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WHO BENEFITS MORE FROM DIRECT MARKETING SCHEMES? THE CASE OF ARABICA COFFEE COOPERATIVE AND ITS FARMERS MEMBER IN RURAL INDONESIA

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Abstract

Cooperatives play a prominent role in the agricultural sector, both in developed and developing countries. This study aimed to examine the cost and profitability of direct marketing between a cooperative and its farmers member. Data were collected based on a direct face-to-face economic survey using the purposive sampling method for a case study of Alam Kerinci cooperative, the biggest arabica coffee cooperative in Kerinci Regency, Indonesia, and its farmers. Cost-profitability calculation analysis was conducted, and the non-parametric Mann-Whitney test was used to examine the differences between the inputs, variables, cost, and profitability. The results highlighted that the cooperative's variable cost was enormous, reaching 98.15% of its total costs, and its major component was purchasing red cherry beans, with a value of 57.80%. For farmers, the largest cost was variable cost (79.51%), with hired labor as the major component, reaching 31.47%. The profitability for the cooperative and its farmers can be demonstrated by the monthly net profit, which was IDR 96,787,500 and IDR 1,714,108, respectively. This confirmed that the cooperative's profit was larger than that of farmers. However, the farmers' cost-benefit ratio was higher than the cooperative's, at 0.87. The implication of this study is that farmers benefitted economically from this scheme. The study makes a novel contribution as it shows that a direct marketing scheme with the cooperative is beneficial to farmers.

Key words**:** *profitability, cooperative, coffee, farmer, rural, Indonesia*

INTRODUCTION

Coffee is one of the five most important world commodities [13, 29, 9, 20]. In fact, coffee is the second most traded commodity after oil on the world's exchange markets [8]. In addition to being an income source, coffee also produces employment and foreign exchange income. It plays a particularly crucial role in the Indonesian national economy as an export item and has long been cultivated there. Globally, two main varieties of coffee are planted: arabica and robusta. Since 2016, worldwide arabica production (102 million bags; one bag equals 60 kg) has been significantly higher than that of robusta (56 million bags). The largest arabica coffee producing country is Brazil, with 55 million bags produced in 2016, followed by other countries such as Colombia (14.5 million bags) and Indonesia (11.2 million bags). Indonesian arabica coffee production is still relatively low, at approximately 8% of world production, amounting to 637,000 tons in 2017 [26]. One of Indonesia's coffee productions centers is Jambi Province [7]. Potential coffee production centers in Jambi Province include Kerinci Regency, Sungai Penuh City, Merangin Regency, and West Tanjung Jabung Regency. The coffee plants grown in these regions include robusta, arabica, and liberica. One of Jambi Province's largest arabica coffee production centers is Kerinci Regency; the latest data show that coffee plantations there occupied 7,573 hectares or 30% of the land area [27]. Recently, large retailers have entered the coffee market. However, farmers, who are the primary producers and struggle with agricultural production, are not enjoying the benefits of this trend; there has been no great improvement in their financial position and

profit [9]. The lengthy Indonesian coffee value chain involves several institutions before the product reaches the end consumer. Farmers commonly sell their coffee to traders or middlemen, and this arrangement is economically detrimental to them [23]. A simplified value chain can benefit producers (farmers) by cutting the cost of middlemen and guaranteeing fair prices [33]. The marketing flow in the study area is illustrated in Figure 1.

