The Role of Gender in Agricultural Productivity in the Philippines: The Average Treatment Effect*

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Abstract

Using average treatment effect and data from 2012 the Central Luzon Loop Survey, this study investigates the role of gender in rice production. Results indicate that female-headed farm households, despite having limited access to land, have a higher value of rice production than their male counterparts. However, there is no significant difference between net farm incomes earned by male- and female-headed farm households. Female-headed households have higher fixed costs, consequently earning less total household income. Findings from this study indicate that women are less efficient in farming, but are more likely to adopt improved seed varieties. In addition, female-headed farm households are better at controlling farming costs.

Keywords: Gender, average treatment effect, rice, women, farm households, agricultural productivity

1. Introduction

Agriculture plays a significant role in the Philippine economy, contributing 20 percent to the Gross Domestic Product (GDP). Rural women involved in variety of production and caring farm activities. Women in Philippines are active economic actors and mostly engaged in micro-manufacturing enterprises and trade of agricultural and fishery products. In most of the developing countries women's actual contribution to food production and rural economy remains undervalued due to which women have less access to productive resources. Quisumbing et al., (2014) stated that agriculture is underperforming because half of its farmers–women–do not has equal access to the resources and opportunities. An empowered woman to make decision about planting materials and inputs are more productive in agriculture. Swaminathan et al., (2012) identified that inter and intra-household differences are key drivers of the dynamics of how female-headed households are often poorer and more disadvantaged. Agriculture is one of the largest sectors of women's employment in the Philippines. Rural women are engaged in variety of production and caring farm activities.

Pandey et al., (2010) studied the gender role in rice farming in the Philippines and stated that gender roles and gender relations within households are strongly influenced by social, cultural, economic circumstances, family structure, and the degree of labor participation in the marketplace. They further stated that there is a high incidence of migration of women from rural to urban areas and overseas in the Philippines. The International Rice Research Institute (IRRI) acknowledges role of women in the global rice sector as both paid and unpaid family labor. A woman contributes at least half of total labor input in rice production in Asia and sub-Saharan Africa. About 39% to 49% of the farming households hired women workers in pulling and bundling of seedlings, and in planting and harvesting activities in Philippines. Women's participation is also significant in planting/transplanting, manual weeding, care of crops and harvesting in rice sector. Male workers are generally engaged in land preparation, seedbed preparation, leveling, and care of irrigation canals.

According to Quisumbing et al., (2014), women comprise about 43% of the agricultural labor force in developing countries, ranging from 20% in Latin America to 50% in sub-Saharan Africa and East Asia. Pandey et al., (2010) estimated 32% female: male ratio in agricultural labor force in Philippines.

Rural women are mostly responsible for accessing capital needed for farm production, because they are mainly engaged in off-farm activities—augmenting household income. Women labor force participation rate is 50 percent in the Philippines whereas male participation rate is 80 percent. More recently, an Asian Development Bank (ADB) projects, in Philippines, an increase in women's influence in farm decision making process. There is increasing trend of female-headed farm households in the developing counties. Likewise, in the Philippines, female-headed farm households have been increasing not only as a result of widowhood but also of social changes such as the migration of males, awareness of gender equity in society, and the rise in female labor force participation rates (Miralao, 1992).

In spite of increase in number of female-headed farm households in the Philippines, they are facing constraints that affect rural women's ability to improve yield, profit ,and efficiency in agriculture which are mainly; (1) women's legal and cultural status, such as degree of control on productive resources and inputs; (2) property rights and inheritance laws, such as access to land and other natural resources; (3) relationship among economic and ecological factors which includes product market failures, marketing channel, seasonality of rainfall, availability of fuel-wood; (4) the way that agricultural services are staffed, managed, and designed which are skewed towards male farmers. Therefore, the objective of this study is to assess the impact of gender in rice farming in the Philippines. Specifically, we investigate how gender affects net farm income, total farm output, farming efficiency, production costs, and total household income.

2. Literature Review

Women usually spend more hours in farms than men in agricultural activities. Women make essential contribution not only to the agriculture but also to household expenditure and protection of children's welfare. Handa (1996) studied expenditure behavior and children's welfare in female headed households in Jamaica and concluded that children from female headed households do not necessarily suffer from lower health and educational outcomes compared to male headed households. This is mainly due to that female are more efficient on use of inputs into the household production function.

