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Participation of women in rice production in the Municipality of Gonzaga, Cagayan, Philippines

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Abstract

Agriculture needs both genders to participate if it is to be sustainable. This study assessed the participation of rural women in rice production activities in the municipality of Gonzaga. It described their socio-demographic characteristics and the income profile of the household respondents. It investigated the participation of rural women in rice production activities at the different stages of rice production. Seventy-six (76) respondents were purposively selected in the Municipality of Gonzaga, Cagayan. Fifteen (15) barangays were involved in representing the irrigated and non-irrigated rice ecosystems of the municipality. Descriptive analysis of the socio-economic characteristics and the different activities of rural women in rice production was conducted by analyzing the means, standard deviations, frequency counts, and percentage distribution. To determine the effects of the different independent variables on the dependent variable, women participation, regression analysis was conducted. The study revealed that there are tasks performed by the women-farmers which are expected to be performed by men. These include the decision on seed selection, plowing, and fertilizer application. The role of schooling is also emphasized as it influences the productivity of the women farmers. They have encountered problems that needed long-term solution, such as investments on solar and mechanical dryers.

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Introduction

The U.N. Food and Agriculture Organization (FAO) estimates that female farmers contribute to more than 50 percent of the world's food production, whereas in sub-Saharan Africa and the Caribbean, they make up approximately 80 percent of the agricultural labor force. Despite the relentless efforts toward achieving the third Millennium Development Goal (MDG) of gender equality and women's empowerment by 2015, hundreds of thousands of female farmers worldwide are still facing multiple challenges due to social constraints, ranging from less access to agricultural resources and decision-making to land grabbing and lack of education (FAO, 2012).

Many societies, particularly in developing countries, usually emphasize only women's domestic and community roles. The economic and political spheres are considered in these communities as exclusive domains reserved for men. Even where women's economic role is obvious such as in the case of water and fuel wood collections, vegetable gardening, dairy and poultry keeping, these economic contributions are minimized and dismissed as emanating from their biology (Mosse, 1993). Thus, women's productive work is often less visible and valued than men's.

Women in agriculture play a significant role as they contribute at least half of the total labor inputs in rice production in Asia and sub-Saharan Africa. Similarly, with men, they engage in rice production, postharvest, and processing. But despite being the farm producers, farm managers, and income earners, women's economic contributions are often neglected in agricultural statistics.

The study was undertaken to identify the core contribution of women in rice production activities and identify factors influencing women's participation in rice farming in Gonzaga, Cagayan. It analyzed labor market participation from the perspective of women's welfare.

This study aimed to assess the participation of rural women in rice production activities in the municipality of Gonzaga. Specifically, it aimed to: 1) Determine the participation of rural women in rice production specifically on Seed Selection, Land Preparation, Crop Establishment, Nutrient Management, Crop Health Management, Harvesting, and Post-Harvest; 2) Determine the participation of women in rice production activities; 3) Determine the factors affecting their participation in rice production activities; 4) Identify problems encountered by the respondents and their coping mechanisms; and 5) Recommend policies to address women's concerns in rice production.

Materials and methods

Research design

The mixed-research method was used, utilizing quantitative and qualitative research strategies to gather the needed data in order to satisfy the research objectives. The quantitative part focused on the correlational research design using regression analysis. The qualitative part focused on the FGD and interviews.

Sampling technique

The selection of barangays was purposive. The selected communities were either irrigated or non-irrigated, and economic opportunities were available to rural women in the study areas. The barangays and the respondents were purposively selected. It is important to note that purposive samples are common when researchers want to collect in-depth, reliable data in a small geographical area. Seventy-six (76) respondents were purposively selected in the Municipality of Gonzaga, Cagayan. Fifteen (15) barangays were involved in representing the irrigated and non-irrigated rice ecosystems of the municipality.

Locale of the study

The municipality of Gonzaga is located at the northeastern tip of the Cagayan province. The fifth-largest municipality in the province of Cagayan, it covers about 6.3 percent of the total land area of the province. It is endowed with rich natural resources both from its forests and from rivers and seas. It has a total land area of 56,743 hectares, 12,066.48 hectares of which are devoted to agriculture. The total land area of the municipality is unevenly distributed among its 25 barangays, four urban and 21 rural barangays.