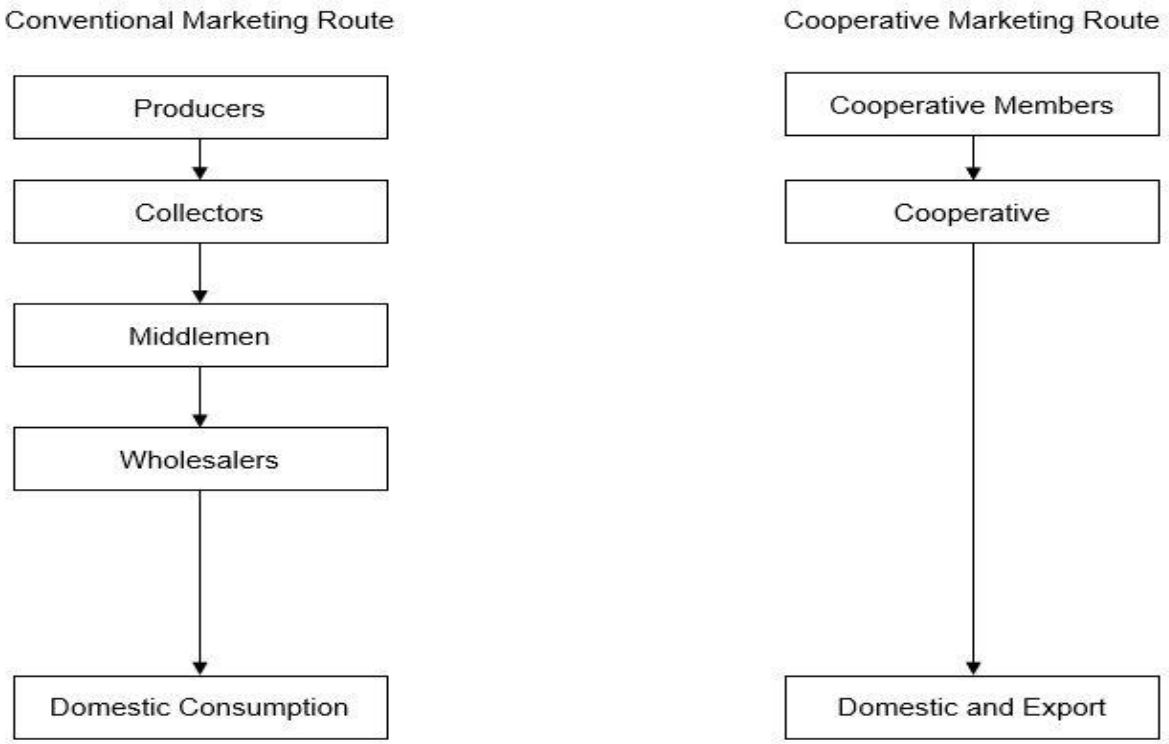

Fig. 1. Arabica coffee marketing flow in the study area
Source: Field survey by the authors.

The literature on arabica coffee farming has focused on climatic suitability and impact certification [25, 15, 2, 32]. A limited number of studies have analyzed arabica coffee marketing [1] and profitability [10]. Furthermore, there is a lack of research on direct marketing costs and profitability involving cooperatives and their farmer members in Indonesia. Panggabean et al. (2019) [19], Rico et al. (2020) [22], and Udayana (2017) [30] studied the strategies and efficiency of Indonesian arabica coffee marketing. They examined past problems, focusing on competitiveness of arabica coffee commodities as agricultural products. The present study differs from the above works as it focuses on the direct marketing system between the basic institution of agricultural cooperatives and their farmer members. Understanding arabica coffee's contribution to the economic sustainability of cooperatives and their membership is essential to future economic sustainability. This is the first study to address this issue using the proposed methodology. To fill the current knowledge gap, this study analyzed the inputs, costs, profitability, and benefits of a direct marketing system between an arabica coffee cooperative and its farmers in rural Indonesia. We focused on a direct marketing scheme using economic survey data to show that with this scheme, no party is impaired—neither the cooperative nor the farmer, who has been the most deprived coffee marketing system participant in Indonesia. This study provides compelling evidence that intermediaries (middlemen), who are detrimental to farmers, are not required. The remainder of this paper is organized as follows. The next section describes the study area. Then we summarize

the materials and methods and explain the data analysis approach. The following section presents the results and a discussion detailing the socio-demographic, farming, and business characteristics of sample respondents and their statements on arabica coffee. Additionally, the direct selling scheme's cost and profitability is presented. The final section offers the conclusions and recommendations.

MATERIALS AND METHODS

Study Area

Historically, farmer cooperatives in Indonesia have been inseparable from the government's national development program. Their development has always been part of the country's food sufficiency program. Cooperatives establish rural stores that provide members with farm inputs and consumer goods at discounted prices, with guaranteed prices set by the government [28]. The aim of establishing a cooperative was to protect citizens from loan sharks. Earlier, two types of cooperatives were established: saving and loan cooperatives. This list then expanded to include agricultural cooperatives [3]. The growth of rural agricultural cooperatives has been supported by government-backed businesses which, in part, were designed to provide cooperatives with a secure financial base upon which they could develop unsupported businesses to address members' needs [17]. This research was conducted in Kerinci Regency (Figure 2), Jambi Province, Indonesia as a case study of the Alam Kerinci Agricultural Cooperative and its farmer members. This research location and subject were chosen because Kerinci Regency is the biggest arabica coffee production center in Jambi Province, one of Indonesia's most important coffee production centers, and the cooperative is one of the biggest for arabica coffee in Kerinci Regency. Most members are small farmers, and their livelihood is tied to small-scale coffee cultivation. They cultivate on volcanic soils. Volcanic soils originate from previous volcanic eruptions, which introduce three types of materials into the environment: solids, liquids, and gas. Solid materials include sand, dust, and volcanic ash, while liquid materials include lava. These materials decompose into primary soil ingredients. Soil developed from volcanic ash is considered fertile and suitable for agriculture [24].