Udry et al., (1995) studied gender differentials in farm productivity in African households and found that plots controlled by women for all crops have significantly lower yields in comparison with men controlled plots within a same year and same cropping patterns. This is due to women have less access than men to productive resources and opportunities. Quisumbing et al., (2014) stated that if women had the same access to productive resources as mean, they could increase farm yields by 20-30%. Hwang et al., (2011) studied women's role in intrahousehold decision-making in Korea and the Philippine rice farming households. According to them, in spite of having major role of women in agricultural households, they got less power in the decision-making process. In Philippines, although women actively involved in majority of work in agriculture, elder men still own the land, control women's labor, and make agricultural decisions.

According to Layton & MacPhail (2013), a report published by Asian Development Bank in the Philippines, stated that women own less land in their name than men. Women are disadvantaged through inheritance laws and land titling systems and in their ability to purchase land. Women are responsible for subsistence crops and have less access to cash crops and the resulting income. They further mentioned that women receive less agriculture extension training and less credit in Philippines. A study by Fletschner (2008) in Paraguay stated that women headed households are unable to meet their needs for credit due to which they are not producing as much as they possibly could. Chant (1997) studied situation of women-headed households in Philippines, Mexico, and Costa Rica and concluded that female household headship may sometimes be a positive strategy for survival.

Women in the Philippines are traditionally in charge of budgeting. The cultural setting in the Philippines' household is that men are expected to turn their earning over to their wives for budgeting and allocation of resources; however, women complain that their husbands do not turn over all their income (Ashraf, 2009). In Philippines, women can own, inherit, acquire, and dispose of property in their own right but income from the wife's pre-marriage property is considered conjugal income whose use is subject to the husband's consent. In rice villages of Philippines, daughters typically receive less land and non-land assets than sons (Quisumbing, 1994a). Lu (2010) studied women in the Philippine agriculture and their occupational issues and stated that women's engagement in agricultural work is more intense than that of the male.

3. Econometric Model

Simple comparison or even regression-adjusted comparisons may provide misleading estimates of causal effects due to which treatment effect is becoming popular under such condition. Selection bias (omitted variable bias) is the most serious thread that arises in the estimation of treatment effects. Treatment effects are designed by matching individuals with the same covariates instead of through a linear model for the effect of covariates. We applied the ATT to analyze the impact of gender to income and rice production in the Philippines. ATT basically measures the difference in mean outcomes between units assigned to the treatment and units assigned to the control (Uematsu &Mishra, 2012).

We are interested in estimating the average effect of a binary treatment (gender) on the proxy of rice productivity status: cost of production, farming efficiency, net farm income, total household income, and value of rice produced. For individual i, i=1,….,N; let $\{Y_{i0}, Y_{i1}\}$ denote the two potential outcomes: Y_{i0} as the outcome when the household head is male and Y_{i1} as the outcome when the household head is female. In ATE, we have two values: Y_{i0} is the value of the outcome variable for untreated individual i and Y_{i1} is the value of the outcome for treated individual i—in our case, the treatment variable being the female-headed household. The treatment effect for an individual is expressed as ATE$=Y_{i1} - Y_{i0}$. The average treatment effect for the entire population, population average treatment effect, is given by E $[Y_{i1} - Y_{i0}]$. ATE for a sample is denoted as $\frac{1}{N}\sum_{i=1}^{N}(Y_{i1} - Y_{i0})$, where N is size of the sample. In this method, each farm is compared with a matching farm. A practical problem with a cross-sectional dataset is that these two groups are mutually exclusive, which means that we can observe either Y_{i1} or Y_{i0}. Average treatment for the treated (ATT) is represented as

$$ATT = E\ [Y_{i1} - Y_{i0} | T = 1] \qquad (1)$$

where T is a binary variable that represents the treatment status (T=1 indicates treatment, 0 otherwise).

There is always an overlap of the characteristics between treated and non-treated groups after sorting and that can control for any self-selection bias. ATE uses matching estimators to match observations from the two groups. Propensity score matching is one of the matching estimators used in ATE analysis. In propensity score matching, the predicted probability score of being in the treatment is estimated using either a logit or a probit model (Becker and Ichino, 2002). In propensity score matching, a female-headed household will be matched to a male-headed household with some similar characteristics, thereby ensuring that dissimilar households and outliers will have no/little influence on the treatment impact. The propensity score, defined by Rosenbaum and Rubin (1983), is expressed as

$$p(X) \equiv \Pr\{D = 1|X\} = E\{D|X\} \qquad (2)$$

where $D = \{0,1\}$ is the indicator of exposure to treatment and X is the multidimensional vector of pre-treatment characteristics.