It has a total population of 36,948 consisting of 28,707 households. Rice and corn are the major commodities of the municipality. There are around 6,000 farmers engaged in rice and corn production, while fisher folks are about 2,048.

Research Instrument and Data Gathering procedure

A questionnaire for the socio-economic survey was prepared to gather the necessary information relevant to the study. The questionnaire served as a guide in conducting personal interviews of the respondents to elicit important information deemed relevant to the study. Actual ocular visits to the study areas were done to observe and gather first-hand information about the rice production activities of the women respondents. Focus group discussions were also conducted.

Analysis of Data /Statistical treatment

Descriptive analysis of the socio-economic characteristics and the different activities of rural women in rice production was conducted by analyzing the means, standard deviations, frequency counts, and percentage distribution. The test of mean differences was indicated by the F-test statistic.

To determine the effects of the different independent variables on the dependent variable, women participation, the regression equation is in the form

$$Y = \alpha + \beta_1 X_{1i} + \beta_2 X_{2i} + \ldots\ldots + \beta n\, Xn + \varepsilon_i$$

where Y is the dependent variable, the Xs are the independent variables, the *ßs* are the unknown coefficients that measure the effect of the independent variables on women's participation proxied by incomes derived from the different activities, and *e* is the error term.

The model was estimated using the Ordinary Least Squares (OLS) method since the goal of the analysis is to determine the values of the ß parameters that minimize the sum of the squared residual values for the set of observations. By examining the magnitude and signs of the regression coefficients (*β*), inference on how predictor variables or independent variables affect the dependent variable can easily be made. Data management was done using STATA.

Results

Table 1. Household profile of the respondents.

Variable	Obser vation	Mean	Std. Dev.	Min	Max
age	76	48.526	9.849	24	72
Years of schooling	76	8.184	2.836	0	14
Age of spouse	65	42.077	17.473	0	63
Total number of children	76	3.461	2.113	0	12
Number of children living with the Household	76	2.316	1.407	0	6
age of eldest child	76	22.974	10.251	0	49
age of youngest child	76	13.566	9.449	0	39
number of children in the elementary	76	.539	.807	0	3
number of children in high school	76	.776	.873	0	3
number of children in college	76	.276	.506	0	2

Civil Status	Frequency	Percent	Cumulative Percentage
married	57	75.00	75.00
single	7	9.21	84.21
widow	12	15.79	100.00

Table 1 presents the socio-economic characteristics of respondent women. The mean age of the respondents is 48; the youngest is 24, and the oldest is 72. On average, the respondents are high school undergraduates, specifically second-year high school. Two respondents are college graduates, and one attained grade 2. The mean age of the spouses of the respondents is 42, the oldest of which is 63.

The average number of children of the respondents is three, where one respondent has 12. The mean number of children living with the household is two, meaning some children are no longer living with them and that some have families of their own. The average age of the oldest children is 23, and the average age of the youngest is 14. As to the present schooling of their children per household, at most three are still in elementary, three in high school, and two in college. As regards their civil status, 57 are married, 12 are widows, and seven are single.

Farming is the main source of income for the 69 (90.79%) respondents; four are helpers, one is a storekeeper, one is a vegetable and fruit vendors, and one is engaged in livestock production. It is important to note that these helpers take various jobs such as

cleaning houses, taking care of young children of their neighbors, and doing laundry jobs.

Table 2. Main sources of income of the respondent.

Main source	Frequency	Percent	Cumulative percentage
farming	69	90.79	90.79
helper	4	5.26	96.05
livestock production	1	1.32	97.37
store keeping	1	1.32	98.68
sales of vegetables & fruits	1	1.32	100.00
Total	76		100.00

Table 3. Incomes derived from the sources.

