Nonfarm Employment towards Poverty Alleviation and Agricultural Productivity: the case of Canaman, Camarines Sur

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Abstract— The Community-Based Monitoring System of Canaman for the year 2019 reveals a 22.44% urban-rural poverty gap, and a 64.35% poverty rate in the agricultural sector. Among the rural poor, 58.23% rely mainly on agriculture. With this information, alleviating poverty among rural farm households may lead to significant decreases in the poverty rate, as well as an improvement in the productivity of agriculture in the municipality. The study identified the determinants of sector-specific employment, and then investigated the role of rural nonfarm employment in improving productivity in the agricultural sector and reducing poverty in the municipality. Using a Probit model, it was identified that educational attainment was a significant factor in determining the sector an individual was employed in. Having a junior high school education increased the chance for nonfarm wage employment and self-employment. Having a college education increases the chance of being employed in the nonfarm sector which usually has the best occupations in terms of monetary compensation. Having a primary education increases the chance that an individual is engaged in own-farming while reducing the chance of employment in the nonfarm sector. Using a Tobit regression, it was found that nonfarm wage decreases investment in agricultural equipment such as fertilizer/pesticide sprayers and hand tractors, while nonfarm self-employment improved investment into such equipment. Wage earned as an agricultural wage laborer led to investments into sprayers but not into hand tractors. This reveals that providing nonfarm self-employment capacitation for rural farm households is a potential pathway to improving productivity. In terms of poverty reduction, all forms of employment reduced the probability of being poor except for being a wage worker in the agricultural sector. This tells us that the income from agricultural wage labor falls short of providing local farmers with enough income to meet their basic needs. It is revealed that providing opportunities for nonfarm self-employment can lead to improvements in productivity as well as a reduction in the poverty rate. Providing opportunities for nonfarm employment through higher education may also reduce poverty but would compete with promoting agricultural productivity due to the greater opportunity cost of high wage earners and competing interests.

Keywords— Agricultural Productivity, CBMS, Nonfarm Employment, Poverty.

1. INTRODUCTION

The municipality of Canaman, Camarines Sur is composed of 24 barangays, 15 of which are rural. The other 9 of its barangays are located in close proximity to Naga City – Bicol region's center of commerce and industry. This pattern of development suggests that urbanization in Canaman is heavily influenced by a barangay's proximity to the city of Naga, an idea supported by the findings of Kasraian, Maat, & van Wee (2019). In the study, they found that urban proximity is the strongest driver of urbanization, followed by transport accessibility and spatial

policies. Patridge & Rickman (2008) found that poverty rates increased with greater distance from metropolitan areas due to labor migration to urban areas and a lack of options for commuting to rural areas. These findings suggest that rural barangays in Canaman may lag in the development process relative to the barangays closer to Naga City. A snapshot of Canaman's poverty status confirms this. Using the municipality's Community-Based Monitoring System (CBMS) database for 2019, it is revealed that the poverty rate for its rural and urban areas is 61.90% and 39.46%, respectively. This urban-rural poverty gap raises concern for identifying development pathways for Canaman's rural communities. Looking more closely at the data, agricultural workers are among the most vulnerable to poverty. In the same year, 64.35% of those employed in the agricultural sector earned less than the provincial poverty threshold of ₱10,168 (Philippine Statistics Authority, 2020), while those employed in other sectors collectively registered a 36.98% poverty incidence. Given that 58.23% of the poor in rural areas rely mainly on agricultural income, targeting rural farm households for poverty alleviation programs may be a potential pathway to rural development in Canaman.

