

# IMPACTS OF COOPERATIVE MEMBERSHIP ON SUGARCANE FARMERS' INCOME IN EAST JAVA

## *Dampak Keanggotaan Koperasi terhadap Pendapatan Petani Tebu di Provinsi Jawa Timur*

**Ening Ariningsih**

*Indonesian Center for Agricultural Socio Economic and Policy Studies (ICASEPS)  
Jl. A. Yani 70, Bogor 16161  
E-mail: ening.ariningsih@yahoo.com*

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### **ABSTRAK**

Provinsi Jawa Timur merupakan sentra produksi tebu terbesar di Indonesia dan koperasi mempunyai peran penting dalam agribisnis tebu di wilayah itu. Akan tetapi, walaupun banyak manfaat yang ditawarkan oleh koperasi, masih banyak petani tebu yang enggan untuk menjadi anggota koperasi. Studi ini bertujuan untuk mengkaji dampak keanggotaan koperasi terhadap pendapatan petani tebu di Jawa Timur. Uji perbandingan nilai tengah dua contoh dengan uji-t digunakan dalam membandingkan biaya usahatani, penerimaan, dan pendapatan usahatani antara anggota dan bukan anggota, dan antara anggota dan bukan anggota yang memanfaatkan layanan jasa koperasi. Hasil kajian menunjukkan bahwa layanan jasa koperasi mempunyai dampak yang positif terhadap harga tebu di tingkat petani. Demikian pula dampak positif secara nyata terhadap biaya usahatani, penerimaan, dan pendapatan bersih usahatani dibandingkan dengan bukan anggota yang tidak memanfaatkan layanan jasa koperasi. Sebaliknya, tidak ada perbedaan yang nyata dalam biaya usahatani, penerimaan, dan pendapatan bersih usahatani antara petani anggota dan bukan anggota yang memanfaatkan jasa koperasi. Hal ini menunjukkan bahwa status keanggotaan tidak berdampak nyata terhadap variabel-variabel tersebut selama kedua kelompok mendapat jasa layanan koperasi. Oleh karena itu, disarankan untuk membedakan layanan jasa antara anggota dan bukan anggota pada tingkat yang bisa memberikan insentif bagi bukan anggota untuk menjadi anggota koperasi.

**Kata kunci:** *koperasi, tebu, pendapatan, petani, anggota, Jawa Timur*

### **ABSTRACT**

East Java Province is the largest sugarcane producing center in Indonesia and cooperatives have important roles in sugarcane agribusiness in this province. However, in spite of the advantages offered by the cooperatives, there are still many farmers reluctant to become members of the cooperatives. The objective of this study was to assess the impact of cooperative membership on sugarcane farmers' income in East Java. The comparison of two samples means using t-test was applied in comparing the means of costs, revenue, and net farm income between members and non-members as well as members and non-members who availed cooperatives' services. The results of the study showed that cooperatives' services had a positive impact on sugarcane price at farm level. Moreover, the results of the two samples t-test showed that cooperative services had some significant positive impacts on sugarcane farm costs, revenue, and net income of the members as compared to non-members who did not avail cooperative services. However, there were no significant differences in sugarcane farm costs, revenue, and net income between farmer-members and non-members who availed cooperative services, suggesting that cooperative membership status had no significant impact on those variables. Therefore, service differentiation at a certain level that would become incentives for the farmers to become members of the cooperatives is recommended by the study.

**Keywords:** *sugarcane, cooperative, farmer, income, member, East Java*

## INTRODUCTION

East Java Province is the largest sugarcane producing center in Indonesia. In 2011, it is estimated that East Java contributed around 44.2 percent of sugarcane area and 41.4 percent of sugarcane production (Directorate General of Estate Crops, 2012). Around 85.5 percent of total sugarcane area in the province was cultivated by farmers, which in general, were dominated by small-scale farmers with landholding size less than 1 hectare (IAARD, 2007). Data from BPS-Statistics Indonesia showed that sugarcane farmers in East Java in 2009 was accounted for 139,760 farmers; that is, around 71.5 percent of total sugarcane farmers in Indonesia (Tempo.co, 2009). The data also revealed that around 50 percent of farmers in East Java had farm size less than 0.5 ha. It is of concern that Fitriani *et al.* (2013) indicated that landholding size less than 0.5 ha tended to be less profitable in the development of sugarcane farming.