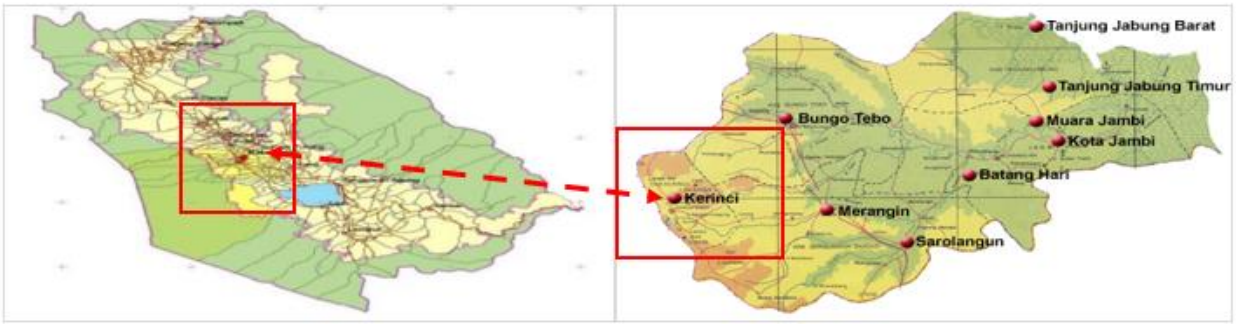

Fig. 2. Map of the study area, Kerinci Regency in Jambi Province.
Source: [21]

In September 2020, in depth-interviews using semi-structured questionnaires were conducted face to face with the cooperative's chief executive officer and its farmer members. The survey extracted data on socio-demographic and economic characteristics from 51 cooperative farmers and cooperative business characteristics using the purposive sampling method. We selected only farmers employed by the cooperative and assumed that they have identical farming characteristics and only grow arabica coffee. Most sell directly to the cooperative, not through middlemen. We confirmed the representativeness of the sample by verifying with the village office and several key informants that Alam Kerinci was the largest arabica coffee cooperative in Kerinci

Regency. We also confirmed with the chiefs of the cooperative that the sampled farmers matched the criteria for our questionnaire. All cost data for both the cooperative and its farmer members were compiled from official cooperative reports at the time of the interview.

Data Analysis

The indicators for all costs were calculated based on the categories of variable costs, fixed costs, and total costs. Variable costs included costs for tools, production costs, materials, electricity, water, gunny sacks, plastic sacks, tarps, fertilizers, herbicides, pesticides, hired labor, marketing, shipping, and transportation. Fixed costs included repairs and maintenance, business permits, land rent, and depreciation; depreciation was calculated using the straight line, which is the simplest and most used method for estimating depreciation. In this method, the annual depreciation is constant; in addition, for determining the depreciation, it is assumed that the value loss is directly proportional to the asset's age [6]. The equation of the straight-line method is expressed as:

$$D_k = (P - S)/n \quad (1)$$

where:
D_k is the annual depreciation in the k^{th} year ($k = 1, 2, n$);
P is the purchase price of the asset;
S is the final salvage value in the n^{th} year;
n is the asset's useful life expressed in years.

The data were summarized using descriptive statistics of the mean, percentage, and standard deviation. The calculated profitability indicator was gross profit generated from the sales quantity multiplied by the sales price (cooperative) and yield multiplied by the farmers' sales price. We calculated the net profit generated, namely, the gross profit minus the total cost. Since the number of observations is not large, the parametric test is not appropriate for comparing the groups (in terms of input costs and profitability). In such a case, a non-parametric test (e.g., the median, Mann-Whitney, and Kolmogorov-Smirnov tests) is commonly used in the literature [5, 11, 12]. Using this test gives consistent results [4]; therefore, to test the differences between the inputs, variables, fixed cost, total cost, and profitability, the non-parametric Mann-Whitney test was used. Mathematically, the Mann-Whitney U statistics are defined as follows for each group [18]:

$$U_x = n_x n_y + [(n_x (n_x + 1))/2] - R_x \quad (2)$$

$$U_y = n_x n_y + [(n_y (n_y + 1))/2] - R_y \quad (3)$$

where:
-nx is the number of observation or participants in the first group;
-ny is the number of observations or participants in the second group;
-Rx is the sum of the ranks assigned to the first group; and
Ry is the sum of the ranks assigned to the second group.
The level of significance was set at an alpha level of 0.05. The data were analyzed using Statistical Package for Social Science (SPSS) version 25.