Rural nonfarm employment (RNFE) and the income derived from such activities (RNFI) have been shown to alleviate poverty by increasing household income, improving rural farm productivity, and improving food security (Davis et al., 2009; Reardon et al., 2001). RNFE is defined as rural household employment outside of agriculture (which includes own-farming and wage employment in agriculture), hence employment in the manufacturing and service sectors. RNFE is further decomposed into nonfarm wage employment and self-employment. The agricultural sector is characterized by high investment risk due to vulnerability to extreme weather conditions and pest infestation. RNFE can provide safeguards against this risk by offering opportunities to diversify income (Davis et al., 2009) often resulting in long-term consumption smoothing (Oseni & Winters, 2009). RNFE also provides employment to the landless, common in a growing rural population (Mech et al., 2017). In the face of credit market failures, RNFI can provide much-needed liquidity to rural farm households (Hertz, 2009). More importantly, employment in the nonfarm sector has been shown to produce improvements in the agricultural sector by providing means for reinvestment (De Janvry et al., 2005; Savadogo et al., 1998). This shows that promoting RNFE in Canaman may be a way to reduce poverty in its rural areas while not neglecting the importance of the agricultural sector in the municipality's urbanization.

With the foregoing, this study aims to assess the importance of self-employment and nonfarm wage employment on the welfare of rural farm households. Specifically, it aims to (a) identify the determinants of participation in nonfarm activities (c) determine the effect of nonfarm income on the use of productivity-enhancing inputs, and (c) identify the effect of nonfarm income on the poverty status of rural farm households in Canaman.

2. LITERATURE REVIEW

2.1 Determinants of participation in Nonfarm Employment

Numerous studies have been conducted on the determinants of RNFE using country-level data. The characteristics which influence participation in RNFE can be generally classified into three categories: individual, household, and regional characteristics. There has been a consensus that better-educated individuals are more likely to be employed in well-paying jobs in the nonfarm sector (Asfaw et al., 2017; Dary & Kuunibe, 2012; Davis et al., 2009;

Kumar et al., 2011; Micevska & Rahut, 2008; Reardon et al., 2001) because of high skill requirement in the nonfarm sector. With better qualifications, educated individuals can explore a wider range of employment options outside of the agricultural sector (Kumar et al., 2011). Dary and Kuunibe (2012) found that individuals with vocational training are able to enter the services sector in tailoring, carpentry, repair works, and masonry. These findings indicate that individuals act on the incentive of better returns to labor in the nonfarm sector, and that entry into this sector requires investment in human development through training and education.

Other individual characteristics that determine participation in RNFE are age, gender, and social network. Most of the literature agrees that younger individuals of working age are more likely to acquire nonfarm employment (Asfaw et al., 2017; Dary & Kuunibe, 2012; Kumar et al., 2011; Mech et al., 2017). This may be due to older individuals' unwillingness to transition from their traditional work in agriculture (Kumar et al., 2011) and that younger individuals have better adaptability enabling them to learn new skills required in nonfarm employment (Das, 2017). The effect of gender on RNFE participation is ambiguous. Berdegué et al. (2001), Dary and Kuunibe (2012), Kumar et al. (2011), and Vasco and Tamayo (2017) found that females are more likely to participate in RNFE while Corral and Reardon (2001), Das (2017), and Elbers and Lanjouw (2001) found that males are more inclined to participate in nonfarm activities. In a study conducted in Ghana and Uganda, Newman and Canagarajah (2000) state that nonfarm activity ends at the beginning of the farming season for men while women continued to work in the nonfarm sector. Additionally, Griffith et al. (1999) state that the poor in sub-Saharan Africa are mostly women. Belonging in the lower-income class pushes women in the study site to be more aggressive in pursuing nonfarm employment. On the other hand, Binswanger-Mkhize (2013) states that the women of India may be facing discrimination, thereby limiting access to nonfarm employment. Gordon and Craig (2001) state that the activities that women are allowed to participate in have long been constrained by tradition, religion, or other social mores. Dary and Kuunibe (2012), Gordon and Craig (2001), and Zhang and Li (2003) found that belonging to a social group greatly increases participation in RNFE. Gordon and Craig (2001) state that one of the advantages of belonging to a social group is better accessibility to micro-lending schemes. Zhang and Li (2003) noted that members of social groups have access to information on potential employment opportunities that are rare in the study area.

