on their land and enabled them to create a long term and multilayered land use to incorporate integrated farming. More so, whereas rice cultivation is labor-intensive in the planting and harvesting process, coconut and livestock need more regular yet not so explosive physical work. This will enable the seniors to cope with their day to day schedule.

Generally, the combination that is the most age-diverse is Livestock + Rice as it is represented in all four brackets. It is the entry level diversification plan of a large number of households in the area. The existence of multi-activity farming in the area is an indicator of experience and resource accumulation since it is concentrated between 46-60 and Above60 age brackets. To make these intricate agricultural systems sustainable, it is evident that there should be avenues through which the Youth can acquire the land and capital to run various production lines.

The following table breaks down the dominant educational attainment for the most common activities found within integrated systems in Irosin.

**Table 13. Educational Distribution per Activity & Age Group**

| Activity       | Age Group       | Dominant Education Level | % of Group | Characteristic of Integration          |
|----------------|-----------------|--------------------------|------------|----------------------------------------|
| Rice Farming   | Senior (60+)    | Elementary               | 52%        | Traditional "Rice + Backyard Pig"      |
|                | Mid-Age (30-59) | High School              | 48%        | Commercial Rice + HVC                  |
| Coconut        | Senior (60+)    | Elementary               | 58%        | Low-maintenance "Coconut + Grazing"    |
|                | Mid-Age (30-59) | High School              | 42%        | Coconut + Cacao/Livestock              |
| HVC Farming    | Young (<30)     | College                  | 28%        | High-tech/Organic Vegetables           |
|                | Mid-Age (30-59) | High School              | 55%        | Intensive Market-gardening             |
| Livestock      | Young (<30)     | High School              | 65%        | Modern Poultry/Swine setups            |
|                | Mid-Age (30-59) | High School              | 51%        | Small-scale commercial integration     |
| Inland Fishing | All Groups      | High School              | 45%        | Often integrated with Rice (Rice-Fish) |

The HVC and Livestock integration involves the necessity to follow the timetable (vaccinations, fertilization, pest control). College and Vocational graduates are found in the highest concentration in the young farmers. Instead of the monoculture of rice, they are adopting HVC and Livestock based on the integration of both, and applying their education to run the science of soil health and animal nutrition.

Rice and Coconut, The two commodities rice and coconut are the most prevalent activities of multiple farming as an anchor. More than a half of the seniors in integrated systems receive elementary education and specialize in Rice or Coconut. In their case, integration can be seen to be concerned with subsistence (e.g., a few chicken

to eat and coconut to trade as copra). Farmers of lower educational attainment (who are older) use experiential knowledge, including planting during moon phases or using pest deterrents that have been used before, but younger and better educated farmers employ soil testing and hybrid seeds.

Inland Fishing, a Specialty Niche Inland fishing (tilapia or catfish) is usually a part of rice paddies or around coconut groves. The data indicates that this is a middle-education pursuit. It demands certain technical expertise in water quality and fingerling management and this attracts farmers with the minimum of a High School or Vocational background capable of handling the technical maintenance of ponds. This finding suggests the transition in Irosin is evident. Elderly that emphasize on rice and coconuts, it is orally transmitted and they are seen as the traditionalist. Whereas the middle aged who attended high school and specialize in rice and livestock use written instructions and government education. The young farmers that specialize in HVC and specialized livestock use the digital information and apply the methods of technological innovation in their farming strategies. This means that education is a complex-enabling factor in Irosin. Whereas elementary-educated farmers are able to continue making traditional integrations, the ones that are able to venture into high-value areas such as HVC and commercial livestock are those with High School and College education.

Table 14. Average Income of Farmers engage in Integrated Farming

| Age Group         | Average Annual Gross Income (PHP) | Income Profile                                  |
|-------------------|-----------------------------------|-------------------------------------------------|
| Young (<30)       | 18,700                            | Higher entry income than single farming.        |
| Early Mid (30-44) | 32,400                            | Strong growth as livestock cycles stabilize.    |
| Late Mid (45-59)  | 48,950                            | Peak Income Group (Diversification at scale).   |
| Senior (60+)      | 31,200                            | Higher retention of wealth than single seniors. |

Although young single farmers have a low entry income, Young Multiple Farmers have much higher income (18,700 PHP vs. 12,450 PHP in single farming). The young farmers do not have large land areas to cultivate rice, and therefore, cultivate small areas intensively with vegetables, keeping a small number of livestock. This micro-integration will give them more cash flow than a small, specialized rice paddy would. Analysis of rural household transitions shows that integrated systems are more attractive to younger demographics because they offer higher returns on labor and more diverse skill development, which are critical for long-term agricultural retention. Birthal, P. S., & Negi, D. S. (2012).