RESULTS AND DISCUSSIONS

Sociodemographic, Farming, and Business Characteristics

The farmers' sociodemographic characteristics are presented in Table 1. Of the respondents, 96.1% were men and 3.9% were women. The average age was 46.
The major ethnicity (96%) was Javanese. In terms of education, most of them had attended only elementary school. Arabica farm ownership was 98% private.
A total of 84.3% farmers had secondary jobs, and the average farming experience was seven years.
Table 2 presents the characteristics of arabica farming in the sample. The farmers' crop failure rate was 80.4% due to parasites, plant disease (*Hemileia vastatrix*), and drastic climate change in the farming area, all of which had a tremendous negative impact on quality production for the export market. Of the farmers, 86.3% sold red cherry coffee beans.

Table 1. Socio-demographic statistic of farmers

Socio-demographic	Number	Mean
Sex ratio (%)		
Male	96.1	-
Female	3.9	-
Age (years)	-	45.7
Ethnicity (%)		
Javanese	96.1	-
Bataknese	2	-
Indigenous	2	-
Education (%)		
Elementary school	54.9	-
Junior high school	29.4	-
High school	15.7	-
Land ownership (%)		
Own land	98	-
Lease	2	-
Secondary job (%)		
No	15.7	-
Yes	84.3	-
Farming experience (years)	-	7
Number of observations: 51		

Source: Own field survey, 2020.

This type is the most valuable and is classified as grade A, with an average price of IDR 8,500. The second most valuable grade is a mix of green and red cherry, which are sold to local powdered coffee mills and local coffee shops in Jambi Province. This type is priced at an average of IDR 7,088, much lower than that for grade A. Most farmers gathered information on fluctuating prices from the cooperative (94.1%). Around 5.9% of farmers sold their produce to entities outside the collective, mostly to powdered coffee mills. This highlights their vulnerability to pricing decisions made by these mills compared with other farmers who get price information from official institutions. Cooperative farmers showed increased confidence in anticipating the price because 94% gained price information from the cooperative. The reason was that not all farmers could produce red cherry coffee beans to fulfil the cooperative's quality requirements and searched for options to sell crops not accommodated by the cooperative; thus, they sought price information outside the cooperative anticipating that their crop could not meet the cooperative's quality requirements of grade A (red cherry).

Table 2. Farming characteristics

Characteristic	Number	Mean	Std. dev.
Crop failure (%)			
Ever	80.4	-	-
Never	19.6	-	-
Form of coffee sold (%)			
Red cherry	86.3	-	-
Mix of green and red cherry logs	13.4	-	-
Price information (%)			
From cooperative	94.1	-	-
From others	5.9	-	-
Sales destination (%)			
Cooperative	94.1	-	-
Powdered coffee mill	5.9	-	-
Farmer association (%)			
Joined	54.9	-	-
Not joined	45.1	-	-
Price determination (%)			
Cooperative	94.1	-	-
Others	5.9	-	-
Coffee varieties (%)			
Sigarar utang	60		
Andung sari	20		
P-88	20		
Farm size (ha)	-	1.1	1.1
Employees (no.)	-	3	1.34
Production (kg/ha)	-	212	195.5
Harvest numbers (year)	-	22	3.4
Certified seed applied (%)	3.9		
Intercropping applied (%)	90.2		
Number of observations: 51			

Source: Own field survey, 2020.

Consistent with the literature, we found that farmer cooperatives were unable to buy and market their members' yield because its poor and unstable quality, in most cases, was detrimental to their members themselves and small businesses in the area [16]. Moreover, the actual volume purchased by the cooperative was limited due to financial constraints [14]. The results showed that 54.9% of farmers joined farmers' associations, and cooperatives determined the market price (94.1%). The average farm size was small, less than 2 hectares in size. Most cultivators had no determined land size for coffee farming and conducted inter-cropping to supplement their income (90.2%).