Common household characteristics influencing participation in RNFE are household size, land ownership, and per capita income. The literature agrees that larger household sizes lead to more participation in RNFE (Kumar et al., 2011; Mech et al., 2017; Micevska & Rahut, 2008; Ruben & others, 2001). Kumar et al. (2011) state that more members of the household mean more labor can be allotted to nonfarm employment without compromising the farm productivity of rural agricultural households. Landownership has been shown to negatively impact the probability of RNFE participation (Micevska & Rahut, 2008; Ruben & others, 2001; Vasco & Tamayo, 2017). Micevska and Rahut (2008) found that having fewer land forces household members to seek employment in the nonfarm sector. In terms of household income, it has been proven several times that greater per capita income leads to better access to nonfarm employment (Asfaw et al., 2017; Davis et al., 2009; Kumar et al., 2011). Income, in this context, serves as a barrier to entry.

Regional characteristics have also been shown to influence participation in RNFE through conditioning proximity to infrastructure, and transaction costs (Abdulai & Delgado, 1999; Dary & Kuunibe, 2012; Davis et al., 2009; Vasco & Tamayo, 2017). Elbers and Lanjouw (2001), and Lanjouw (1999) found that access to infrastructures such as electricity and telephone lines has a positive effect on RNFE participation. The quality of infrastructure such as roads also matters for better accessibility to RNFE (Do et al., 2019). Proximity to the nearest market has also been found to positively influence RNFE participation (Jonasson & Helfand, 2010) by lowering transportation costs.

2.2 Increased use of Inputs and Higher Farm Productivity

Several studies attest to the investment-attenuating effect of RNFI on agricultural inputs, thereby increasing productivity. Oseni and Winters (2009) found that participation in nonfarm activities among Nigerian farmers increased expenditure on fertilizers and hired labor. Stampini and Davis (2009) found that Vietnamese households engaged in RNFE spend significantly more on hired labor, seeds, livestock inputs, and services. Hertz (2009) found that Bulgarian households with positive expenditure on farm inputs have a 0.14 farm input elasticity with respect to nonfarm income. It was also found that the elasticity of the number of households engaged in livestock with respect to nonfarm income is 0.35. Savadogo, Reardon, and Pietola (1998) found that nonfarm incomes have a role to play in supporting commercial farms in Burkina Faso. Nonfarm incomes enabled the farmers in the study to improve capital and variable inputs such as animal traction, fertilizer, and additional labor towards intensifying the production of maize and cotton. It should be noted that the results were obtained under favorable agro-climatic zones in Burkina Faso. De Janvry, Sadoulet, and Zhu (2005) found that participation in nonfarm activities of rural Chinese households creates spillover effects on farm incomes. It was found that rural farm households not engaged in nonfarm activities are losing out on around 52% more farm income. A common conclusion among the studies mentioned is that RNFI increases agricultural productivity by relaxing constraints imposed by credit and insurance market failures commonly found in transition economies (De Janvry et al., 2005; Hertz, 2009; Oseni & Winters, 2009; Stampini & Davis, 2009).

3. METHODOLOGY

The data to be utilized is the Community-Based Monitoring System (CBMS) data of Canaman, Camarines Sur for the year 2019. The dataset is a census containing individual- and household-level responses on variables pertaining to economic activity, education, health, security, and disaster preparedness. As of 2019, Canaman has 30,485 individuals living in 6,818 households.

Among these, only 4,189 are classified as rural farm households. In the subsequent analysis, the rural barangays are subdivided into West and Central Canaman. The barangays included in the West are those which are prone to flooding from the Bicol River and are distant from the adjacent economically prolific city of Naga. According to Karim (1996), vulnerability to natural calamities aggravates poverty, especially in rural areas. The assignment of the rural barangays into Central and West Canaman is detailed in Table 1.

Table 1. Region Assignment of Barangays in Canaman.

Region assignment	Barangays
Central (N=2,288)	Linaga, Poro, San Jose East, San Jose West, San Roque, Santa Teresita, Sua, Talidtid
West (N=1,919)	Fundado, Iquin, Mangayawan, Palo, San Francisco, San Juan, San Nicolas

To achieve the objectives of the study, several models would be constructed. First, a probit model would be constructed on the determinants of RNFE participation of rural farm households wherein the dependent variable would be a dummy assuming the value of 1 if a household member is employed in nonfarm wage employment. For comparison, a similar estimation will be done on other sources of income which are as follows: agricultural wage, self-employment, and own farming. The model would include explanatory variables pertaining to the region, agricultural resources, nonearned income, household composition, household head characteristics, and educational attainment.