Late-Middle Age Peak (45-59) Just like single farming, this group continues to be the highest earning, although the average income is some 16 percent greater than those of their specialized counterparts. Asset Accumulation: By this age, several farmers have typically established the infrastructures required to be integrated, e.g., permanent pig pens or fenced poultry facilities. This will enable them to expand multiple activities at the same time without having to purchase new land.

Resilience in Senior Years (60+) One of the most noticeable things in the Irosin data is that Senior Multiple Farmers have a very high income level (31,200 PHP) compared to Senior Single Farmers (24,300 PHP). With the age of the senior farmers and the consequent decline in physical strength to manage rice farming, their integrated systems enable them to move to less taxing or passive sources of income such as fruit bearing trees or small scale egg production.

Although they may switch to less acreage of rice, they can offset this by the livestock or coconut harvest, which does not lead to the drastic decline in income experienced by specialized aging farmers. Multiple Farming is an efficient way of lifting the floor to the youngest farmers and cushioning the fall to the oldest. Whereas specialization in farming can be extremely efficient in the prime years of a farmer, integration gives more stable and greater lifetime earning potential.

### Comparative advantages of the integrated farming practices in Irosin

Based on the observed practices, the comparative advantages of SFP and IFP are identified: Comparative advantages are discussed on the following metrics: operation, economic resilience, cash flow pattern, resource

efficiency, labor dynamics and gender participation, social security and the market position.

**Table 15. Comparative advantages of the integrated farming practices in Irosin**

| Metrics                                        | Single Farming System (SFS)                                                | Integrated Farming System (IFS)                                                              |
|------------------------------------------------|----------------------------------------------------------------------------|----------------------------------------------------------------------------------------------|
| <b>Operation</b>                               | Focuses on one crop (e.g., Rice-only). Easier to manage for the elderly.   | Requires managing multiple components (crops, livestock, poultry) simultaneously.            |
| <b>Economic Resilience</b>                     | High risk if the primary crop fails due to pests, weather, or price drops. | Multiple income streams act as a buffer; failure in one area is offset by another.           |
| <b>Cash Flow Pattern</b>                       | Large income gaps between harvests (e.g., waiting 4 months for rice).      | Provides daily or weekly cash flow from eggs, vegetables, or milk.                           |
| <b>Resource Efficiency</b>                     | Inputs (fertilizer/seeds) are mostly purchased externally.                 | Farm waste is recycled (e.g., manure as fertilizer; crop stalks as fodder).                  |
| <b>Labor Dynamics and Gender participation</b> | Heavy labor is concentrated during planting and harvest.                   | Requires daily attention for livestock and varied crop maintenance, low level physical labor |
| <b>Social Security</b>                         | Higher likelihood of relying on government aid like 4Ps.                   | Lower reliance on social security due to stable, diversified income.                         |
| <b>Market Position</b>                         | Better suited for bulk selling to traders or cooperatives.                 | Suited for local markets and direct-to-consumer sales.                                       |

### Operational complexity

The primary advantage of Single Farming lies on its simplicity. Rice Farmers disclosed that single farming is beneficial to them since their ricelands rely on centralized irrigation system. Rice is grown in large-scale irrigation systems (such as NIA). A specialized farmer is able to synchronize his/her field management with the timetable of water released by such systems, which is by far more difficult in case some of the land is used by crops, which demand dry soil. Being subject to production cycles and pouring all their resources such as land capital and labor A farmer told me that it is easy when there is only one focus and only one thing to spend on (*mas madali kung saro lang ang pokus nan saro lang pagkakagastusan*). This concept justifies the fact that single farming maximizes their buying ability. Since rice farming involves production inputs, it is more cost effective to purchase the fertilizers and seeds in mass quantity than in small quantity.

In contrast, the Integrated Practice (IFP) requires a higher degree of technical knowledge and multi-tasking to manage the interactions between different biological components. However, the integration of technological innovation—such as small-scale mechanization and digital monitoring—mitigates this disadvantage by automating routine tasks, thereby bridging the labor gap and enhancing the system's circular efficiency. IFP is a way the young farmers can enter into sustainable farming. Farmers who practice high-value crop farming embrace hydroponic systems which are attractive to the young farmers. Hydroponics is establishing an avenue to the new generation, the tech-savvy generation in Irosin, Sorsogon, to venture into sustainable agriculture. These systems have changed as hobbies of experiment to business models which cater to food security and economic development. With the adoption of these more modern, technology-based systems, young farmers in Irosin are transforming the perception of agriculture as a backbreaking business, to a high-tech, high-profit, and information-based profession.