In this study, we use the nearest neighbor-matching estimator following the paper by Abadie and Imbens (2011) using the "nnmatch" command in Stata. The nearest neighbor-matching estimator takes each treated unit and searches for the control unit with set of covariates. Each unit is used as a match more than once because matching is done with replacement. Matching with replacement reduces biases in our analysis. The nearest neighbor-matching estimator summarizes information from a multiple covariate into a single index using the vector norm $\|x\|v = (X'VX)^{1/2}$, where V is a positive definite matrix. The nearest neighbor-matching sets define the minimum distance between two observations and this is represented as $\|z - x\|v$, where z and x are the vectors of observable characteristics for two observations. The estimator for ATT is defined as

$$ATT = \frac{1}{N_1}\sum_{i:T_1=1}^{N_1}[Y_{i1} - \acute{Y}_{\iota 0}] \qquad (3)$$

where N_1 is the number of observations in the treatment and the subscript i represents individual observations, whereas Y_{i1} is the observed outcome and $\acute{Y}_{\iota 0}$ is an unobserved variable for the ιth individual. An unobserved variable is expressed as

$$\acute{Y}_{\iota 0} = \begin{cases} Y_i \; if \; T_i = 0 \\ \frac{1}{M}\sum_{m \in M_i} Y_m \; if \; T_i = 1 \end{cases} \qquad (4)$$

where M is the number of matched observations and M_i is the set of observations in the control group matched to the ith observation in the treatment. $\acute{Y}_{i0}$ if T_i=1 is simply a weighted average of the outcome variables for all matched observations in the control group. The nearest neighbor-matching estimator allows us to specify the number of matches, m for each treated observation. We need to be very careful in choosing the values of $m.$ When $m = 1$, each treated observation is matched with an observation in the control group with the closest distance. A large number of m can reduce the quality of the match because of the use of more observations in the matching process.

To consistently estimate the treatment effect of interest, we assume that assignment to a treatment is independent of the outcomes and the probability of assignment is bounded away from zero and one. Generally, more than one covariate is specified in ATT. When more than one covariate is used, the matching depends on the weighting matrix. The output of ATT reflects our choice of the inverse variance-weighting matrix (Abadie et al., 2004). Although the matching estimator attempts to eliminate selection bias, there is always an effect of unobservable factors explaining the treatment. Therefore, a matching estimator is used to reduce selection bias rather than to completely eliminate selection bias (Becker and Ichino, 2002; Sitienei et al., 2014).

4. Data

This study used farm-level cross-sectional data from the Central Luzon Loop Survey conducted by the Social Sciences Division of International Rice Research Institute (IRRI). It is the best available data set ever collected. The Central Luzon is the major rice producing area of the Philippines that's why it is called as ―"rice bowl of the Philippines". This survey contains detailed information on rice yields, prices, fertilizer, pesticide inputs, detailed labor use, and land tenure, mechanization, and cultural and labor practices that is related to rice production. The

Central Luzon Loop survey began in 1966, and is conducted about once every four years. The main objective of the Loop survey is to monitor the changes in rice farming in the Philippines. In this paper we use 2012 cross-sectional data. The Central Luzon Loop Survey collects data from rice farming household, along a loop of the main highway north of Metro Manila through the provinces of Bulacan, Nueva Ecija, Pampanga, Tarlac, Pangasinan, and La union.

Variables of interest include the costs of production (variable costs and fixed costs), the value of farm production, indicators of income, rice yield per hectare, and farming efficiency. Fixed costs include the cost of land rental and capital rental. Variable costs include the cost of seeds, fertilizer, fuel, irrigation, and labor. Total household income and net farm income indicate the performance of the farm. The farming efficiency variable is mostly related to managerial characteristics, and it is defined as the ratio of gross value of production to total variable costs. A number of exogenous variables, such as age, education, household size, marital status, and occupation, were used to match the farms.

Table 1 provides the definition and summary statistics of the variables used in our analysis for the entire sample, female-headed farm households and male-headed farm households. Of 76 household observations, only 18 (or 23.6% of the entire sample) were female-headed farm households. The last column of Table 1 shows *t-statistics* or *z-statistics*, which compare the means of the treated (female-headed farm households) and control (male-headed farm households) observations. These test statistics simply compare the means of each variable of interest without controlling for any underlying factors. Under such circumstances, a matching estimator would help to overcome this issue and estimate the effect of the treatment variable on the outcome variable (Uematsu and Mishra, 2012).