Second, a Tobit regression would be estimated to determine the role of the different sources of income in the decision to invest in productivity-enhancing resources. Specifically, the decision to invest in fertilizer/pesticide sprayers and hand tractors would be investigated. These inputs are chosen to reflect the investment decisions of farm households simply because these are among the cheapest and most accessible inputs to small farmers. A Tobit model is used because a lot of rural farm households in the study site do not own any of the equipment. Specifically, 50.6% and 54.9% of the rural farm households do not own a fertilizer/pesticide sprayer and hand tractor, respectively. The dependent variable for this model is the number of farm equipment owned by the household. Control variables pertaining to the region, fixed production factors, and family composition are included in the model.

Table 2. Description and summary statistics of variables used.

Variable	Description	Mean	Min	Max.
NWage_dum	1=Household has at least 1 member engaged in formal wage employment; 0=otherwise	0.194	0	1
AWage_dum	1=Household has at least 1 member engaged in formal wage employment; 0=otherwise	0.081	0	1
Self-emp_dum	1=Household engages in self-employment; 0=otherwise	0.201	0	1
Ownfarm_dum	1=Household engages in own/family farming; 0=otherwise	0.908	0	1
Sprayer	Number of fertilizers/sprayers owned by the household	0.636	0	1
Hand Tractor	Number of hand tractors owned by the household	0.482	0	1
Poor	1=Household is classified as poor; 0=otherwise	0.524	0	1
West	1=Household lives in West Canaman; 0=Central	0.197	0	1
AgriArea	Agricultural area cultivated by household	8.729	0.0076	4000
AgriArea2	Squared agricultural area cultivated by household	19337.2	5.8E-05	1.6E+07

HogProd	Number of hogs produced by household	120.6	0	31000
ChickenProd	Number of chickens produced by household	1.392	0	50
Capital income	Interest gained from deposits, loans, and dividends	3177.5	0	210000
Domestic Supp	Income from government support, other household	2513.4	0	210000
Adults	Number of adults in the household	3.965	1	10
Women/adults	Women per adult ratio	0.821	0	4
Children/adults	Children per adult ratio	0.713	0	4
HHAge	Age of household head	49.763	0	92.337
HHAge2	Squared age of household head	2678.8	0	8526.07
HHGender	1=Household head is female; 0=otherwise	0.086	0	1
NoEduc	Number of household members who did not finish primary education	1.99	0	7
Primary	Number of household members who finished primary education	4.280	0	13
JHS	Number of household members who finished junior high school	2.345	0	11
SHS	Number of household members who finished senior high school	1.616	0	8
Tertiary	Number of household members who finished college	0.375	0	5
Title	1=cultivated land is owned and titled by household; 0=otherwise	0.190	0	1
Nonfarm wage	Wage earned in nonfarm employment	83896	-32000	1338696
Agri wage	Wage earned in agricultural employment	12896	0	387000
Self-emp	Income from self-employment	4909	0	194400
Own-farmin	Income from own/family farming	29556	0	848000
Unemp	1=Household is not engaged in any employment; 0=otherwise	0.054	0	1

Finally, a probit model will be estimated to identify the poverty alleviation effects of the different sources of income. The dependent variable would be a dummy variable assuming the value of 1 if monthly household income per adult equivalent falls below ₱10,168, and 0 otherwise. This is based on the poverty threshold set by the Philippine Statistics Authority for the province of Camarines Sur for the year 2018 (Philippine Statistics Authority, 2020). The adult equivalence scale used is based on Hagenaars et al. (1994). Following previous studies (Davis et al., 2009; Mech et al., 2017), control variables pertaining to the region, household composition, household head characteristics, and educational attainment will be used. Definitions and summary statistics of variables used in the models are shown in Table 2.