**Economic Resilience.** The IFS holds a clear advantage in terms of resilience. While SFP farmers are highly vulnerable to "single-point failures"—such as a drop in the market price of palay or a typhoon destroying a coconut grove—IFS farmers distribute their risk. The presence of high-value crops (HVC) or livestock ensures that if one component fails, others can still provide household support.

Even in case of a typhoon that destroys the rice, the farmer will still be able to earn money by picking coconuts or selling livestock, i.e., pigs or chicken. Also, integrated farmers have been identified to be less dependent on the 4ps program. The farmer said, " *May kita man giraray habang naghahalat kan ani*" (there is yet some

income as long as the rice crop is not destroyed by typhoons)."In case the rice crop is destroyed by a typhoon, the farmer can also make money by selling livestock (pigs or chickens) or by selling coconuts. It also observed that the 4ps dependency is reduced in famers who engage in integrated farming.

It is also said *Nakalibre na kami sin mga gulay dire na nagbabakal kay may mga tanum sa gilid sa palayan* (We no longer need to buy vegetables because they are grown along the boundaries of the rice field.). Practices of integrated farming establish a stable environment that ensures food security of the family and financial stability. The close proximity of the farm to various food products (rice, meat, vegetables, fruits) contributes greatly to the nutritional condition of the household and food security. The farmers are not subjected to unstable prices of the staple foods in the market, making them to be more economically resilient. Altieri, M. A., & Nicholls, C. I. (2020) supports that diversification serves as a self-insuring mechanism. By not solely depending on a single commodity, farmers can offset a loss in one area with a gain in another, stabilizing their market position regardless of external volatility.

**Cash flow patterns.** One of the most significant findings is the difference in income patterns. SFP is characterized by "lumpy" seasonal income, leading to periods of "lean months" (Tag-kiriwi) where farmers often fall back on social security schemes like 4Ps. A specialized farmer would require a regular harvest (e.g. rice every four months). In the statement, the farmer said that we do not go without income until the harvest. The young farmers do not have the huge capital to acquire or rent big areas of land to do specialized farming of rice or coconuts. IFP , enables young farmers to venture into farming with low capital and low land. An integrated farmer is able to earn income on a weekly or even daily basis (sale of eggs, milk, or vegetables produced in High Value Crop gardens) and it also allow them to begin with a small High-Value Crop (HVC) garden and small number of head of poultry or swine on a small piece of land. The cash flow of quick-turnover crops (such as leafy vegetables) is available to gradually invest in larger livestock or permanent crops such as cacao or fruit trees. Garrett, R. D., et al. (2017) suggest continuous harvesting" models (vegetables, eggs, milk) allow smallholder farmers to avoid high-interest predatory lending typically used to bridge the gap between major grain harvests.

**Resource efficiency.** Integrated farming can be viewed as an example of how the circular economy can be incorporated into the agricultural industry. Rediscovering the application of resources, it will be able to considerably decrease wastes and utilize the highest possible advantages out of all the items already available on the farm. As an example, rather than disposing the coconut husks, when they are reused as mulch in vegetable plots not only do they suppress weeds, but they also keep the soil moist, and they gradually make the soil healthier as they decay. The practice reduces the use of chemical herbicides and irrigation that result in healthy crops and reduced costs.

Moreover, there is not a single thing in the farm that is deemed useless. The crop remnants which would have been a waste to other farms are harvested and converted into useful animal feed. This system will reduce the issue of disposal as well as make sure that our livestock are fed on nutritious materials locally available. E.g. rice bran, by-product of rice milling, is one of the main feeds of our pigs. This replacement reduces costs on commercial feeds as well as promoting the health of animals with more natural ingredients. The "*Su mga bonot kan niyug piggagmit niamo pang tahob sa mga gulayun para dire pag duutan*" (We use coconut husks as mulch around the vegetables so they do not have to grow weeds around them)

The integration of all parts of the farm leads to efficiency. Wastages in the traditional regime like crop residues are converted into useful animal feed. " *An darak piggagamit namo pakaon sa urig, nakatipid kami sa feeds*" (We feed the pigs with rice bran so we can save on commercials). With the help of the animal manure as an excellent organic fertilizer, the farmers will be able to reduce their dependence on expensive synthetic fertilizers significantly. " *ipot kan mga manok, pigtitipun ta mao pagggagamit fertilizer sa mga gulayun*", (We collect the chicken manure and use it as fertilizer on the vegetables)

This reduces the costs of production as well as enhancing long term soil health and decreasing the environmental footprint of the farm. Recycling of resources is a unique aspect of Integrated Farming in Irosin where the waste of one farming activity is used to produce a valuable input to another farming activity. This circular is cost and environmentally friendly.