In sugar industry, sugarcane that the farmers produce is raw material for sugar mills. In fact, since generally sugar mills have no or very small plantation, almost all the cane comes from the farmers. Therefore, the sugar mills are highly dependent on the farmers for their sugarcane. On the other hand, the farmers are also highly dependent on the sugar mills because they cannot process their sugarcane into sugar crystal themselves. Majority of the sugar mills is state-owned. Out of 31 existing sugar mills in East Java, as many as 27 sugar mills belong to the government.

Sugar industry development in East Java, and in Indonesia in general, faces some problems. One of the major problems faced by this industry is inefficiency at both farmer level (on-farm) and sugar mill level (Sutrisno, 2009). According to Suyono (2008), problems at sugarcane farmer level are very complex. Small capital, unavailability of fertilizer at proper time, incapability in mastering post-harvest technology, lack of access to farming-related resources, weak bargaining position, and limited landholding are amongst the problems that the sugarcane farmers face.

Study of Lestyani *et al.* (2012) showed that high land rent, large amount of capital needed, and long money revolving-time made farmers reluctant to plant sugarcane. Therefore, sugarcane farmers' empowerment should be done. In this matter, enhancing the role of cooperatives is one effort that can be carried out (Hanani *et al.*, 2012). These cooperatives which serve as farmer institutional organizations have developed and been growing in rural areas of East Java.

Sugarcane cooperatives have big potentials in supporting the empowerment of sugarcane farmers though developing sugarcane agribusiness. However, the performance of cooperatives in supporting sugarcane agribusiness is still not as expected. Many cooperatives do not run well and many others are not active anymore. The quality of the officers and management still becomes major constraints (Hanani *et al.*, 2012). According to Saiman (Republika online, 01 Maret 2012), there are five factors that affect cooperative performance. The first factor is the quality of human resources (HR) of members, officers, manager and board of auditors. The other factors are lack of capital, lack of the information technology, not globally oriented, and lack of willingness to merge or consolidate. Similar condition was also experienced by cooperatives other than sugarcane cooperatives. For instance, the performance of KPS Bogor—a dairy cooperative—was categorized as less healthy in terms of both financial and non-financial aspects (Purwono *et al.*, 2013).

Suprayitno (2007) criticized the conflict of interests brought about by the concept of cooperative and considered it as a factor that affects cooperative performance. On one hand, a cooperative basically is a firm that needs to generate profit to survive its business. On the other hand, a cooperative, based on the purpose of its establishment, is required to promote the welfare of its members. When it is viewed as a business entity, a cooperative is required to maximize its profit. However, given that the spirit of cooperative establishment is to promote its farmer-members' welfare, the cooperative cannot set a high margin for its farmer-members. To be noted, farmer-members of a cooperative are also consumers of the respective cooperative.

Meanwhile, Subari (2012) reported that main asset for the success of a cooperative lays on idealism and courage of the cooperative management to act to develop cooperative. Other factors such as business facilities will follow in line with the development of the cooperative. Supports from local government is not an absolute need; business experience can be learned while working; and the presence of competitors will be overcome if cooperative is consistent in developing competitive market system.

Until now, despite all the constraints and problems faced, sugarcane cooperatives are still considered as a good means to improve the smallholder farmers' welfare. The establishment of KPTRs (*Koperasi Petani Tebu Rakyat* = People Sugarcane Farmer Cooperatives) by sugarcane farmers after many KUDs (*Koperasi Unit Desa* = Village Unit Cooperatives) have collapsed is a proof that the farmers still believe that cooperatives are still important for them. Around 20,000 sugarcane farmers in East Java are members of the cooperatives. By joining cooperatives, the farmers expect to improve their production and marketing performance, and thus their welfare.

However, in spite of all the advantages offered by the cooperatives, there are still many farmers that are reluctant to become a member of the cooperative or avail cooperative services. Some of them think that cooperatives will charge them many costs of membership or services that will reduce their revenues; some of them think that become cooperative members will give them complexity; while some others think that being cooperative members will make them lose their freedom to market their produces. It raises a question

whether these sugarcane cooperatives really have positive impacts on the welfare of the sugarcane farmers or not. However, until now, there is no study that has examined comprehensively the economic impacts of these cooperatives on farmer-members' income. Therefore, the objective of this study was to assess the impact of cooperative membership on farmers' income in East Java Province.