4. RESULTS AND DISCUSSION

4.1 Participation in Nonfarm Employment

Table 3 presents the determinants of participation in nonfarm employment, with comparisons of the determinant of other sources of income. It can be seen immediately that supplementary sources of income such as interest gained from bank deposits, lent money, and dividends do not factor much into motivating participation in any sector. The same can be said for government support and support from other households. Western barangays are more inclined to engage in nonfarm wage employment while barangays in Central Canaman are more inclined to engage in self-employment. Farm households that raise chicken are more inclined to agricultural wage labor. Greater land ownership makes it easier for households to engage in own-account farming. Hog raising appears to be a common undertaking of households engaged in their own farming.

The results regarding the women/adult ratio indicate that it is mostly men who are employed in agricultural wage employment and own farming. Similarly, female-headed households are less inclined to engage in the agricultural sector. Meanwhile, female-headed households are more inclined to engage in self-employment than male-headed households. On the child/adult ratio, a significant positive coefficient in the estimation for family-operated farming participation may indicate that households are involving their children (members aged 15 years old and younger) in agricultural activities. More adults in a household increase the probability of participating in formal wage employment while discouraging participation in self-employment. Households with older household heads are less likely to be engaged in own-farming activities than households with younger heads.

Table 3. Probit Estimation for Farm Household Labor Participation (N=4,189)

	Nonfarm wage	Agricultural wage	Self-employment	Own farming
Region (Central omitted)				
West	0.027*	0.008	-0.029*	0.000
Agricultural resources				
AgriArea	-0.001	0.000	0.000*	0.002*
HogProd	0.000	0.000	0.000	0.008***
ChickenProd	-0.002	0.002**	0.001	0.000
Nonearned income				
Capital income	0.000*	0.000	0.000	0.000
Domestic Supp	0.000	0.000	0.000	0.000*
Household composition				
Adults	0.028**	0.004	-0.027**	0.007
Women/adults	0.007	-0.031**	-0.029	-0.031**
Children/adults	-0.031	0.000	-0.030	0.034
Household head characteristics				
HHAge	-0.003	-0.001	0.004	-0.005**

HHAgeSQ	0.000*	0.000	0.000*	0.000**
HHGender	0.001	-0.041**	0.058***	-0.038**
Educational attainment				
NoEduc	-0.015**	-0.005	0.019**	-0.022***
Primary	-0.020**	-0.011*	0.007	0.026***
JHS	0.032***	0.004	0.016***	-0.009*
SHS	-0.021***	-0.005	0.006	-0.022***
Tertiary	0.030***	-0.006	-0.025***	-0.003
Constant	-0.809***	-0.683	-0.954	1.838***
Pseudo R2	0.046	0.0293	0.0162	0.0875
Chi2 statistic	189.67***	68.95**	68***	226.31***
*** $p < 0.01$; ** $p < 0.05$; * $p < 0.1$				

In terms of education, more members of the household who have finished junior high school and college lead to better chances of being employed in the nonfarm sector. This supports previous findings that high-yield nonfarm employment requires some investment in human capital development. Meanwhile, finishing junior high school and having no primary education increases the chances of engaging in self-employment. This shows that there are self-employment opportunities that are accessible (e.g. owning a sari-sari store) for rural farm households with little to no investment in human capital. For the agricultural sector, finishing one's elementary education decreases the chance of being employed in agricultural wage labor. On the other hand, the same qualification increases the chances of being employed in family-operated farming. More members who finished senior high school or did not finish primary schooling decrease the probability of being employed in own-account farming.

4.2 Potential for Agricultural Productivity Enhancement

In this section, we explore the effect of having different sources of income on the decision to invest in agricultural productivity-enhancing input. The results show that western and central barangays are equally likely to own a fertilizer/pesticide sprayer, while western barangays own significantly more hand tractors. As farm households cultivate larger agricultural land, the number of hand tractors owned increases at a decreasing rate. More adults lead to less ownership of hand tractors, potentially because of greater labor input from more adults in a household. The same relationship is seen between the number of hand tractors and the ratio of children to adults in a household. This may signal less investment capacity for these households due to more costs associated with child-rearing. On the other hand, this may reflect an intensive use of child labor to substitute for the use of productivity-enhancing inputs. More women in the household lead to greater ownership of both sprayers and hand tractors. A positive relationship is also observed between female-headed households and the ownership of sprayers. This may indicate that labor from women does not substitute for the productivity of farm equipment, necessitating the purchase of such equipment. This supports the results from Table 3 indicating less engagement in agricultural activities among households with greater female membership. Land-titling is not important in conditioning ownership of the farm equipment.