Incomes derived from the sources	Observation	Mean	Std. Dev.	Min	Max
Main source of income	76	48.526	9.849	24	72
Other sources of income	76	8.184	2.836	0	14

The table shows the income of the respondents, both their main source and other sources. The average income of the respondents for their main source is 48,750.00 with the highest income obtained of 150,000. On the other hand, as their other income sources, the average is 5,189, and the highest is 100,000.00. The values are reflective of the diversity of farm and non-farm activities of the respondents.

Table 4. Participation of respondents in seed selection activities.

Seed selection	Frequency	Percentage	as % of the total number of respondents
decide on seed selection only	2	11.76	2.63
Soaking only	8	47.06	10.53
Seeding only	4	23.53	5.26
decide on seed selection and seeding	3	17.65	3.94
total number of participants	17	100.00	22.37
total number of non-participants	59	100.00	77.63
total number of Respondents	76		100.00

Seed selection has always been a task not done by women in agricultural societies. Of the 76 respondents, only 17, or 22.37% of them, participated in seed selection activities. Fifty-nine (77.63%) did not participate in any of the seed selection activities. Eight (47.06%) of them did the soaking of seeds, while four (23.53%) respondents did the seeding. It is significant to note that of these 17 respondents, 3(17.65%) decided on what seed to select, and did the seeding themselves. Seed selection is a major decision-making in rice production and is a decision usually made by the male household head. However, it is worth noting that this decision is also made by a female household member.

Table 5. Participation of respondents in land preparation activities.

Land Preparation Activities	frequency of participation	percentage of participation	as % of the total number of respondents
Plowing only	6	24.00	7.9
Harrowing only	1	4.00	1.3
Repairing of dike only	9	36.00	11.8
Plowing and harrowing	3	12.00	3.9
Plowing, harrowing and repairing of dike	6	24.00	7.9
Total number of Participating respondents	25	100.00	32.9
Total number of Non-participating respondents	51	100.00	67.1
Total number of respondents	76		100

This involves major activities such as plowing, harrowing, and repairing dikes. Twenty-five (32.9%) respondents participated in land preparation activities, while 51 (67.1) respondents did not participate in any land preparation activities. Of those who participated, nine (36%) respondents were involved in repairing dikes only, and six (24%) were involved in plowing, harrowing, and repairing dikes. While it is expected that plowing is a task done by men, it is important to note that there were six (24%) respondents who were involved in plowing.

Crop establishment involves several activities such as uprooting, bundling, and transplanting. Sixty-eight (89.5%) respondents participate in crop establishment activities. Twenty-two (32.35%) respondents conducted both bundling and uprooting activities only, while 20 (29.41%) respondents conduct both uprooting and transplanting only. It is significant to note that 15 (22.06%) respondents

conduct uprooting, bundling, and transplanting activities. Only eight (10.5%) respondents are not involved in any crop establishment activities.

Table 6. Participation of respondents in crop establishment activities.

Crop Establishment Activities	frequency of participation	percentage of participation	as % of the total number of respondents
uprooting only	11	16.18	14.5
bundling and uprooting	22	32.35	28.9
uprooting, bundling and transplanting	15	22.06	19.7
uprooting and transplanting	20	29.41	26.3
total number of participating respondents	68	100.00	89.5
total number of non-participating respondents	8	100.00	10.5
total number of respondents	76		100.0

Table 7. Participation of respondents in nutrient management activities.

Nutrient Management Activities	Frequency	Percentage	as % of the total number of respondents
fertilizer application only	19	48.72	25.00
irrigating only	7	17.95	9.21
fertilizer application and irrigating	13	33.33	17.11
total number of participants	39	100.00	51.32
total number of non-participants	37	100.00	48.68
total number of respondents	76		100

The major activities involved in nutrient management include fertilizer application and irrigation. 39 (51.32%) respondents participated in nutrient management activities, while 37 (48.68%) did not participate. Of the 37 participants, 19 (48.72%) respondents performed fertilizer application only, 13 (33.33%) perform both fertilizer application and irrigation, and seven (17.95%) irrigating activities only. Fertilizer application is also expected to be performed by men, however, the task is also done by women.

Table 8. Participation of respondents in crop health management activities.

