
The Role of Women in Cacao Farming in Calinan, Davao City, Philippines: An Empirical Investigation

**Sarah Jane P. Obsioma, Jon Marx P. Sarmiento,
Roxanne T. Aguinaldo, Thaddeus R. Acuña
& Anne Shangrila Y. Fuentes**

Abstract

Cacao (*Theobroma cacao* L.), a perennial cash crop cultivated in humid tropics, has high and stable demand for cacao beans as raw materials in chocolate production both locally and internationally. Around 9,584 hectares of land are planted with cacao in the Philippines with Davao City contributing 1,332 hectares. The goal of this study is to identify the role of women in cacao farming. A sample of 32 farmers with 13 women farmers in the village of Subasta, Calinan, Davao City was used in the empirical investigation focusing on the productivity, technical efficiency and profitability performance. Women in cacao farming could take the role of farmer, wife of the farmer or as farm laborer. On average, female farmers were as productive, efficient and profitable as their male counterparts. They produced 2,989 kg of wet beans per hectare earning PhP 46,985 annually. Around 53% of the wives contributed to farming operations, 68% in farm decisions and 74% had financial contributions. Some 12% of the women were hired as farm laborer. Farm tasks for women laborer and wives include farm cleaning, weeding, harvesting, pod sleeving, pod breaking and drying of beans. The farmers' cooperative pays 2 pesos/kg for tasks including weighing, pouring of beans to the fermentation boxes, transferring beans to the solar dryer, sacking and transferring of beans to the storage area while female laborers are paid 1 peso/kg for sorting and grading of beans. This study concludes that ca-

cao farming can also be the realm of female farmers, however, some gender differences were noted related to farm tasks and wage rate.

INTRODUCTION

Cacao (*Theobroma cacao* L.) is a perennial cash crop which is usually cultivated in humid tropics. The beans of cacao are highly priced since its end products are considered among the basic premium food in many countries. There is a high and stable demand for cacao beans both locally and internationally used as raw materials for chocolate production. This trend is believed to continue parallel to the increase in human population worldwide (Blommer Chocolate Company, 2012).

The Philippines is one of the cacao producing countries. The cacao industry grows steadily in the country (Tacio, 2012). Around 9,584 hectares of land are planted with cacao, usually intercropped with coconut trees. About 55% of the land areas are located in the Davao region particularly in Davao del Sur and Davao City. In 2011, Davao City has 1,332 hectares of land devoted to cacao farming. Most of these farms are located in Calinan, Davao City (Bureau of Agricultural Statistics [BAS], 2012; Magat & Secretaria, 2007).

Women play different roles in cacao farming: as a farmer; laborer; and as a wife of a farmer. However, their contributions remain unaccounted for (Chandy, 2012). The female farmers usually depend on hired workers. In the Ivory Coast, which is one of the major producers of cacao in the world, the female farmers who have inherited lands from their husbands, father or brother still continue to venture into cacao farming as their main source of income. These women hire laborers because of the lack of knowledge in cacao farming and less household labor available (Society for Cooperation in International Development [SOCODEVI] as cited in Novib, 2009).

Several feminist research methods have been used in different women studies. In this study, quantitative analysis, specifically Data Envelopment Analysis (DEA) and the independent samples t-test were done to determine the performance of women

as farmers. Qualitative analysis was also done to determine the role of women as laborers and as farmers.

Ogunniyi, et al. (2012) identified factors affecting the productivity and technical efficiency of female farmers. Hired labor and farm size can significantly increase their productivity while farming experience can significantly increase their technical efficiency. Furthermore, constraints that keep women farmers from being able to work farms as effectively as men include physical differences and lack of access to cash and labor (International Food Policy Research Institute [IFPRI], 2002).

The hired women laborers are involved in limited tasks in cacao farming. Moreover, women are generally paid by the task, whereas men are generally paid by the day. This is also true in the Philippines since the agricultural wage rate earned by male farm workers is 8 pesos higher as compared to the daily wage rate of female farm workers in 2011 (Novib, 2009; BAS, 2012).

Women play a key role not only in running households but also in making major contributions to agricultural production in rural areas of the developing world. However, women are having difficulties in sharing their full potential because of the inequalities that exist between women and men (International Fund for Agricultural Development [IFAD], 2011).

The factors affecting the participation of women to farming and financing decisions were identified in a study by Enete and Amusa (2010). It was found out that men dominate in farm decision-making. The household socio-economic factors which encouraged high women contributions to farm decision making were identified to be their number of years of formal education, farming experience and their financial contributions to farming activities. Moreover, it was identified in the same study that as the financial contribution of women to farming becomes lower, the weight of their contributions to farming decisions declines.