Table 4. Tobit Regression of the Use of External Inputs in Crop Production (N=135)

	Fertilizer/Sprayer		Hand Tractor	
	Nonfarm wage	Agricultural wage	Self-employment	Own farming
Region (Central omitted)				
West	0.050	0.354	0.415**	0.201
Fixed production factors				
AgriArea	0.101	0.107	0.118**	0.058
AgriAreaSQ	-0.007*	0.004	-0.005**	0.002
Family composition				
Adults	0.027	0.119	-0.132**	0.067
Children/adults	-0.807*	0.432	-0.636***	0.247
Women/adults	1.869***	0.678	1.144***	0.368
HHGender	1.195***	0.427	0.285	0.210
Liquidity				
Land title	0.197	0.282	0.169	0.160
ln(Nonfarm wage)	-0.242*	0.124	-0.193***	0.070
ln(Agri wage)	0.646***	0.168	0.027	0.078
ln(Self-emp)	0.376*	0.215	0.261***	0.116
ln(Own farming)	-0.376	0.194	-0.183	0.104
Constant	-10.765***	3.107***	1.918***	1.242***
Pseudo R2	0.0825		0.1645	
Chi2 statistic	31.65***		49.18***	
*** $p < 0.01$; ** $p < 0.05$; * $p < 0.1$				

For the effect of different sources of income on farm equipment investment, income from self-employment is beneficial in the purchase of at least one fertilizer/pesticide sprayer and hand tractor. Agricultural wage is reinvested into the purchase of sprayers, but not into the purchase of hand tractors. Those engaged in agricultural wage labor do not reinvest in expensive inputs such as hand tractors since they cultivate someone else's land and would not derive greater wages from such an investment. Surprisingly, greater income from own-account farming does not lead to reinvestment into productivity-enhancing equipment. Finally, income from formal wage employment leads to lower investment in both sprayers and hand tractors. This is because individuals engaged in this sector have little interest in farming.

4.3 Poverty Alleviating Effect of Nonfarm Income

In this section, the effect of nonfarm income and agricultural income will be investigated and compared with each other. The risk of falling into poverty is the same between the western and central regions of Canaman. More adults in a household lead to less poverty incidence due to greater labor input. Specifically, an additional adult in the household leads to a 9.3% decrease in the household falling into poverty.

Table 5. Probit estimation for the determinants of being poor (N=4,189)

	Marginal effect	Standard error
Region (Central omitted)		
West	0.000	0.017
Household composition		
Adults	-0.093***	0.004
Women/adults	0.003	0.023
Children/adults	-0.021	0.019
Household head characteristics		
HHAge	0.000	0.003
HHAge2	0.000	0.000
HHGender	-0.024	0.025
Educational attainment		
NoEduc	0.028***	0.006
Primary	0.082***	0.019
JHS	-0.066***	0.020
SHS	-0.052**	0.021
Tertiary	-0.066**	0.034
Employment sector (Unemp omitted)		
NWage_dum	-0.202***	0.019
AWage_dum	-0.124	0.026
Self-emp_dum	-0.081***	0.017
Ownfarm_dum	-0.129***	0.025
Constant	1.618***	
Pseudo R2	0.1583	
Chi2 statistic	918.02***	
$***p < 0.01; **p < 0.05; *p < 0.1$		

In terms of educational attainment, a greater number of individuals who finished junior high school, senior high school, and college decrease the probability of the household being classified as poor. Specifically, an additional member of the household who finished junior high school, senior high school, and college decreases the probability of being poor by 6.6%, 5.2%, and 6.6%, respectively. On the other hand, more members of the household with only a primary education lead to higher chances of falling into poverty. In particular, an additional household member who achieved primary education only has an 8.2% greater chance of falling into poverty. Similarly, an additional member of the household who did not finish at least primary education increases the probability of the household being poor by 2.8%. It is interesting to note that an additional member having only primary education contributes a 5.4% higher chance of being poor than an additional member who did not finish primary education.