Crop Health Management Activities	frequency of participation	percentage of participation	as % of the total number of respondents
Spraying only	5	7.46	6.58
Cleaning of dike only	2	2.99	2.63
Weeding only	14	20.90	18.42
Removing of Golden Kuhol only	4	5.97	5.26
spraying and cleaning of dike	6	8.96	7.89
spraying and removing of golden kuhol	1	1.49	1.32
Cleaning of dike and weeding	3	4.48	3.95
removing of Golden Kuhol and weeding	14	20.90	18.42
spraying, cleaning of dike and removing kuhol	1	1.49	1.32
spraying, weeding and removing of Golden Kuhol	3	4.48	3.95
Cleaning of dike, removing kuhol and weeding	11	16.42	14.47
spraying, cleaning of dike, removing kuhol and weeding	3	4.48	3.95
Total number of Participating respondents	67	100.00	88.16
Total number of Non-participating respondents	9	100.00	11.84
Total number of respondents	76		100.00

The major activities in crop health management include spraying, cleaning of dike, weeding, and removing golden kuhol (golden snail). Sixty-seven (88.16%) respondents participate in crop health management activities, while nine (11.84%) are non-participants. Fourteen (20.90%) respondents engage in weeding only, and 14 (20.90%) respondents also indicated removing golden snails and weeding. Eleven (16.42%) engage in the cleaning of dikes, removing golden snails, and weeding. It is important to note that there are six (8.96%) who engaged in spraying and removing golden snails. While spraying is expected to be a task done by men, the study indicates the task is also performed by women.

There are two major activities involved in "harvesting" harvesting and threshing. Seventy-five (98.7%) respondents participated in harvesting activities, while only one (1.3%) did not participate.

Fifty-seven (76%) participated in harvesting activities, while 18 (24%) engaged in harvesting and threshing. There is a big difference between participants and non-participants in harvesting activities. This is indicative of realities in rural areas where manual harvesting and threshing are still prevalent.

Table 9. Participation of respondents in harvesting activities.

Harvesting	Frequency	Percentage	as % of the total number of respondents
Harvesting	57	76.00	75.0
harvesting and threshing	18	24.00	23.7
total number of participants	75	100.00	98.7
total number of non-participants	1	100.00	1.3
total number of Respondents	76		100.0

Table 10. Participation of respondents in postharvest activities.

Post-harvest	Frequency	Percentage	as % of the total number of respondents
drying only	32	51.61	42.11
milling only	2	3.23	2.63
drying and milling	28	45.16	36.84
total number of participants	62	100.00	81.58
total number of non-participants	14	100.00	18.42
total number of Respondents	76		100.00

Post-harvest activities identified by the respondents are drying and milling. Sixty-two (81.58%) respondents participated in post-harvest activities, while 14 (18.42%) are non-participants. Thirty-two (51.61%) engaged in drying only, while 28 (45.16%) engaged in both drying and milling. The difference between the number of participants compared to the number of non-participants is relatively high. In the rural setup, most palay drying activities are done using the available spaces of public places such as roads and other multi-purpose pavements. These places are usually accessible to rural households. Milling facilities owned by private individuals are also found in rural areas, which may either be located on the private land of the owner-operator or mobile milling facilities. The presence of these facilities in the areas contributes to the participation of women in post-harvest activities such as both drying and milling.

Table 11. Regression Model Explaining the Determinants of Women participation in rice production in the municipality of Gonzaga; Dependent Variable (Women participation – Income Derived from land preparation).