## METHODOLOGY

### Sampling Frame

East Java Province was chosen as study site because it is the largest sugarcane producing center in Indonesia and cooperatives have important roles in sugarcane business in the area. In this study, sugarcane cooperative is defined as a cooperative with sugarcane agribusiness, either as its single business unit or one of its business units. In 2012, among the cooperatives engaged in sugarcane business in East Java, there were 46 primary cooperatives that were members of KUB Rosan Kencana, a secondary sugarcane cooperative. These cooperatives were spread over 24 regencies/cities, with different scales, activities, and performance levels.

A number of 130 respondents from two cooperatives consisted of 60 members and 70 non-members were interviewed to get the information regarding inputs and outputs of sugarcane farming. The sample sizes of the sugarcane farmers for the two groups by cooperative are presented in Table 1.

Table 1. Sample Sizes of Sugarcane Farmer-Respondents by Farmer Group, East Java, Indonesia, 2012

Cooperative	Farmer Group			Total
	Member	Non-member		
		With cooperative services	Without cooperative services	
KPTR Arta Rosan Tijari	30	17	18	65
KUD Gondanglegi	30	15	20	65
Total	60	32	38	130

Out of 46 primary sugarcane cooperatives that were members of KUB Rosan Kencana, data from 31 primary sugarcane cooperatives from 2008-2011 were gathered. Based on the high values of net surplus generated by the primary sugarcane cooperatives, the two primary sugarcane cooperatives, i.e., KUD Gondanglegi in Malang Regency and KPTR Arta Rosan Tijari in Jombang Regency, were selected to represent sugarcane cooperatives in East Java and used as the cooperative-bases to assess the impact of cooperative membership on farmer-members' income. In choosing the farm samples, stratified random sampling was employed. Under this stratification, sugarcane farmers in the area covered by the selected cooperatives were grouped into two categories, namely: members of the cooperatives and non-members of the cooperatives. A farmer-member of a cooperative is defined as a farmer who is registered as a member of the cooperative and pay membership fee.

Data on inputs and outputs of sugarcane farming were gathered from the farmers through personal interviews using a set of interview schedules. Data gathering was conducted in November-December 2012.

Some non-members availed the services provided by the cooperatives (loan, inputs, marketing services, and other services), while some others did not. The inclusion of non-member farmers who availed cooperative services as non-member samples is debatable since it would cause underestimation of the effect of cooperatives on farmer-members. In an effort to overcome this problem of underestimation, the analysis separated the impacts of cooperatives on farmer-members with both farmer non-members who availed cooperative services and farmer non-members who did not as controls.

### Analytical Tools

In order to satisfy the objective of this study, mean comparison analysis (two samples t-test) was used in comparing the means of costs, revenue, and net farm income between farmer-members (CF) and farmer non-members (NCF).

Under the assumptions that: (1) each group is considered to be a sample from a distinct population; (2) the responses in each group were independent of those in the other group; and (3) the distributions of the variable of interest were normal, the null hypothesis is that the two group means were equal to each other, that is

$$H_0 : \mu_1 = \mu_2$$

$$H_1 : \mu_1 \neq \mu_2$$

where  $\mu_1$  = The means of costs, revenue, and net farm income of CF

$\mu_2$  = The means of costs, revenue, and net farm income of NCF

The t-statistic was defined as (MonarchLab, 2014)

$$t_c = \frac{\bar{x}_1 - \bar{x}_2}{\sqrt{\left(\frac{s_1^2}{n_1} + \frac{s_2^2}{n_2}\right)}}$$

where

$\bar{x}_1$  = Sample mean of the variable being tested for CF

$$= 1/n_1(x_{11} + x_{12} + x_{13} \dots \dots \dots + x_{1n})$$

$$= (1/n_1) \sum x_{1i}$$

$\bar{x}_2$  = Sample mean of the variable being tested for NCF

$$= 1/n_2(x_{21} + x_{22} + x_{23} \dots \dots \dots + x_{2n})$$

$$= (1/n_2) \sum x_{2i}$$

$s_1^2$  = Variance of CF samples

$$= 1/(n_1 - 1)[(x_{11} - \bar{x}_1)^2 + (x_{12} - \bar{x}_1)^2 \dots + (x_{1n} - \bar{x}_1)^2]$$

