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Research Article

Profitability of Robusta Coffee (*Coffea canephora L.*) at farm level in Quirino, Philippines

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ABSTRACT

The Philippine government is planning to put in place the necessary investment to regain the long lost position of the Philippines as one of the top producers of coffee in the world. Meanwhile, Quirino Province has a historically significant amount of coffee production. Thus, this research study was conducted to determine the profitability of the robusta coffee at farm level from the crop year 2015-2017 in Quirino province, the top two coffee-producing in Cagayan Valley. Three producing municipalities namely, Aglipay, Diffun, and Maddela were selected purposively for the study. Primary data were collected from the coffee farmers and key informants. Secondary data were also obtained from various government and private agencies. The study used a descriptive research method with a structured survey questionnaire as the primary research tool. The study revealed that the average net profit margin in the farmer's level from the crop year 2015-2017 was 63.21% which was lower than the industry standard. The problems and constraints identified were: the high cost of farm inputs, climate change, inadequate post-harvest facilities, and limited transportation facilities. This resulted in loss of crops, limited access to the market, and high transportation costs. The study recommends that the support and assistance from the local government and national agencies such as capacity building, technology transfer, and shared service facilities will help improve the profitability of coffee.

Keywords: *Net profit margin, Profitability, Quirino, Robusta coffee*

Introduction

Coffee is the world's leading agricultural resource in terms of value (Agricultural research for development, 2018). About 70% of the world's coffee is produced by small-scale farmers and as many as 120 million people rely directly or indirectly on coffee production for their economic survival (Scott M. Climate & Coffee, 2015). Fifty-nine percent (59%) of production volume comes from the species coffee arabica, while the remaining 41% is coffee robusta (World coffee production, 2020). Coffee exports are also a key source of foreign exchange and national income for many developing

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countries. In the crop year 2017 to 2018, there was a 4% increased in total exports to 7.3 million tons (Exportable production by all exporting countries, 2018).

The output of commodities in the agricultural sector including coffee production, is influenced by changes in the wider economy, increasing global integration, and thus trade, currency movements, and foreign prices. Some industries were especially hard hit during the global economic downturn of the last decade. Agriculture was also affected, but impressive resilience has been shown by the coffee industry (FAO, 2015). In the 19th century, the Philippines was a leading exporter of Arabica coffee, however, the country shifted its emphasis toward robusta after coffee rust and other diseases decimated the crop in the1890s. While production rebounded in the latter half of the 20th century, the Philippines failed to fully recover its former leading role (Bamber et al., 2017). As of the year 2017, the production of dried coffee berries decreased by 8.7% from 32.17 thousand metric tons to 29.36 thousand metric tons last December 2016. Robusta coffee was the top-produced variety at 71.6% of the overall coffee production, followed by Arabica, 23.3%; Excelsa, 4.1%; and Liberica, 1.0% (Philippine Statistics Authority, 2017).

At present, the government is currently developing a roadmap to revive the Philippine coffee industry and is planning to put in place the necessary investment to regain the long lost position of the Philippines as one of the top producers of coffee in the world (Department of Agriculture, Bureau of Plant Industry, 2017). Moreover, with the enactment of the Republic Act (RA) No. 7900, the High Value Crops Development (HVCD) Act of 1995 promotes the production, processing, marketing, and distribution of high-value crops, providing funds to crops other than traditional ones which include coffee (High Value Crops Development Act of 1995, 2018). While, the RA No. 8435 also known as the Agriculture and Fisheries Modernization Act of 1997 aims to enhance profits and incomes in the agriculture and fisheries sectors, by ensuring equitable access to assets, resources, and services, and promoting higher-value crops, value-added processing, agribusiness activities, and agro-industrialization (Agriculture and Fisheries Modernization Act of 1997, 2018).

For the past few years, the Department of Agriculture (DA) and the Department of Trade and Industry (DTI) have been helping coffee farmers to prosper in the region's coffee production, processing, trade, roasting or marketing (Gallibu, 2018). DA announced in 2012 an allocation of P192 million for the Coffee and Cacao Agribusiness Zone Growth to support the so-called 'mocha trend' to improve the coffee industry in the province of Quirino. This included improving coffee production to make it competitive locally and globally (Domingo, 2019).

Due to its agro-climatic characteristics, which are highly suitable for coffee plantations, Quirino Province has a historically significant amount of coffee production. The province had nearly 700 hectares of land planted with coffee in the 1990s until the early 2000s and the number of harvests reached as high as 400 metric tons per year. The province is currently pursuing through the Community Forestry Foundation of Quirino, Inc. (CFFQI), a watershed restoration program with agroforestry farming and other support for livelihoods as integral components. Therefore, the development of the coffee industry in the province of Quirino may address the twin objectives of improving income and livelihoods, in particular for poor rural families, while ensuring the sustainability of the natural resources of the province (Department of Agriculture. Initial Environmental Examination Report, 2018).