There are also societal constraints militating against the contribution of women to farm decisions which includes: (1) Techno-institutional constraints which include the lack of extension programs for women and insufficient knowledge of women of farm credit sources; (2) Socio-personal constraints which include misconceptions that women do not have farming ideas and are sup-

posed to be subordinate to men in farming and the low self-confidence by women; and lastly, (3) Economic or financial constraints which include low or lack of financial contributions of women to farming activities, low access to credit support groups and cooperatives, and unwillingness of women to invest in a male dominated cacao farming environment (Enete & Amusa, 2010).

In Davao City, one of the barangays in Calinan has become famous for cacao farming. Barangay Subasta is about 20 kilometers away from the city proper. It is a community where cacao farming is the main source of livelihood. In this barangay, the farm size allocated for cacao farming varies with different farmers ranging from less than a hectare to 15 hectares but majority of them have $\frac{1}{2}$ to 4 hectares. Out of the 155 farmers in this Barangay, 22 (14%) are women.

This study considers the case of the smallholder cacao farmers in Subasta, Calinan, Davao City. It aims to: (1) Identify the role and contribution of women to cacao farming as a farmer, laborer and as a wife of a farmer; and (2) Compare the technical efficiency, productivity and profitability performance of farmers according to gender. This is in recognition of the important role of women as cacao farmers and as contributors in farm operations in terms of farm and financial decision making.

METHODOLOGY

Primary data were gathered using simple random sampling method and were obtained from 32 cacao farmers in Brgy. Subasta, Calinan, Davao City. There were 20 male respondents and there were 12 female respondents.

Technical efficiency, as defined by Msuya et al. (2008) is the ability of a farmer to maximize output given similar levels of inputs. A farmer is considered efficient if a change in the level of inputs can no longer increase the farmer's output (Cooper et al., 1995). In studies which estimate the level of technical efficiency, there are two main approaches used: (1) the Data Envelopment Analysis (DEA) which is a non-parametric approach, and (2) the Stochastic Frontier Analysis (SFA) which is a parametric approach.

Stochastic Frontier Analysis is a parametric approach which uses stochastic production, cost, or profit function to estimate efficiency (Chakraborty et al., 2002). In this study, the DEA was used. It is a deterministic, nonparametric approach that developed out of mathematical programming to measure efficiency. The performance of a farm is evaluated in DEA in terms of its ability to either decrease an input's usage or increase the level of output subject to the restrictions imposed by the best-observed practices (Chakraborty et al., 2002).

In the output oriented production function specification, the ability of a farmer to maximize the level of output having a limited level of inputs is the measure of the farmer's technical efficiency. Since cacao is a labor and capital intensive crop to produce, smallholder farmers in the study area are constrained with limited financial resources. Thus, these smallholder farmers also have limited access to inputs. This justifies why the study used the output oriented production function specification.

The output-oriented model taken from the study of Bhaduri et al. (2007) is as follows:

$$\begin{aligned}
 & \text{Max}_{\theta, \lambda} \theta & (1) \\
 & \text{Subject to} \\
 & -\theta y_i + Y\lambda \geq 0 \\
 & x_i X\lambda \geq 0 \\
 & N1' \lambda = 1 \\
 & \lambda \geq 0
 \end{aligned}$$

where one of the DMUs under evaluation is represented by DMU_i , and x_i and y_i represent the input and output for DMU_i respectively. The proportional increase in outputs which could be achieved by the i -th DMU, with input quantities held constant is $1 \leq \theta < \infty$, and $\theta - 1$ and $N1$ is an $N \times 1$ vector of ones. The convexity constraint which represents the scale is the $N1' \lambda = 1$ and if it is included, the model assumes and if it is included, the model assumes VRS. By using the DEAP software developed by Coelli (1996a), the farms' efficiency scores were calculated under Variable Returns to Scale assumption.

The productivity and profit performance discussed in the study were based on the volume of wet beans produced and the

profit earned by cacao farmers in Subasta, Calinan, Davao City. The significant differences between the production level, technical efficiency and profitability were analyzed using different statistical methods. Independent Samples T-test was used to evaluate differences in the means of men and women in terms of their farm productivity, technical efficiency and farm profitability.

The analysis on the role and contribution of women was divided into three: as a farmer, as a laborer and as a wife of a farmer. Qualitative analysis was also done using the information gathered from the respondents regarding the role and contribution of women as a laborer and as a wife of a farmer.

RESULTS AND DISCUSSION

The following are the demographic features of the farmers: male; average age of 52 years old; a family size of 6 members; with 10 years of formal education; with 16 years of farming experience; with 1.88 hectares land area allocated for cacao farming; and with 15 years old trees.