$$= 1/(n_1 - 1)[\sum x_{1i}^2 - (1/n_1)(\sum x_{1i})^2]$$

$s_2^2$  = Variance of NCF samples

$$= 1/(n_2 - 1)[(x_{21} - \bar{x}_2)^2 + (x_{22} - \bar{x}_2)^2 \dots + (x_{2n} - \bar{x}_2)^2]$$

$$= 1/(n_2 - 1)[\sum x_{2i}^2 - (1/n_2)(\sum x_{2i})^2]$$

$n_1$  = Sample size of CF

$n_2$  = Sample size of NCF

The t-computed value was compared with the t-tabulated, with k degrees of freedom, where  $k = n_1 - 1$  or  $n_2 - 1$ , whichever is less (since  $n_1 \neq n_2$ ). If  $t_c > t_t$ , the null hypothesis ( $H_0$ ) that the means of the two groups is not different, was rejected and  $H_1$ , that the means of the two groups is different, was accepted. It was concluded that the difference in the means of the two groups is statistically significant. The same test was done in comparing the means of costs, revenue, and net farm income between members and non-members who availed cooperative services and between members and non-members who did not avail cooperative services.

## RESULTS AND DISCUSSION

### The Role of Cooperatives in Sugarcane Agribusiness and Sugarcane Farmers' Empowerment

In Indonesia, cooperative has important role as the cornerstone of economy. In this matter, Haryanto (2011) stated that the role of cooperative needs to be maximized by empowering the cooperative as a micro financial institution to rural areas. Cooperative also needs to take position as a professional organization which not merely manages cooperative exclusively, but also develop entrepreneurship that is channelled to the community. With this role, it is expected that the cooperative becomes community's choice as a partner in their business. Furthermore, cooperatives are expected to share their significant part in efforts to reduce unemployment and to alleviate poverty (Tambunan and Anik, 2009).

As other cooperatives, cooperatives that are engaged in sugarcane agribusiness should hold the seven principles of cooperatives as follows: (1) voluntary and open membership, (2) democratic member control, (3) member economic participation, (4) autonomy and independence, (5) education, training and information, (6) cooperation among cooperatives, and (7) concern for community. Based on the principles, it is clear that there is no pressure on the farmers to become a member of a cooperative. Hence, it is the cooperative itself that should prove it beneficial for the farmers both economically and socially

so that the farmers will be interested to become its member and participate actively in its economic activities. Moreover, the cooperative should realize its functions and roles in sugarcane agribusiness where it is engaged in.

Ariningsih (2013) reported that, in general, cooperatives have functions and roles in sugarcane agribusiness as follows: (1) empowering sugarcane farmers through activities in sugarcane farming (on-farm); (2) playing an active role in helping farmers/members to improve the quality of sugarcane farming; (3) facilitating farmers/members with training, capital (credits/loans), procurement of inputs, machinery services, and other things needed in supporting sugarcane farming; and (4) acting as a bridge between farmers, sugar mills, and the government. According to Hanani *et al.* (2012), sugarcane productivity is strongly affected by the role of cooperatives and the most outstanding role of the cooperatives is their backward linkage in the provision of production inputs.

Asmara and Nurholifah (2010) revealed that sugarcane farmers joined the cooperatives for credit of capital for their sugarcane farms, provision of production inputs, and better bargaining position with sugar mills. Meanwhile, Wibowo (2013) found that farmers with credit had higher income than farmers without credit. Furthermore, Wijayanti (2014) found out that sugarcane farmers with both acceleration credit and KKPE (*Kredit Ketahanan Pangan dan Energi* = Credit for Food and Energy Security) had higher income than sugarcane farmers with only acceleration credit or KKPE alone. Meanwhile, the study of Yekti and Sulastya (2009) found that majority of the farmers used credit for supporting their current business; only some used credit for supporting new business. On the contrary, study of Afriza (2010) and Kurniawan and Mahri (2011) showed that economic benefit of a cooperative had significant positive influence on member participation. All these studies highlighted the importance of credit of capital in attracting farmers' participation and improving farmers' income. This was due to limited capital owned by the farmers to run their farms which required high cost.