Thus, this research study was conducted to determine the profitability of the robusta coffee at the farm level in Quirino Province from the crop year 2015-2017 and recommend possible changes for its improvement. It specifically aimed to: describe the production and financial management practices of the coffee farmers, analyze the profitability of coffee crop production, identify gaps/constraints encountered by the farmers, and determine innovative solutions to enhance the coffee industry.

Methods

The study adopted the conceptual framework of the input-process-output model (Figure 1).

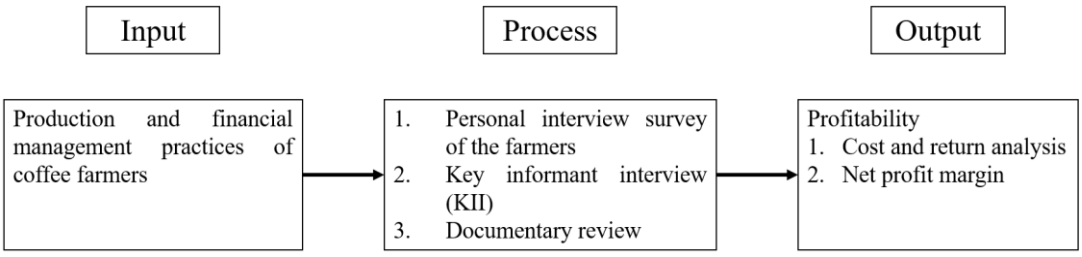

Figure 1. Conceptual Framework

Input shows the production and financial management practices of the coffee farmers. Key Informants Interview (KII) was conducted to further substantiate and validate the data gathered for the survey questionnaire. The designated OIC of the Office of Provincial Agriculturists (OPAG), the municipal officer of the Municipal Agriculture Office (MAO), and the different Barangay Officials of the producing barangays were the research informants.

The study was conducted in the province of Quirino, the top two coffee-producing in Cagayan Valley composed of the top three producing municipalities namely: Maddela, Aglipay, and Diffun. In each town, three barangays were chosen and in each barangay, ten farmers were selected. A total of 90 coffee farmers were interviewed.

To describe the production and financial management practices of the respondents, the study used table, also, mean and percentages were drawn. To analyze the profitability of coffee crop production, cost and return analysis were constructed from the raw data collected. The financial status of the industry was measured using profitability indicators specifically, the net profit margin. To identify gaps/constraints encountered, the respondents were questioned and required to rank the given problems. Further, to determine innovative solutions to enhance the coffee industry in Quirino Province, the researcher recommends a possible solution to problems and constraints.

Results and Discussion

Production management practices of coffee farmers

The respondents revealed that they planted coffee once a year (79%), while six percent planted twice a year and the remaining 16% did not plant. Most of the coffee planted was wildlings (68%), however, 23% of them planted seedlings certified by the DA, Q-life, and Nestle Philippines, while the remaining nine percent planted hybrid seedlings. Farmers should ensure that the planting material originates from registered and licensed nurseries when they decide to plant seedling (Bureau of Plant Industry, 2015).

Moreover, coffee farmer respondents planted coffee using the straight-line method (97%) intercropped with vegetables and fruit trees, and only two percent (2%) planted coffee seeds using the broadcast method. The recommended layout of the field for robusta coffee should be 3m x 4m if it was mono-cropping and 4m x 4m if intercropped (Mojica, 2016). Intercropping with rubber trees is also good as it decreases luminosity and temperature substantially during the day, facilitating greater branch etiolation and greater leaf expansion (Araujo et al., 2016).

While the majority of the coffee farmers did not used fertilizer (67%) because the coffee trees were old, hence, they gathered all the organic matters around the coffee tree. However, 27% used inorganic fertilizer like complete fertilizer, 16-20-0, 42-0-0, and others. In addition to having a beneficial effect on coffee yields, the optimum use of nutrients will also minimize greenhouse gas emissions, minimize nitrate emissions to soils and water bodies, and contribute to a lower need for pesticide application (Gaitan et al., 2018). On the other hand, 87% said that they did not used crop protection products. Similarly, the coffee farmers from Kogi State, Nigeria did not employ any control measure on the pest/diseases due to lack of money to purchase the required pesticides (Aderolu et al., 2014). However, farmers

complained that the main contributors to decreased coffee production were coffee wilt disease and coffee stem borers (Kiying et al., 2012).