As a farmer

According to IFPRI (2002), women are able to farm cocoa as well as men especially if they have the same access to inputs like fertilizers. Based on the results of the independent samples t-test, there is no significant difference between the farm productivity and profitability of male and female farmers. However, it can be noted that on average, there is an economical difference between the farm productivity and profitability of male and female farmers. On average, male farmers in Subasta have higher yield per hectare and profit per hectare compared to female farmers. This conforms to the study of Vigneri and Holmes (2009) in Ghana wherein women in Ghana also identified to be less productive than men since they have lesser yield per hectare compared to men.

Based on the result of the statistical analysis for technical efficiency analysis, on average, female farmers in Subasta have higher technical efficiency compared to male farmers, however, there is also no significant difference (Table 1).

TABLE 1. Productivity, Efficiency and Profitability performance according to gender

	Productivity	Technical Efficiency	Profitability
	Yield/ha (wet beans)	Output Oriented	Profit/ha
Male	3,857	0.45	74,025
Female	2,989	0.53	46,985
Difference	-868	-0.08	-27,040
%Change	-23%	-17%	-37%
p-value	0.478	0.54	0.278

As a farmer's wife

Among the total number of respondents, 65% are male and among the male respondents, 59% are married. The contribution of their wives in terms of farm decisions, financing decisions, financial needs and farm operations were identified.

According to Enete and Amusa (2010), male farmers continue to dominate farm decision-making. Among the wives of the farmers, 53% contribute to farming operations and farming decisions which indicates that almost half of the wives are involved in the management of the farm. Most of the wives' tasks include farm cleaning, harvesting, pod sleeving and drying of beans. Men dominate the decision-making for the pre-harvest activities and post-harvest activities. Some respondents consider the suggestions of their wives however the husband is the one who makes the final decision. The main role of wives in farm decision-making is only to recommend or suggest.

Wives of farmers also contribute to farm financial needs and farm financing decisions. Among the wives of the farmers, 74% have financial contributions to the needs in cacao farming. The land contributions of women are also included in the 74%. There are female farmers who are the owners of the land

which are used by their husbands for cacao farming. There are also wives who are the ones who hold the income of their husbands and are in charge in the budgeting of money for the household needs and for the farm. Moreover, 68% of the wives of farmers are participating in the financing decisions made by farmers. The husbands are still the one who makes the final decision in terms of financial decisions.

As a laborer

There are two types of laborer considered in this study: the laborers hired in the farm and the laborers in the cooperative. Among all the respondents, 38% hired male laborers while only 12% hired female laborers; the rest do not hire labor but utilized household labor. In the case of the hired female laborers in the farm, the usual activities or tasks assigned to them include farm cleaning, weeding, pod sleeving, harvesting, and pod breaking.

On the other hand, 3-4 laborers are hired by the farmers' cooperative: 1 male laborer and 2 female laborers. The male laborer hired by the cooperative has the option of hiring another male laborer or not. The salary is given to the one hired by the cooperative and it depends on their agreement on how much will be the wage rate for the additional laborer. Regardless of how many additional laborers will be hired by the laborer, the wage rate is fixed at PhP 2/kg paid by the cooperative. In most cases, the male laborer hired by the cooperative gives his additional hired laborer a wage rate of PhP 0.50/kg. The male laborers' tasks include weighing, pouring of beans to the fermentation boxes, transferring beans to the solar dryer, sacking and transferring of beans to the storage area. Female laborers hired by the cooperative have only one task which is sorting and grading beans.

According to a key informant from the cacao cooperative in Subasta, there were women in the area who did not have paid work and spend much time just talking with each other. This is the reason why the cooperative thought of hiring these women. They were hired to sort beans at PhP 1.00 per kilo. This way, the women earn additional income and can continue to enjoy chatting with one another while doing their sorting task.

CONCLUSION

The case of the female cacao farmers in Subasta is a subject of interest. There has been no significant difference in the productivity, technical efficiency and profitability of male and female farmers in Subasta, Calinan, Davao City. However, there is an economic difference between their yield and profit which shows that on the average, farms managed by male farmers appear to be more productive and profitable compared to those managed by women. In terms of the role of women as wives of farmers, they contribute through provision of labor, and financial or land contributions. In terms of decision-making, they are not the ones who are in charge. The final decision still lies on their husband who is the main farmer. In terms of labor contribution, female hired laborers have lesser and lighter tasks compared to male farmers. For those who are working in the cooperative, female hired laborers receive a lower wage rate compared to male labourers. Hence, this study concludes that cacao farming can also be the realm of female farmers as well as their male counterpart. However, some gender differences were noted related to farming activities and wage rate.

Further studies need to be made to further explore the reasons behind the higher productivity and profitability of farms managed by men, as well as understand the gender differences revealed by the study and how these can be changed.