However, Baksh and Yustika (2008) reported that the cooperatives usually bore on sugarcane farmers higher interest than legal rules. Besides, different conclusion reported by Dalilah (2013), that agricultural credit in KKPE program had not given significant implication on sugarcane farmers' income in Malang Regency.

The importance of capital credit service has made distribution of loan sourced from outside (KKPE, PKBL and Ratoon) and from the cooperative itself (pre-financing/after-financing) became one major economic activities of KPTR Arta Rosan Tijari, aside from other economic activities such as saving and borrowing, tractor services, sugarcane farming and cane nursery, sugar marketing and operating an agriculture store. It provided services to members as well as non-members. However, the members had some privileges in terms of prioritization of loan to distribute, easier administration process and also patronage refund.

The cooperative was run almost professionally, so it could generated a net surplus of IDR358 million in 2011. In fact, it was one of sugarcane cooperatives in East Java which booked the highest net surplus in the year. It allocated 40 percent of its net surplus for its members as patronage refund (10% was based on their share of capital and 30% was based on their contribution to the cooperative's business), 30 percent for reserves, 10 percent for BODs, 10 percent for staff, 5 percent for education, and 5 percent for social purposes. However, farmers were required to have at least two hectares of sugarcane farm to get the cooperative services. This requirement has made the sugarcane farmers getting services from the cooperative have different characteristics from that of sugarcane farmers not getting services from the cooperatives, especially in terms of land holding size.

Different from KPTR Arta Rosan Tijari, KUD Gondanglegi which was located in Gondanglegi Sub-district, Malang Regency did not limit its members' landholding size to get its services. Every sugarcane farmer within its operational area, both members and non-members, can access the services provided by the KUD.

The fact that KPTR Arta Rosan Tijari and KUD Gondanglegi as well as other sugarcane cooperatives in East Java provide services for also non-members is criticized by Nugroho (2011) as inconsistency in the implementation of the principles of cooperative; that is, the principle of cooperative services from members to members. According to him, the principle is one of the unique value propositions of cooperative that needs to be held tightly.

KUD Gondanglegi's business units included saving and borrowing unit, sugarcane unit, dairy cattle unit, electricity payment service unit, feed unit, Rice Milling Unit (RMU)/food unit, and transportation service unit. The sugarcane unit covered distribution of loan sourced from outside (KKPE and Ratoon) and from the cooperative itself, transportation services, and input/agriculture store. Like KPTR Arta Rosan Tijari, the cooperative provided services to its members as well as non-members. Both sugarcane farmer-members and non-members were grouped in much bigger sized groups as compared to KPTR Arta Rosan Tijari's sugarcane farmers due to the large number of members. In doing their business with the cooperatives, the farmers were represented by the leaders of the groups. However, this made the majority of the farmer-members less active and had less sense of ownership to the cooperative. It was found that in some cases the farmer-members were not aware of their membership status in the cooperative. According to Nugroho (2011), this could be due to members' lack of knowledge and commitment in doing cooperative's business.

KUD Gondanglegi had the largest total assets and net surplus among the cooperative-respondents in East Java. In 2011, it had IDR69,480 million in total assets and generated a net surplus of IDR443 million. However, it had no specific arrangement for allocating its net surplus nor patronage refund. According to the manager, in the previous book year, every member received IDR50,000 as their "patronage refund". It seems that this very low "patronage refund" gave no incentive for the farmers to actively participate in cooperative activities. The fixed or uniform patronage refund is inconsistent with the basic concept of a cooperative that members get

refund the amount of which is dependent on their participation in or patronage of the services of the cooperatives.

## Characteristics of Sugarcane Farmer-Respondents and Their Farm

### *Socio-economic characteristics*

The socio-economic characteristics of the sample farmer-respondents are presented in Table 2 and Appendices 1 and 2. Both farmer-members and farmer non-members had an average of 51 years of age. Farmer-members had higher average schooling years (12 years) compared to farmer-non-members (9 years) with slightly higher household size (5 persons) as compared to farmer non-members (4 persons). Moreover, farmer-members had longer sugarcane farming experience at 19 years as compared to farmer-non-members at 17 years. Majority of both farmer-members and non-members had sugarcane farming as their main occupation at 80 percent and 76 percent, respectively. All of the farmer-members availed loans while only 67 percent of farmer non-members availed loans.

members who did not avail cooperative services also availed loan usually from the traders, with higher interest rate and agreement that the farmers would sell their sugarcane to the traders. The simple process in the loan and marketing transactions has made borrowing money from the trader attractive to these farmers.