The ownership cooperative comprised a group of people, each owning shares. The cooperative has 25 male and 4 female farmer associations across 22 villages and five subdistricts. The land area covered is over 300 hectares, with 72 laborers coming from local communities. The cooperative characteristics are shown in Table 3.

Table 3. Cooperative's characteristic

Characteristics	Description
Ownership	Group
Male Farmer Associations	25
Female Farmer Associations	4
Villages covered	22
Subdistricts covered	5
Land area (ha)	310
Established (year)	2016
Employees (no.)	72
Farmer members (no.)	514
Height of planted land (m above sea level)	1,300–1,600

Source: Own field survey, 2020.

The cooperative focuses on the export market with 7 tons/month production capacity, and only a small portion of production goes to the domestic market (0.7 ton/month). The average export prices obtained were IDR 80,000, with IDR 65,000 for the domestic market (Table 4).

Table 4. Cooperative Business Activity

Characteristics	Market description	%
Export (t/month)	7	-
Domestic (t/month)	0.7	-
Export price (IDR)	80,000	-
Domestic price (IDR)	65,000	-
Price purchase (IDR)	8,500	-
Price fixing (farmers)	By cooperative	100
Price fixed (buyer)	By buyer	100
Coffee form	Red cherry	100
Coffee form for export	Dry green bean	100
Coffee form for domestic market	Green bean, roasted	30–70
Export market	-	90
Domestic market	-	10

Source: Own field survey, 2020.

The cooperative runs a few businesses related to coffee tourism (educational tour of arabica coffee farming and cottage rentals in the farming area).

Cost and Profitability of Direct Selling

The cost and profitability analyses result of direct selling among the cooperative and their farmers are presented in Table 5.

The results highlighted that the average fixed cost of total production in a one-year cycle of arabica coffee for the cooperative was IDR 8,557,500, and for farmers, it was IDR 326,216; the average costs per kilogram of arabica coffee produced for the cooperative and farmers were IDR 66,173 and IDR 4,094, respectively.

The proportions of variable and fixed costs for the cooperative were 98.15% and 1.85%, respectively, whereas for farmers, they were 79.51% and 20.49%, respectively. There was a statistically significant difference between the cooperative and its farmers in terms of the total variable cost ($p = 0.02$).

The main cost components for the cooperative were red cherry arabica coffee purchase and hired labour (IDR 267,750,000 and IDR 108,000,000, with proportions of 57.80% and 23.32%, respectively).

For farmers, the main costs were hired labour and fertilizer combined with herbicide, with values of IDR 501,176 and IDR 300,000, 31.47% and 18.84%, respectively. The average total cost for the cooperative was IDR 463,212,500, and for farmers, it was IDR 1,592,392.

The results showed that the total cost difference between the cooperative and farmers was statistically significant ($p = 0.00$). Cooperative activities requiring labour included processing red cherry arabica beans, drying green beans, and shipping, which comprise the labour-intensive stage of preparing coffee for the market.

Meanwhile, the labour-intensive stage for farmers is concentrated only on peak harvesting. For the cooperative, 72 laborers were required for buying and processing, which implied excessive labour. For farmers, hired labour is not a huge requirement, with an average need for three people.

Labour is also only used during peak harvest time, and hired laborers' sole responsibility is picking red cherries. Coffee cultivation and harvesting are usually carried out by the farmers themselves because arabica coffee farmers are mostly small scale with farms of less than 1.12 hectare. There was a statistically significant difference in terms of

depreciation (p =0.03) and hoe values (p =0.000).

Table 5. Average cost and profitability of direct selling arabica coffee among cooperative and its farmers