Explanatory variables	Coef.	Std. Err.	t-statistic	p-values
Age	4.190277	6.479957	0.65	0.52
Years of schooling	40.86613	18.08409	2.26	0.028
Age of spouse	-7.40734	2.881745	-2.57	0.013
Number of child in the elementary school	139.692	68.95633	2.03	0.047
Number of child in high school	-17.56328	57.46922	-0.31	0.761
Number of child in college	6.441237	104.6236	0.06	0.951
Size of land owned	64.36117	67.76046	0.95	0.346
Cons	-125.0409	414.4729	-0.3	0.764

*R-squared 23.64%

Table 11 reports the factors affecting women's participation in rice production. The following variables are significant: years of schooling of the respondent, age of spouse, and the number of children in elementary school. The table reveals that for every additional year of schooling of the respondent, the income derived from land preparation increases by forty (40) pesos, controlling for other factors. This finding puts a premium on education as farmers become more adaptive to new technologies and innovation, hence becoming more productive. It is also revealed that for every additional year in the age of the spouse, the income derived from land preparation decreases by seven (7) pesos, all else remain constant. This becomes the case especially if there are comorbidities associated with age. Hence, time supposedly spent for more farm activities such as land preparation is now crowded out, resulting to lower productivity. For every additional number of children in the elementary, the incomes derived from land preparation increases by 139 pesos, all else remain constant.

This implies that if an additional cost is imposed upon the household, the demand for income by the household increases.

Problems Encountered and Coping Mechanisms of the Respondents

The respondents were also asked to identify the problems they encountered and their coping mechanisms during the different phases of rice production. For seed selection, their problems include poor seed quality, birds and rodents eating the seed, there are seeds that do not germinate, and there is water shortage; hence weeds grow. Their coping mechanisms include the following: consult experts in seed selection, put scarecrow/poison them, report to the dealer the seeds that don germinate, and make sure water is sufficient to prevent weeds from growing.

For land prep, the problems they encounter include hardened soil being difficult to plow/, water being scarce; hence harrowing is difficult, dikes being destroyed due to mechanized harvesting, loose dike soil, and machinery failure. Their coping mechanism includes irrigating the field early to loosen the soil, fixing dikes while the soil is loose, putting the soil in a sack to prevent the dike from eroding, and for mechanical failures, they call for a mechanic to repair it.

They also encounter problems during crop establishment. These include the the presence of leeches, water being itchy, difficulty in uprooting seedlings, the hot temperature during summer, cropping, the cold temperature during the rainy season, the seedling being difficult to bundle, Golden snail (Kuhol) shells that can injure, insufficient seedlings, insufficient labor to plant, and lack of funds to pay for additional planters. Their coping mechanisms include using rubber boots, applying fertilizer to loosen the soil, using of an umbrella, using of raincoat so as not to soak in the rain, using a straw instead of bamboo ties, wearing socks, ask from fellow farmers who have extra unplanted seedlings, and owners continue planting for several days.

The respondents also encountered problems with nutrient management. These include fertilizer being itchy, the smell of fertilizer causing nausea, fertilizer being heavy, fertilizer being expensive, water shortage, and other farmers also cutting the water supply. Their coping mechanisms include using ajacket/long-sleeve shirt, using of mask, carrying a small amount of fertilizer only, loan money to maintain the healthy plant, and constant monitoring /watching.

Crop health management also poses problems to the respondents. These include insecticides, and pesticides that cause nausea, and the weight of the sprayer is heavy. Chemicals can cause itchiness, weeding is difficult and can injure fingers, and there are leeches and difficulty removing golden snails (kuhol).

The coping mechanisms include using a mask to avoid ingestion of chemicals, using long-sleeve shirt/wash after spraying, using gloves, using rubber boots, and resorting to indigenous remedies like papaya stalks.

Harvesting also poses problems to the respondents. These include scarce manual harvesting due to the emergence of mechanized harvesting, palay leaves are itchy, muddy soil, and when it is raining, the seeds are soaked; hence it is difficult to sell. Their coping mechanisms include to other places that patronize manual harvesting, looking for other sources of income, wearing jackets and pants and rubber boots and do not harvesting when the weather is not good.

Some of the problems they encounter for post harvesting include drying pavements that are far from residence, the dust of the palay causes itchiness, harvests that are too heavy for a woman to carry, and the weather is predictable. Some of their practical solutions include wearing a long-sleeved shirt and pants and a mask, using a trolley/carry in smaller quantities, monitoring weather conditions, and selling palay even wet/undried.

Discussion

Given that they provide at least half of all labor inputs used in the production of rice in Asia and sub-Saharan Africa, women play a crucial role in agriculture.