On average, female-headed farm households' total household income was PHP 26,272 while male-headed farm households earned PHP 34,127 per year. The average female-headed farm household annual net farm income was PHP 27,166, which was slightly below that of the average male-headed farm household (PHP 27,933). Similarly, the value of rice produced by female-headed farm households (PHP 117,453) was lower than that of male-headed farm households (PHP 119,188). Compared with male-headed households, female-headed households, on average, tended to have higher fixed costs, higher seed and fuel costs, and higher remittance. Interestingly, female-headed households had lower fertilizer and irrigation costs, lower household income, and lower net farm income. However, there was no statistically significant difference between the treated and control group in terms of age, education, fuel cost, remittance, and land preparation cost.

5. Results and Discussion

The average treatment effect was estimated using matching estimator m_i where i=1…5. Table 2 shows the result of ATT of gender role on cost of production, production values, income indicators, yield per hectares, and farm-efficiency. The choice of m does not influence statistical significance.

The result indicates that the ATT on the households' net income is negative for all $m = 1 \ldots 5$ and significant. This suggests that the average effect of having female-headed household is associated with a decrease in net income. The point estimates of ATT indicate that female-headed households on an average earned between ₱ 14,425.263 and ₱ 14,242.80 less on net income annually than male-headed households. Similarly, household income for $m_1, m_2,$ and m_3 of female-headed households is negative and significance. A female-headed household on an average earns ₱ 11,658 less household income than male-headed households. Interestingly, female-headed households earn more remittance as cash which is ₱ 11,472.73 higher than male-headed households, though this variable is insignificant for all m_i in ATT. Estudillo et al., (2001) highlighted that 60% of the females in the Central Luzon participate in non-farm employment, whereas only 42% of the males are participants. Generally, female participant earn more than the male participant from non-farm employment because female have 1.6 years of additional schooling. Therefore, household income and net income both are low for female-headed household compared to male-headed household. In addition to this, women's wages are 48 percent lower than men's in wet season of rice production in the Philippines (Quisumbing, 1994a).

The ATT estimates of fixed cost such as land rent and capital rent shows that female-headed household uses more fixed cost than male-headed households. The matching estimators m_1 and m_2 are significant for land rent at 10 percent level of significance. A female-headed household on an average pays ₱ 4,081.22 more on land rent than male-headed household. The entire matching estimators are positive and significant at 10 percent level of significance for capital rent. The ATT on capital rent ranged between ₱ 3,918 and ₱ 4,484. Due to legal, social, and institutional disparities between male and female, female-headed households usually have lower levels of physical and human capital compared to male-headed households (Quisumbing, 1994a).

We estimate ATT effect on variable cost which are seed cost, fertilizer cost, fuel cost, irrigation cost, permanent labor cost, and variable labor costs. Among them fertilizer cost and fuel cost are not significant. This implies that there is no significantly difference in fertilizer cost and fuel cost between female headed households and male headed households. Seed cost is positive and significant. A female-headed household spent more (on an average ₱ 1,553.5) on seed compared to male-headed households. This is due to female farmers are more likely to adopt improved seed and use agrochemicals (Quisumbing, 1994a). On the other hand female-headed households spent less (on an average ₱ 1,515.9) on irrigation cost compared to male-headed households. Total permanent labor cost is significant for $m_1, m_2,$ and m_3 and have positive value. Similarly, variable labor cost is significant for m_1 and have positive value. A female headed household pays ₱ 8,229.8 more on permanent labor cost than male-headed household. Similarly, a female-headed household pays more (on an average ₱10,699.1) on variable labor cost compared to male-headed household. In Philippines, women tend to have lower marginal products of labor due to cultural constraints from participating in farm work. Female-headed households have less access to land and own fewer tools, and less likely to adopt new technologies such as farm machinery and tractor. Therefore, female-headed households invest large amount of variable cost as labor costs compared to male-headed households (Quisumbing, 1994a).

The most important result obtained from ATT is that female-headed households have higher rice production value than male-headed households. In spite of having less area of production, investing high fixed costs and variable cost, they have higher output as well as higher production value than male-headed households. The production value is significant for m_1 and m_2 and have positive sign. A female-headed household earns ₱ 23,801.91 more on after sales of rice production than male-headed household. Since women are more likely to adopt improved seeds, they will get more pesos from the sales of rice.