In terms of sources of income, households engaged in formal wage employment, self-employment, and family-operated farming experience a lower chance of being poor compared to households without any employment at all. In particular, engagement in the mentioned sectors contributes to a 20.2%, 8.1%, and 12.9% lower probability of being poor respectively, compared to a household without any employment. On the other hand, the effect of engagement in agricultural wage employment on poverty reduction does not differ significantly from households not participating in any form of employment. This implies that the income derived from agricultural wage employment is not enough to differentiate their poverty status from households without any employment.

5. CONCLUSION AND RECOMMENDATIONS

This study aimed to identify the determinants of nonfarm income and establish its importance in enhancing the productivity of farm households in Canaman. It also investigated the role of different sources of income in alleviating poverty. It found that western barangays in Canaman are more likely to engage in formal wage employment in the manufacturing and services sector, while self-employment is more common in central barangays. Households engaged in agricultural wage employment supplement their income by raising chickens while those engaged in own-account farming raise significantly more hogs.

The household head being female and a greater number of females in the household lead to less engagement in the agricultural sector. This implies that the agricultural sector is dominated by men. The results support previous findings that female-headed households are more inclined to nonfarm employment in the form of self-employment. More adults in a household lead to a greater likelihood of participation in formal wage employment while having the opposite impact on the likelihood of the household being involved in self-employment. In terms of human capital requirement, participation in formal wage employment requires at least a junior high school education and as much as a college education. Self-employment on the other hand can accommodate individuals with no primary education and those who have finished junior high school. This confirms previous findings that employment in high-yield nonfarm employment requires great human capital investment. It also reveals that some employment opportunities in this sector are available for those who are less equipped. Participation in nonfarm wage employment and self-employment have been found to significantly reduce the probability of a household falling into poverty by 20.2% and 8.1% respectively. Therefore, it is ideal for the LGU of Canaman to promote employment in these sectors. To pursue this, it is advisable for the LGU to pursue policies that promote the continuous development of human capital through formal education up to tertiary education. Since self-employment is accessible to those with less formal education, training or cash assistance may be offered to enable households to start their own business in the nonfarm sector.

Being engaged in family-operated agricultural activities decrease the probability of the household being poo by 12.9% compared to households not participating in any employment. The same cannot be said for those engaged in agricultural wage employment. It is quite concerning to find that engaging in agricultural wage labor does not increase a household's income enough to differentiate its poverty status from households without any employment. For households solely engaged in agricultural wage employment, it is advisable to diversify their source of income into the other employment sectors. To achieve this, training for self-employment may be the

most feasible line of action. If possible, land reform programs may be initiated to allow these households to engage in family-operated farming.

In terms of farm productivity, the results suggest that households engaged in their own farming activities take advantage of child labor to increase farm productivity. Having more women in the household and having a female household head leads to more utilization of farm equipment. This suggests that farm equipment such as fertilizer/pesticide sprayers and hand tractors are used to substitute for the lack of labor productivity from women in the agricultural sector. In terms of reinvestment, income from self-employment is reinvested into the purchase of sprayers and hand tractors. Income from agricultural wage is also reinvested in the purchase of sprayers but not for hand tractors. Income from nonfarm employment discourages reinvestment in either equipment because the nature of occupations in this sector is far removed from the agricultural sector. If agricultural modernization is the goal, promoting self-employment presents great potential due to positive reinvestment into productive agricultural inputs. This may suggest that engaging in self-employment relaxes credit constraints faced by farm households in rural Canaman. Overall, income diversification is advisable for rural farm households in Canaman to reduce poverty and decrease income risk, especially for those exclusively engaged in agricultural wage labor.

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