	Cooperative				Farmers				P-Value
	Quantity	Price/Unit (IDR)	Cost (IDR)	Share (%)	Quantity	Price/Unit (IDR)	Cost (IDR)	Share (%)	
Variable Cost									
Tools									
Pulper Machine	2	8,000,000	16,000,000	3.45					
Huller Machine	1		6,000,000	1.30					
Computer	1		7,000,000	1.51					
Continuous Sealer	1		4,000,000	0.86					
Scale (for 5kg)	1		150,000	0.03					
Moisture test equipment	1		7,500,000	1.62					
Hoe	1		98,000	0.02	2	98,000	196,000	12.31	0.000*
Bucket	1		57,000	0.01	1		57,000	3.58	1.000
Production and material									
Red Cherry Coffee (Kg/Month)	38,250	7,000	267,750,000	57.80					
Electricity (Kwh/month)	135	1,111	150,000	0.03					
Water (m3/month)	88	2,841	250,000	0.05					
Gunny Sack	100	3,000	300,000						
Plastic Sack					10	1,200	12,000	0.75	
Tarp	1		2,400,000	0.52					
Fertilizer							300,000	18.84	
Herbicide and Pesticide							100,000	6.28	
Hired Labor (People/Month)	72	1,500,000	108,000,000	23.32	3	167,059	501,176	31.47	0.087
Marketing and Shipping			35,000,000	7.56					
Transportation							100,000	6.28	
A. Total variable cost			454,655,000	98.15			1,266,176	79.51	0.022*
Fixed Cost									
Depreciation			8,157,500	1.76			257,000	16.14	0.033*
Repair and Maintenance (Month)			100,000	0.02			30,000	1.88	0.114
Business permit			300,000	0.06					
Rent of Land (Ha/month)							39,216	2.46	
B. Total fixed cost			8,557,500	1.85			326,216	20.49	0.127
C. Cost production (D/E) & (D/F)			66,173				4,094		0.089
D. Total Cost (A+B)			463,212,500				1,592,392		0.005*
E. Yield (Kg/Month)							389		
F. Sales Quantity (Kg/Month)			7,000						
G. Sales Price			80,000				8,500		0.069
H. Gross Profit (F*G) & (E*G)			560,000,000				3,306,500		0.317
I. Net Profit (H-D)			96,787,500				1,714,108		0.089
J. Cost-Benefit Ratio (H/D)			1.21				2.08		0.764
K.ROI (H-D)/D x 100%			20.89				107.64		0.089

* Significant at p < 0.05, Mann-Whitney test for the difference between all inputs
Source: Authors' data calculation, 2020.

The results also showed that labour cost was the cooperative's second major cost item at 23.32%. A similar finding was reported by Utami et al [31], who found that labour cost at

Tirto Kencono cooperative, Tanggamus Regency, Indonesia, was also the second major variable cost, at 33.56%. The cooperative's biggest cost item was buying red cherry arabica beans from farmers, with a value of IDR 267,750,000 (57.80%). Other costs for the cooperative included repair and maintenance (0.02%) and business permits (0.06%), while for farmers, this included depreciation (16.14%) and repair and maintenance (1.88%). The cooperative's average arabica sales per month in kilograms was 7,000; the farmers' yield per hectare was 389 kg/month. Higher production can be achieved by farmers partly because Mount Kerinci is an active volcano mountain, and the soil in Kerinci Regency is fertile and supports arabica coffee farming. The cooperative's gross and net profits were IDR 560,000,000 and IDR 96,787,500, respectively; for farmers, they were IDR 3,306,500 and IDR 1,714,108, respectively. The rates of return were 1.21 for the cooperative and 2.08 for farmers. The return on investment (ROI) values were 20.89 and 107.64 for the cooperative and farmers, respectively.

The results showed that farmers could earn a 0.87-point higher earnings return than the cooperative. This indicated that net profit generated by the cooperative is large compared with the farmers, but small when considering the incurred total costs.

This differed from farmers' net profit, which covered the cost of production in one season of arabica coffee production, unlike that for the cooperative.

Farmers operate as personal businesses that only fund household needs, unlike the cooperative, which must finance production needs and share the net profit with shareholders; the farmers receive the entire net profit without sharing it with any party. Further, the cost-benefit analysis verified that farmers gain more benefits since their total costs are not as large as those of the cooperative.

The ROI values confirmed that farmers achieve higher profitability from selling directly to the cooperative. From a business institutional perspective, cooperatives are expected to earn higher profits, but this study revealed that the return rate and ROI values for farmers are much higher than that of cooperatives; therefore, our findings break new ground by demonstrating that farmers benefit more with direct marketing schemes.

CONCLUSIONS

This study showed who benefits more from direct marketing schemes based on direct economic surveys in rural Indonesia. It demonstrated that the biggest cost incurred under this scheme was variable cost. We observed a lack of support from external institutions (non-governmental organizations and local government). Based on these results, we suggest that both cooperatives and farmers benefit from cooperation, and local governments should draft policies to reduce variable cost components. Our findings make several contributions to the literature. First, the calculated gross and net profits are large, but statistically, they are not much different between the cooperative and farmers. Second, farmers enjoy more profitability with a higher net return point and ROI than the cooperative. This result can encourage policymakers to consider our novel finding that a direct marketing scheme can be applied to other areas of economic sustainability development in rural Indonesia especially more benefit for small farmers.

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