The female-headed household has an average rice production of 7,390.17 kg while it is 8,167.67 kg for male-headed household. The ATT estimate on rice yield (kg) per hectare indicates that female-headed households has lower yield per hectare (range of 505 kg to 1320 kg) compared to male-headed households. Estudillo et al., (2001) and Quisumbing (1994) studied the gender differences in land inheritance and stated that sons receive 0.15 additional hectares of land compared to daughters in the Philippines. They further stated that daughters are treated more favorably in schooling investments, receiving 1.5 more years of schooling than sons. Due to which, daughters are more preferred to have off-farm activities. This is the one reason that indicates that female-headed households has less area of land and less total rice production compared to male-headed households. Moreover, female-headed household generally manage less quality plots compered to plots managed by male-headed households (Saito et al., 1994). Due to which, a female-headed household has lower yield per hectares than male-headed household.

We estimate farm efficiency for female-headed and male-headed households. Farm efficiency is a ratio term defied as total value of rice production with total variable cost involved in rice production. The ATT estimates on farm efficiency are negative and significant at 5 percent level of significance. A female-headed household is less farm efficient (range of 1.10 to 1.33) than male-headed household. In spite of having higher rice production value for female-headed households than male-headed households, they spent more money on variable cost compared to male-headed households, due to which farm efficiency is less for female-headed households. According to Fletschner (2008), credit constraints for women can cause an additional 11% drop in household efficiency in Paraguay. Female-farmers have less access to formal credit because they are less mobile than men and they lack adequate collateral, particularly land title. Additionally, Women have less access to extension and other services, due to which they are less efficient on the use of rice inputs (Saito et al., 1994).

6. Summary and Conclusions

The feminization of agriculture, women's participation in the agricultural labor force, is in increasing rate in Africa and Asia where almost half of the labor forces are women. In spite of having feminization of agriculture, women are still facing constraints on productive resources such as land, credit, and labor women. Additionally, women do not have the same access to agricultural services and resources (Lastarria-Cornhiel, 2008). An understanding of women's farming role and constraints is a prerequisite for any country to prepare gender policy in agriculture. Female-headed households are a growing phenomenon in Philippines. The role of women in agriculture needs to be recognized.

This study examined whether female-headed households were better off than male-headed households in terms of farm household income, net income, farm efficiency, and yield per hectares, fixed costs, and variable costs. In this paper, we used a non-parametric approach and used the nearest neighbor matching method to estimate the average treatment effect of having female-headed households on various components of production costs, farm efficiency, and income indicators. There is no statistically significant difference between female-headed and male-headed households in terms of age, education, fuel cost, fertilizer cost, remittance, and land preparation costs. The interesting finding of this study is that female-headed households have higher production value compared to male-headed households; however, female-headed households are less efficient (share of value of production to total variable costs) than male-headed households.

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Table 1 Variable definition and summary statistics

Variable	Mean			T/Z score
	Entire sample	Female HH	Male HH	
Age (in years)	60	60	60	-0.69
Education (in years)	8	9	8	1.23
Land area (hectares)	1.39	1.38	1.40	1.95*
Land preparation cost (PHP)	2,350	3,142	2,192	1.56
Post-harvest cost (PHP)	15,167	14,890	15,222	1.77*
Costs of production				
		Fixed costs (PHP)		
Land rent	4,374	6,738	3,900	-1.73*
Capital rent	7,157	10,444	6,499	-1.85*
		Variable costs (PHP)		
Seed cost	4,478	4,746	4,424	-2.01**
Fertilizer cost	12,174	11,968	12,215	-1.98**
Fuel cost	2,728	3,158	2,642	-1.46
Irrigation cost	1,663	1,176	1,760	1.68*
Variable labor cost	31,518	33,400	31,225	1.83*
Permanent labor cost	8,929	9,949	8,726	-2.03**
Value of rice produced	1,18,899	1,17,453	1,19,188	2.07**
Income indicators				
Household income (*PHP*)	32,818	26,273	34,127	1.98**
Net farm income (*PHP*)	27,805	27,166	27,933	2.54**
Remittance (PHP)	19,212	19,291	19,196	-1.45
Production				
Yield per hectare (*kg*)	5762.49	5362.97	5842.40	3.08**
Efficiency	(*Gross value of production/total variable costs*)			
Farming efficiency	5.66	4.76	5.84	1.72*