### *Landholding and planting system*

Table 3 and Appendices 3 and 4 present the farm characteristics of sugarcane farmer-respondents. Table 3 shows that the average landholding size was larger for farmer-members (9.5 hectares) than for farmer-non-members (3.4 hectares). Similarly, both owned-land and rented-land sizes were larger for farmer-members (2.8 hectares and 6.7 hectares, respectively) as compared to those of farmer non-members (1.4 hectares and 2.0 hectares, respectively). Land holding and sugarcane farm sizes were relatively similar, which means that almost the entire land held by the farmers was cultivated with sugarcane.

Appendices 3 and 4 show that landholding size of both farmer-members and

Table 2. Socio-Economic Characteristics of Sugarcane Cooperative Farmer-Members and Non-Members, East Java, 2012

Item	Member	Non-Member			All
		With cooperative services	Without cooperative services	Both	
No. of respondents	60	32	38	70	130
Average age (years)	51	51	52	51	51
Average educational attainment (years)	12	10	9	9	10
Average household size (persons)	5	4	4	4	4
Average cane farming experience (years)	19	20	16	17	18
Sugarcane farming as main occupation (%)	80	75	76	76	78
Availed loan (%)	100	94	45	67	82

The selected socio-characteristics of farmer non-members who availed and those who did not avail cooperative services were relatively the same, except that farmer non-members who availed cooperative services had longer farming experience than those who did not (20 years and 16 years, respectively). In addition, around 45 percent of farmer non-

members associated with KPTR Arta Rosan Tijari in Jombang was much larger than that associated with KUD Gondanglegi in Malang at 11.2 hectares and 1.3 hectares, respectively. While landholding and sugarcane farm sizes of farmer non-members who availed and those who did not avail cooperative services were relatively the same in Malang, in

Jombang both landholding and sugarcane farm sizes of farmer non-members who availed cooperative services were much bigger (11.5 hectares and 11 hectares, respectively) than those of farmer non-members who did not avail cooperative services (0.9 hectare and 0.6 hectare, respectively). This was due to the minimum requirement imposed to the farmers to have sugarcane farm size of at least five hectares.

Majority of sugarcane plant was ratoon or “*keprasan*” (local name for growing sugarcane without replanting) which covered more than 80 percent of sugarcane area (Table 3, Appendices 3 and 4). The farmers were generally reluctant to plant sugarcane from seedling because the increase in farming costs was much higher than the increase in revenues. They tended to keep the sugarcane *ratoon* until its production was down to the limit

Table 3. Farm Characteristics of Sugarcane Cooperative Farmer-Members and Non-Members, East Java, 2012

Item	Member	Non-Member			All
		With cooperative services	Without cooperative services	Both	
Average landholding size (ha)	9.5	6.5	0.8	3.4	6.2
- Average owned land size (ha)	2.8	2.4	0.6	1.4	2.1
- Average rented land size (ha)	6.7	4.1	0.2	2.0	4.2
Average sugarcane farm size (ha)	9.0	6.2	0.7	3.2	5.9
Planting system:					
- Plant cane (%)	21			14	19
- Ratoon ( <i>keprasan</i> ) (%)	89			86	81

According to Amanda (2010), the minimum requirement of two hectares was also imposed by KPTR Nira Sejahtera, the other cooperative which was also in partnership with SF Tjoekir as KPTR Arta Rosan Tijari. As a result, farmers who availed cooperative services, both members and non-members, had much bigger landholding size as compared to farmer non-members who did not avail cooperative services.