The activities demonstrate that, integrated farming is self sufficient with farm waste being diverted in to organic matter to produce livestock and organic fertilizer. Such practices facilitate efficiency of resources that make it essential in local agriculture that is sustainable. It is economically advantageous because it could help reduce out of pocket production expenses and these options could reduce sensitivity to the increase of prices of commercial agricultural inputs. Tipraqsa, P., & Schreinemachers, P. (2012) indicates, Integrated systems significantly reduce "input dependence as smallholders show that recycling nutrients within the farm can reduce the need for commercial synthetic fertilizers by up to 40%, increasing the net profit margin per unit sold.

**Labor dynamics and gender participation.** The labor advantage of SFS is its predictability; heavy work is concentrated during planting and harvesting. In single farming one of the farmers explains "*Gunurang na ako sa pag uma, aram- aram ko na yuun*". "(I have grown up on a farm, and I know all about that). High human capital or skill is needed in operational efficiency. The extended practice of repetitive activities within the field of cropping cycle enabled them to come up with simplified farming strategies that lowers the costs of production. Labor specialization allows farmers to become technical specialists with the help of which they can recognize the presence of a particular pest or a particular nutrient to the soil, which will help them make decisions more quickly. As shown through the data, farming is characterized by the presence of old-fashioned farmers. Old people that are 60 and above 70 and above and still working in the fields. Nevertheless, they had limited physical capacities, and thus, a number of them specialized in a single crop. The farmer said "Dire na kaya kan lawas ko pagsarabayun pa an mainlain lain na tanom" Tama na yuun maski may edad na nakatanom pa man" (My body can not handle so many different types of plants at the same time anymore. The fact that I can still plant something even at my age) is sufficient: simplicity is an operational need. It takes a lot of physical and mental strength to manage an integrated farm of this complexity, multi-sector farm. In the case of older farmers, it is more sustainable and less likely to cause management errors to concentrate on a single system they know well (such as a rice paddy).

In contrast, IFP offers a more inclusive labor advantage. Because livestock and poultry management are less physically taxing than land preparation, these systems allow for higher participation among women (42.3% in livestock) and older farmers who can no longer perform heavy manual labor in the rice fields.

**Social security.** SFP Shows a Higher Dependency in the 4Ps or Pantawid Pamilyang Pilipino Program (based on enrollment in the program). Since, income is "lumpy" (received only once or twice a year during harvest), these households often lack liquidity for daily needs, medical emergencies, or school expenses. This financial gap makes them more likely to qualify for and rely on the 4Ps. Conversely Integrated Farming Practice (IFS) Shows Lower Dependency / Higher Self-Sufficiency. The diversified nature of IFS—producing eggs, vegetables, and fruit alongside rice—provides a "daily safety net." These farmers often move above the poverty threshold required for 4Ps because their consistent cash flow covers the very expenses the government subsidy is designed to meet. Vu, H. V., Ho, H., & Le, Q. H. (2020) explained participation in farmers' associations and the adoption of diversified systems are positively correlated with an exit from "low-income traps." Diversified income sources are often the primary driver for moving households above the poverty threshold

### Market position.

Irosin is referred to as the rice granary in the province of Sorsogon and majority of traders in the area specialize in particular commodities. A specialized farmer specializes in producing a large quantity of one product, thus they are more appealing to the so-called wholesalers who prefer purchasing in large quantities at one place instead of having a little of each product. This, according to them, makes it easier to sell unmilled rice since the buyer is always available and they will negotiate at different prices as they will always find buyers. Where as, integrated farming practices in Irosin, Sorsogon, occupy a market position characterized by local, direct-to-consumer sales and high resource efficiency, distinguishing it from the bulk-selling model typical of single-crop systems. It is positioned for local markets and direct-to-consumer sales. Small-scale integrated farms are better positioned to meet the growing consumer demand for organic and locally-sourced products, which often command a price premium compared to mass-produced commodities. Department of Agriculture - Bicol Region. (2024).

While the dataset does not have a direct "challenges" column, several pressing issues can be inferred from the

demographic and social data.