** and * indicate statistical significance at 5% and 10%, respectively.

Table 2 Estimates of the average treatment effect (ATE) for the treated (ATT)

Variable	Number of matches (*m*)	ATT	S.E.	p-values
Net farm income (*PHP/year*)	1	-14,425.26	6,750.19	0.033**
	2	-11,862.00	6,771.342	0.047**
	3	-14,040.11	6,580.052	0.026**
	4	-11,574.82	5,633.507	0.031**
	5	-14,242.80	6,120.775	0.022**
Total household income[1] (*PHP/year*)	1	-11,6518.2	61,114.86	0.050**
	2	-62,113.64	29,287.22	0.034**
	3	-42,893.94	24,888.90	0.031**
	4	-29,093.18	21,478.19	0.176
	5	-23,025.09	18,201.00	0.206
Cash remittance[2] (*PHP/year*)	1	11,472.73	11,419.70	0.315
	2	9,909.09	12,057.27	0.411
	3	7,181.81	10,642.12	0.500
	4	-1,900.00	9,776.52	0.846
	5	-4,025.45	11,238.04	0.720
Land rent (*PHP/year*)	1	4,081.22	2,067.009	0.048**
	2	4,289.40	2,290.774	0.061*
	3	2,916.71	2,686.924	0.278
	4	2,636.45	3,107.607	0.396
	5	2,899.97	3,215.504	0.367
Capital rent (*PHP*)	1	4,483.85	2,637.765	0.049*
	2	3,917.95	2,350.988	0.050**
	3	4,063.64	2,230.784	0.044**
	4	4,315.25	2,497.216	0.059*
	5	4,413.57	2,448.035	0.042**
Seed cost (*PHP*)	1	1,553.41	853.936	0.069*
	2	1,283.52	612.405	0.036**
	3	1,182.57	675.000	0.080*
	4	1,243.75	708.032	0.079*
	5	1,282.27	650.705	0.049*
Fertilizer cost (*PHP*)	1	347.50	1,817.091	0.848
	2	1,827.56	1,402.346	0.193
	3	826.481	903.059	0.360
	4	1,449.31	1,103.188	0.189
	5	1,599.81	1,373.679	0.244

Fuel cost (*PHP*)	1	1,599.45	1,546.848	0.301
	2	825.40	1,689.823	0.625
	3	1,030.03	1,807.261	0.569
	4	1,245.06	1,752.459	0.477
	5	1,141.76	1,715.816	0.506
Irrigation cost (*PHP*)	1	-1,515.90	651.671	0.020**
	2	-969.31	554.648	0.081*
	3	-622.27	614.235	0.311
	4	-405.22	493.800	0.412
	5	-426.81	527.558	0.418
Permanent labor cost (*PHP*)	1	8,229.79	3,677.301	0.025**
	2	6,444.45	3,629.718	0.076*
	3	5,691.00	3,201.107	0.075*
	4	4,837.23	3,220.189	0.133
	5	3,900.91	2,936.442	0.184
Variable labor cost (*PHP*)	1	10,699.07	5,613.910	0.050**
	2	7,472.53	4,778.788	0.118
	3	6,847.96	4,643.541	0.140
	4	6,036.96	5,346.909	0.259
	5	5,127.82	5,218.842	0.326
Value of rice production (*PHP*)	1	2,3801.91	12,206.57	0.051*
	2	2,1940.69	11,129.39	0.049**
	3	1,9968.00	12,166.58	0.057*
	4	1,5819.75	11,352.04	0.163
	5	1,8181.15	12,630.72	0.150
Yield per hectare (*kg/ha*)	1	-1,320.87	692.824	0.050**
	2	-587.26	452.638	0.194
	3	-510.54	434.700	0.240
	4	-573.38	468.956	0.221
	5	-505.00	458.870	0.271
Farming efficiency (*value of production/total variable cost*)	1	-1.3310	0.6454	0.039**
	2	-1.1029	0.5865	0.060*
	3	-1.1913	0.4971	0.017**
	4	-1.1152	0.4614	0.016**
	5	-1.1240	0.4797	0.019**

** and * indicate statistical significance at 5% and 10% level, respectively.

[1] Includes income available to the household of the principal operator. It includes farm business income, income from other farming activities, and off-farm income.
[2] Cash obtained from migrated family member of a family.