According to IAARD (2007), sugarcane farmers in Java in general were dominated by small-scale farmers (70%) with landholding size of less than 1 hectare. The proportion of sugarcane farmers with landholding size between 1-5 hectares was around 20 percent; whereas sugarcane farmers with landholding size of more than 5 hectares was around 10 percent. Sugarcane farmers with big landholding size usually did land renting.

they cannot tolerate. The tendency was much obvious in Malang (associated with KUD Gondanglegi) where the land was more fertile and production was higher than in Jombang (associated with KPTR Arta Rosan Tijari). The farmers might keep their sugarcane plants for more than 10 years. This condition made it very difficult to find farmers with planted cane. Among the varieties of sugarcane planted by the farmers were BR, PS 864, PS862, and PS829.

### **Selling System and Its Impact on Sugarcane Farm Price**

#### ***Selling system***

Four systems were adopted by the sugarcane farmers in selling their production (Table 4 and Table 5) wherein type 3 and type 4 of selling system were associated with cooperative services. These four types of



selling system affected the price of sugarcane that the farmers received, which in turn had impact on the farmers' income. In general, the price of sugarcane also reflected the price of sugar. Mustadjab *et al.* (2012) stated that the price of sugar highly affected sugarcane farmers' income. The four types of selling

to the sugar mills. The farmers received a certain amount of money from the traders without knowing the exact figure of their cane production. The traders paid the farmers based on their prediction of the sugarcane yield, ranging between IDR25 million and IDR30 million per ha. This

Table 4. Selling System of Sugarcane Cooperative Farmer-Members and Non-Members, East Java, 2012 (%)

Item	Member	Non-Member	Both
No. of farmer-respondents reporting			
1. Selling cane in the farm	0.00	44.28	23.85
2. Selling cane upon harvesting and transporting	0.00	10.00	5.38
3. Sending cane to sugar mill through cooperatives	95.00	32.86	61.54
4. Sending cane to sugar mill through another farmer who had contract	5.00	12.86	9.23
Total	100.00	100.00	100.00

Table 5. Selling System of Sugarcane Cooperative Farmer-Members and Non-Members, Jombang and Malang, East Java, 2012

Item	KPTR Arta Rosan Tijari			KUD Gondanglegi		
	Member	Non-member	Both	Member	Non-member	Both
No. of farmer-respondents reporting						
1. Selling cane in the farm	0.00	51.43	27.69	0.00	37.14	20.00
2. Selling cane upon harvesting and transporting	0.00	0.00	0.00	0.00	20.00	10.77
3. Sending cane to sugar mill	100.00	31.43	63.08	90.00	34.29	60.00
4. Sending cane to sugar mill through another farmer who had contract	0.00	17.14	9.23	10.00	8.57	9.23
Total	100.00	100.00	100.00	100.00	100.00	100.00

system are as follows:

1. The farmers sold their sugarcane in the farm. The traders were the ones who harvested and transported the sugarcane

selling system was usually adopted by the farmers who had no contract with the sugar mill and was not adopted by farmer-members. Table 4 shows that this type 1 of selling system was adopted by almost

half of farmer non-members and none of farmer-members.

2. The farmers sold their sugarcane after they themselves harvested and transported their harvested sugarcane to sugar mill location but without SPTA (a letter that authorizes the farmers to harvest and transport their sugarcane) from the sugar mill. Even if the farmers had contract with the sugar mill, without the SPTA they could not send their sugarcane to the sugar mill and had to sell them to other farmers/traders who had the letter. However, the farmers could not do this selling system all the time because of their loan. The loan and its interest should be paid by deducting sugarcane payment from the process of sale. If the farmers sell their sugarcane by this selling system, the mill/cooperative cannot get the loan repayment from the farmers. As a consequence, the farmers will no longer be given any loan from the mill/cooperatives. With this selling system, the farmers usually received IDR 45 thousand to IDR 50 thousand per quintal of sugarcane they sold to the traders. This selling system was adopted by some sugarcane farmers in Malang but not by farmers in Jombang.
3. The farmers sent their sugarcane to sugar mills through cooperatives. This selling system was adopted by farmers who had contract and SPTA. The sugar mill processed the sugarcane into sugar and

molasses and shared them with the farmers. The farmers' shares of sugar depended on the sugar content of their sugarcane and ranged between 66 percent and 67 percent of the total sugar produced. The 90 percent of the farmers' share of sugar was sold through auction process by cooperatives/APTR while 10 percent was given to farmers in kind. In addition, the farmers also got three kgs molasses for each quintal of their sugarcane which was equivalent to IDR3,165. Farmer's loan and the interest were deducted from the payment. Almost all the farmer-members and some of farmer non-members adopted this selling system.