Almost all of the coffee farms were rain fed (88%) but some used deep well (8%) and controlled irrigation (4%) in watering the coffee plants. Coffee is sensitive to water shortages and there should be sufficient well-distributed rainfall of approximately 1,500 mm per year. Rainfall also affects flowering and therefore coffee should be produced in areas with sufficient spring rain (Department of Agriculture, Forestry and Fisheries, 2012). Lastly, during harvesting, 100% of coffee farmers harvested coffee manually.

Financial management practices of coffee farmers

The survey revealed that coffee farmers used their capital to finance their coffee farms. Since almost all coffee farmers did not record their transactions (93%), they also did not prepare financial statements (99%). The coffee farmers informed that they sold their produce to traders who visited their barangay.

The major buyer of coffee from Quirino Province was Mr. Tayaban of Solano, Nueva Vizcaya. His major sources of coffee volume came from Quirino, Ifugao, and Nueva Vizcaya. He preferred to buy green coffee beans (GCB) rather than dried beans because it lessened the labor cost in drying, pulping, and hulling. The dried green coffee beans were packed into a 50kg jute sack and sold to Nestle Philippines. The selling price ranged from PhP90-110/kg depending on the existing world price.

Ms. Domingo is a micro-scale buyer from Baguio Village, Diffun, Quirino. She bought fresh and dried coffee from the farmers around their barangay. She dried coffee on mat or tarpaulin, she had also a manual coffee miller which she used to de-pulped the coffee beans. She sold green coffee beans to retailers at the Diffun public market.

Lastly, the Mataga-ay Coffee Growers Producer Cooperative (MCGPC) started purchasing coffee fresh berries last December 2014. Coffee farmers sold their coffee produce either fresh or sun-dried at a considerable price depending on the percentage of ripe berries, coffee berries sold with 90% red rip is being bought at P16.00/ kg while coffee berries sold with only about 70-80% red ripe is P15.50/kg and mix berries (50% red and 50% green) is P15.00/kg. Dried coffee berries were procured at P40.00/kg and green coffee beans at P90.00/kg. MCGPC processed coffee was sold to retailers such as Quirino Pasalubong Center, Quirino People's Market, and directly to consumers.

Profitability of coffee in Quirino province

To analyze the profitability of coffee at the farm level in Quirino Province, cost and return analysis (Table 1) were prepared based on the information gathered.

Table 1. Cost and return Analysis of robusta Coffee in Quirino Province, 2015-2017

Items	Aglipay	Diffun	Maddela	QUIRINO
Gross Sales	7,806.33	4,435.00	8,795.33	7,012.22
Less: Operating Costs				
Labor Cost	4,333.33	4,400.00	4,266.67	4,333.33
Input Cost	2,626.67	2,566.67	746.67	1,980.00
Farm Tools	600.00	600.00	600.00	600.00
Total Operating Costs	7,560.00	7,566.67	5,613.33	6,913.33
NET INCOME including Family Labor Cost	246.33	- 3,131.67	3,182.00	98.89
NET INCOME excluding Family Labor Cost	4,579.67	1,268.33	7,448.67	4,432.22
NET PROFIT MARGIN excluding family labor cost	58.67%	28.60%	84.69%	63.21%

However, the result showed that the coffee farmers were suffering a net loss due to high operating costs especially labor and input costs. The municipality of Diffun incurred the highest loss due to decreasing yield per hectare. However, as shown in the table below, the municipality of Maddela had a high net income if family labor were excluded.

One of the common financial ratios applied to evaluate the industry's financial position and performance was profitability. Profitability ratios are indicators of whatever the industry is gaining or not. The net profit margin of the coffee industry in Quirino province from 2015-2017 was 63.21% or PhP4,432.22/ha lower than the industry standard. In contrast with the result, the Philippine Coffee Industry Roadmap, 2017-2022, shows that the profit margin for the typical farm averaged to PhP 19,236.00 per ha (Department of Agriculture, Bureau of Plant Industry, 2017). On the other hand, the macroeconomic parameters show that not all processes benefit from the rise in the price of coffee and do not inherently improve profitability since labor costs for harvesting, as well as fertilizer prices, are also growing (Budidarsono et al., 2000). Furthermore, if farmers have adequate resources and inputs, they can be one of the lowest cost of robusta coffee producers in the world and run profitable farms (Marsh, 2007).