REFERENCES

- Blommer Chocolate Company (2012). Sustainability Programs Drive 'Good' Investment to Meet Rising Global Food Demand: Blommer Chocolate Company Plots Sustainability Roadmap. Retrieved August 16, 2012 from http://www.blommer.com/press_releases/Blommer_Sustainability_PR_050812.pdf.
- Bhaduri, S., Durai, S.R.S., & Fogarty, D. (2007). Optimal Media Mix – Evaluation the Impact of Advertizment Expenditures of Different Media. Retrieved February 15, 2013 from www.mse.ac.in/pub/working%20paper%2018%20pdf.pdf.
- Bureau of Agricultural Statistics (BAS). (2012). Other Crops: Area Planted/ Harvested by Region and by Province. Retrieved December 05, 2012 from <http://countrystat.bas.gov.ph/>.

- Chakraborty, K., Misra S., & Johnson, P. (2002). Cotton Farmers' Technical Efficiency: Stochastic and Nonstochastic Production Function Approaches. College of Agricultural Sciences and Natural Resources, Texas Tech University. Northeastern Agricultural and Resource Economics Association. Publication No. CER-00-15 Retrieved January 3, 2013 from www.econpapers.repec.org.
- Chandy, K. T. (2012). Role of Women in Agriculture. Women and Agriculture: WAS – 1. Booklet No. 478 Retrieved September 9, 2012 from www.inseda.org.
- Coelli, T.J. (1996a). A Guide to DEAP Version 2.1: A data envelopment analysis (computer) program. Center for Efficiency and Productivity (CEPA) working papers, University of New England, Australia.
- Coelli, T.J. (1996b). A Guide to FRONTIER Version 4.1: A computer program for Stochastic Frontier Production and Cost Function Estimation. Center for Efficiency and Productivity (CEPA) working papers, University of New England, Australia.
- Cooper, W.W., Kumbhakar, S.C., Thrall, R.M. & Yu, X.L. (1995). DEA and Stochastic Frontier Analyses of the 1978 Chinese Economic-Reforms, Socio-Economic Planning Sciences. Volume 29, pp. 85–112. Retrieved September 9, 2011 from www.sciencedirect.com.
- Ekbom, A. and T. Sterner. (2008). Production Function Analysis of Soil Properties and Soil Conservation Investments in Tropical Agriculture. Environment for Development Discussion Paper 08-20.
- Enete, A., & Amusa. T. (2010). Determinants of Women's Contribution to Farming Decisions in Cocoa Based Agroforestry Households of Ekiti State, Nigeria. Field Actions Science Reports [Online], Vol 4 (2010) Retrieved August 8, 2012 from <http://factsreports.revues.org/396>.
- International Food Policy Research Institute (IFPRI). (2002). Empowering Women and Fighting Poverty: Cocoa and Land Rights in West Africa. NW, Washington, DC 20006-1002 USA Retrieved August 25, 2012 from www.ifpri.org.
- International Fund for Agricultural Development (IFAD). (2011). Women and Rural Development. Retrieved October 23, 2012 from http://www.ifad.org/pub/factsheet/women/women_e.pdf.
- Juszcyk, S. (2005). Milk Production profitability—Multiple Regression Analysis. Abstract. *Electronic Journal of Polish Agricultural Universities*, 8(4).
- Magat, S., & Secretaria, M. (2007). Coconut-Cacao (Cocoa) Cropping Model. Coconut Intercropping Guide No. 7. Philippine Coconut Authority. Department of Agriculture.
- Msuya, E., Hisano, S., & Tatsuhiko, N. (2008). Explaining Productivity Variation Among Smallholder Maize Farmers in Tanzania. Paper presented in the 12th World Congress of Rural Sociology of the International Rural Sociology Association, Goyang, Korea 2008. Retrieved January 25, 2013 from www.irsa-world.org/XII/papers/3-5.pdf.

- Novib, O. (2009). The Role of Certification and Producer Support in Promoting Gender Equality in Cocoa Production. UTZ Certified. Solidaridad—Certification Support Network (February 2009). Retrieved August 25, 2012 from www.api.ning.com.
- Olawepo, R.A. (2010). Determining rural farmers' income: A rural Nigeria Experience. *Journal of African Studies and Development*, 2(4):99–108.
- Tacio, H. (2012, June 11). Potential of Cacao as Export Crop. Sun Star Davao Newspaper. Retrieved August 26, 2012 from <http://www.sunstar.com.ph/davao/feature/2012/06/11/potential-cacao-export-crop-226186>.
- Tvrdon, J. (2003). Conception of the model of agriculture with production and non-production function. *Agricultural Economics—Czech* 49(5):208–212.
- Vigneri, M., & Holmes, R. (2009). When Being More Productive Doesn't Pay: Gender Inequality and Socio-Economic Constraints in Ghana's Cocoa Sector. Paper presented at the FAO-IFA-ILO Workshop on Gaps, trends and current research in gender dimensions of agricultural and rural employment: differentiated pathways out of poverty. Rome, 31 March to 2 April 2009.