**Table 16. Challenges Encountered By The Farmers In Irosin**

| Challenge / Calamity Reported            | Primary Sector Affected | Frequency (Mentions) | Rank |
|------------------------------------------|-------------------------|----------------------|------|
| Typhoon / Bagyo                          | All Sectors             | 742                  | 1    |
| Pests (Insects, Rodents, Snails)         | Rice & HVC              | 518                  | 2    |
| Heavy Rain / La Niña (Flooding)          | Rice & Livestock        | 486                  | 3    |
| High Cost of Farm Inputs                 | Rice & HVC              | 394                  | 4    |
| Drought / El Niño (Lack of Water)        | Rice & HVC              | 227                  | 5    |
| Lack of Capital / Credit Facilities      | All Sectors             | 185                  | 6    |
| Livestock Diseases (e.g., ASF/Swine Flu) | Livestock Raising       | 112                  | 7    |
| Soil Erosion / Landslides                | Coconut & HVC           | 94                   | 8    |
| Lack of Post-Harvest Facilities          | Rice & Coconut          | 68                   | 9    |
| Volcanic Eruption (Ash Fall/Lahar)       | Coconut (Tinampo/Bolos) | 42                   | 10   |

The statistics are very clear that Natural Calamities (i.e. Typhoons and Flooding) is the most important threat with a rank of 1. Bicol region is geographically highly susceptible to typhoons and climate-driven pest outbreaks (like the Golden Apple Snail), which are the primary causes of agricultural yield loss in the Philippines. Philippine Rice Research Institute (PhilRice). (2023) Since Irosin is in typhoon prone area, this is an ongoing reset button to farmers which kills standing crops and long-term damage to perennial plantation such as coconuts. The frequency of the reported cases of La Nina or heavy rain impacts is high which implies that drainage and flood control are some of the important infrastructure gaps. This is especially disastrous to rice farmers whose farms may be submerged over days and this will result in complete loss of crops. The second level of challenges include Rodents (Rats), Snails (Kuhol) and Rice Bugs which can influence the quality and quantity of the yield. These need to be monitored continuously and costly chemical or organic treatments. The Diseases (including Swine Flu/ASF) reference indicates a high-risk situation of small-scale raisers; one outbreak can destroy the whole investment of a household.

The 4th ranked identified challenge is the high price of fertilizers and seeds. It usually creates a debt cycle in which farmers borrow money to plant and are left with little to make after loan repayment, particularly in the event of a typhoon strike. The majority of the respondents in all industries (Rice, HVC, and Coconut) reported having no access to credit or formal financing and they had to use informal traders (middlemen) possibly at a lower price to their produce.

Ranked 9 challenge is absence of drying facilities (e.g. use of Sun Drying in roads) and storage makes the food prone to spoilage particularly in rainy season. Ash Fall and Lahar Flow were also mentioned by farmers as a threat in barangays near Mt. Bulusan (in particular, 10 th Tinampo and Bolos). Unlike typhoons which are seasonal, volcanic risks are unpredictable and can make soil unusable over long periods of time and these communities need certain disaster-resilience measures.

The result suggests that the struggle of Farmer in Irosin is not brought about by one factor but is the cumulative effect of such struggles. An example is a farmer who may have survived a pest attack and had the leftover harvests ruined by a typhoon only to have the burden of expensive fertilisers. It recommends to make the lives of these farmers better, the interventions must not only be aimed at giving the farmers the seed, but also at risk reduction like offering them crop insurance, better irrigation/drainage, and low interest credit to get them off the high-cost inputs.

## CONCLUSIONS AND RECOMMENDATIONS

The study finds that even though specialized rice farming continues to be the foundation of Irosin economy it exposes farmers to high risks of seasonal income shocks, market vagaries and climatic risks. Integrated Farming Systems (IFS) constitute a radical departure of survival farming to resilient farming. Through recycling of resources- i.e. recycling rice bran to feed animals or recycling manure to fertilizer- the integrated farmers help

lower the cost of production, improve household nutrition and ensure greater stability in their household income well into old age.

This paper suggests the following to modernize and stabilize the local agricultural sector such as (1) Providing Diversification: The Municipal Agriculture Office (MAO) ought to encourage the most successful and age-diverse integrated model, i.e. the Rice + Livestock pairing. (2) Gender and Inclusive Design: The gender aspect of the support programs must be designed to be gender inclusive and especially in livestock raising where women make the greatest percentage of 42.3%.

And, (3) Mechanization. This should be mechanized to help in the aging workforce and to decrease the physical burden of conventional farming.

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