Problems/constraints encountered by respondents

As to input supply, the high cost of farm inputs such as fertilizer, crop protection products, and labor is an important constraint as this adversely affects the competitiveness of the coffee products of the province. Colombian producers are also faced with high production costs, specifically inputs such as fertilizers/agrochemicals and labor, as a result, eliminates the income of the farmers (Piza, 2015).

Also, the coffee products produced in the province were competing with coffee imported from Vietnam or Indonesia or even with coffee products produced in other provinces of the Philippines. It was projected that the import volume of Vietnam will hit 1,06 million bags in the 2017-2018 period. Vietnam imported many kinds of coffee, coffee beans, roasted beans, and ready-made coffee from Brazil, the United States, China, Indonesia, Laos, and Cambodia (Marsh, 2007).

Knowing that coffee requires cellular respiration—hot, sunny days and cool nights, because of unpredictable rainfall and rising temperatures, climate change affects ideal growing conditions and made land scarce for producing specialty-grade coffee. In terms of yield, temperature and rainfall conditions are the main drivers. Higher temperatures will not only favor the spread of such pests and diseases but will also spread to regions where they were not usually present. Research suggests that as future temperatures rise, the occurrence of pests and diseases such as coffee berry borer, leaf miner, nematodes, coffee rust, and others will rise. The consequent need for more control would make the processing of coffee both more complex and more costly (International Trade Centre. Climate change and the coffee industry , 2018).

On the other hand, most coffee farmers relied on rain to irrigate their fields and were in danger of losing their trees during extreme droughts that led to crop loss. The erratic rain patterns led to multiple flushes, making harvest more difficult. Some farmers estimated that they revisited the fields for harvest eight or nine times in the season, because of staggered cherry ripening.

Much of the existing activities and processes in coffee farming, harvesting, and primary processing in Quirino province were still manual because of the absence of more mechanized means of carrying out these activities. One constraint of the coffee industry was being dependent on sun-drying due to lack of drying facilities. Consequently, the usage of manual coffee pulper (Philippine Center for Postharvest Development and Mechanization, 2014) which is a portable and low-cost technology that prevents breakage of coffee cherries during pulping would be used during post-harvesting. Moreover, access to farm to market road was also a constraint especially for plantation areas that were quite remote which resulted in high transportation costs that hindered the farmers to sell their products to better market outlets.

Conclusion

To improve the profitability of the coffee industry in Quirino Province, the following are the areas of consideration. The cost of inputs can be reduced considerably if farmers organize themselves and pool their requirements for input purchases to avail of substantial discounts on bulk purchases. The farmer's organization can be linked directly with input providers which offer these inputs at better prices. Moreover, the existing HVCD Fund managed by the Landbank of the Philippines (LBP) and the Development Bank of the Philippines (DBP) provides financial assistance to farmers for the provision of farm inputs. DTI shall strengthen its projects on the promotion of roast coffee granules/beans in the domestic and international markets. It will include agribusiness development services to capacitate the association/cooperative in production, transformation, processing, and marketing of coffee particularly the producers/processor of robusta coffee.

The adoption of climate-smart agriculture technologies mitigates and reduces the impact of climate change. DA-HVCDP in coordination with DA-BAR shall develop and transfer climate-smart agriculture technology for coffee to target association/cooperative of farmers. Moreover, the construction of shared service facilities for association/cooperative of farmers such as solar dryers, coffee pulper and warehouse ideally, near the production areas to reduce cost in the transportation to minimize losses due to spoilage of unprocessed berries and to ensure capacity utilization during the coffee off-season. Cooperatives or association of coffee farmers are the most effective medium in disseminating sustainable and improved coffee farming technology. A good model for this is the MCGPC in Jose Ancheta, Maddela, Quirino. The PLGU Quirino with the help of DPWH must be carried out to lessen the cost and increase the net income of the coffee farmers. Opening of access farm-to-market roads to potential and from the coffee production area will lead to the interest of farmers to pursue coffee production.

Profitability ratios are indicators of whatever the industry is gaining or not. The net profit margin of coffee at the farm level in Quirino province from 2015-2017 was PhP4,432.22/ha lower than the industry standard compared with the result of the Philippine Coffee Industry Roadmap, 2017-2022, shows that the profit margin for the typical farm averaged to PhP 19,236.00 per ha. The identified gaps and constraints encountered by the farmers were; the high cost of farm inputs such as fertilizer, crop protection products affect the farm produce; climate change resulting in loss of crops due to typhoon and drought; coffee farming, harvesting, and primary processing like drying were still manual because of inadequate post-harvest facilities; the limited transportation facilities that resulted to high transportation cost had been affecting the coffee farmers; the majority of coffee farmers had limited market access; and, increasing volume of coffee imports caused by unstable supply and demand.

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