Men also work in rice farming, postharvesting, and processing. However, despite the fact that women run and manage farms and provide the majority of the money, their economic contributions are sometimes overlooked in agricultural statistics. Thus, the study was conducted to determine the primary role played by women in the activities related to rice production and to determine the variables affecting women's involvement in rice farming in Gonzaga, Cagayan. It examined women's wellbeing from the standpoint of labor market involvement.

The survey found that there are jobs carried out by women farmers that are typically done by men. These decisions involve picking the right seeds, plows, and fertilizer applications. The need of education is also highlighted since it affects how productive women farmers are. These are important results given the growing contribution of women to agricultural output. It is crucial for women, who make up a disproportionate amount of Asia's impoverished. Sixty percent of women work in agriculture, which accounts for the largest job sector in Oceania and Southern Asia (Huyer, 2016). Although markets are fast evolving in ways that present chances for more involvement (particularly in relation to profitable cash crops), poor and small farmers, particularly women, are frequently left out of these endeavors (World Bank, FAO, & IFAD 2009). Women usually limit their output to subsistence food crops due to their restricted access to resources (Alex 2013; World Bank, FAO, & IFAD 2009).

Despite the fact that gender equality is a fundamental human right with intrinsic worth (UN 2019; UNHROHC 2019), gender inequalities have a significant impact on resource allocation and lead to inequities in development outcomes (World Bank, FAO, & IFAD 2009). As previously said, a lot of women labor in agriculture, although a lot of it is unpaid or informal (IFPRI, 2014). Due to a lack of money, knowledge, and education, women running small farms are frequently unable to compete with bigger producers when globalization creates new prospects for high-value agricultural output (World Bank, FAO, & IFAD 2009). Even if they are occasionally accurate, persistent gender stereotypes that women are resourceful despite having little access to them harm women in agriculture by preventing them from having the access and resources they require for gender-equitable farming (Doss 2018).

Working for gender parity is a wise economic decision since it fosters growth and development for everyone, not just women (ADB, 2013). Development's progress and sustainability are hindered by restrictions on women's access to and control over resources (World Bank, FAO & IFAD 2009). Therefore, attaining gender equality in the adoption of technology is essential from an economic and efficiency perspective.

Conclusions

This paper attempted to explore the extent of participation of women in rice production in the municipality of Gonzaga, Cagayan province. This is done by analyzing all activities associated with each of the different stages of rice production. The stages include seed selection, land preparation, crop establishment, nutrient management, crop health management, harvesting, and post-harvest. The study revealed that there are tasks performed by the women-farmers, which are expected to be performed by men. These include the decision on seed selection, plowing, and fertilizer application. The role of schooling is also emphasized as it influences the productivity of the women farmers. These are significant findings within the context of the increasing role of women in agricultural productivity. The respondents also encountered problems during the different stages of rice production. While there are problems that can be addressed by simple and practical solutions, there are also problems that need long-term solutions. These include innovations in the weight of sprayers adaptable to the strength of women and investments in the establishment of solar dryers and mechanical dryers.

One of the prevailing problems of farmers nowadays is the poor quality of seeds in the market. The government, through the Department of Agriculture, should encourage farmer associations to venture into

seed production. In this case, the better seed quality will be produced and disbursed among farmers in the locality. Training and capacity building among women should also be conducted on the identification of quality seeds. Women should also be trained in troubleshooting farm machinery in order for them to be able to repair simple troubles of their machines. Moreover, the effect of chemicals and harmful insects causes illnesses and diseases among farmers. Overall, suits should not only be designed for men's size but also for women so that they will be protected from contact with these harmful chemicals. It also recommended that a handy and lighter weeder/grass cutter should be designed to suit women's strength. In addition, mechanical dryers/ multi-purpose pavements should be established, especially on rural farms, to provide access to better drying. While it is costly, it will address problems of drying among women farmers. More importantly, the role of education in agricultural productivity should always be emphasized such that while women may not have time to go back to formal schooling, capacity-building programs could be designed with an emphasis on the different stages of rice production.

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