4. The farmers sent their sugarcane to sugar mill via other farmers who had SPTA. Usually the two parties were bound by share-yield system. It was their group leader who made the arrangement on harvesting and transporting the cane to the sugar mill. The farmers incurred harvest and transport costs. By this selling system, the farmers would give their molasses to the farmers who take care of their sugarcane as payment for their help and maybe some other additional costs. The costs of harvesting, transporting, and other necessary costs were deducted from the payment. This selling system was adopted by some farmer-members in Malang and farmer non-members both in Malang and Jombang. That sugarcane farmers adopting share-yield system rarely got any

Table 6. Sugarcane Price by Selling System of Sugarcane Cooperative Farmer-Members and Non-Members, East Java, 2012<sup>a</sup> (IDR per quintal)

Item	Jombang	Malang	Both
No. of farmer-respondents reporting			
1. Selling cane in the farm	-	-	-
2. Selling cane upon harvesting and transporting	-	49,211	49,211
3. Sending cane to sugar mill through cooperatives	55,705	59,233	57,404
4. Sending cane to sugar mill through another farmer who had contract and also through cooperatives	51,735	56,057	52,609

<sup>a</sup> Sugarcane price at sugar mill site (after harvested and transported). For selling types 3 and 4 sugarcane price was computed by considering conversion factor of sugarcane into sugar and molasses and with deduction of processing-related costs

molasses share from sugar mill was also reported by Baksh and Yustika (2008). According to them, this happened due to lack of institutional arrangements.

### **Impact of selling system on sugarcane farm price**

Table 6 shows sugarcane price received by the farmers by type of selling system regardless of their cooperative membership status. It is clearly shown that the type 3 selling system gave the highest sugarcane price (at sugar mill site), followed by type 4 selling system which was higher than for type 2 selling system. Since type 3 and type 4 were associated with cooperative services, these results suggest positive impact of cooperative services on sugarcane price.

### **Impact of Cooperative Membership on Farm Income**

As noted earlier, there were four selling systems adopted by the sugarcane farmers which affected their farm income in terms of both costs and revenues. The costs, revenues and farm income of the four selling systems adopted by the sugarcane farmers are presented in Table 7.

While the four selling systems were found in Malang, the type 2 selling system was not adopted by sugarcane farmer-respondents in Jombang. Disregarding cooperative membership, both in Jombang (associated with KPTR Arta Rosan Tijari) and in Malang (associated with KUD Gondanglegi), the type 3 selling system generated the highest revenues as well as net farm income for the farmers

Table 7. Mean Comparison of Costs, Revenues, and Net Income of Sugarcane Farmers on per Hectare Basis by Type of Selling System and Location, East Java, 2012 (IDR million/ha)

Item	Farmer Group	KPTR Arta Rosan Tijari				KUD Gondanglegi			
		1 <sup>a</sup>	2 <sup>a</sup>	3 <sup>a</sup>	4 <sup>a</sup>	1 <sup>a</sup>	2 <sup>a</sup>	3 <sup>a</sup>	4 <sup>a</sup>
No. of farmers reporting	Member	0	0	30	0	0	0	27	3
	Non-member	18	0	11	6	13	7	13	2
	Both	18	0	37	6	13	7	40	5
Revenue	Member	-	-	54.681	-	-	-	78.182	73.230
	Non-member	35.406	-	55.387	53.481	54.723	60.981	70.129	69.775
	Both	35.406	-	54.870	53.481	54.723	60.981	75.240	71.448
Costs	Member	-	-	18.268	-	-	-	23.901	25.612
	Non-member	9.266	-	20.063	18.416	13.898	18.581	24.759	26.317
	Both	9.266	-	18.750	18.416	13.898	18.581	24.180	25.894
Rent	Member	-	-	15.467	-	-	-	33.315	32.667
	Non-member	15.386	-	15.682	15.733	25.923	27.500	28.500	30.000
	Both	15.386	-	15.524	15.733	25.923	27.500	31.750	31.600
Income (before rent)	Member	-	-	36.413	-	-	-	54.281	47.618
	Non-member	25.140	-	35.324	35.065	40.825	42.400	44.370	42.459
	Both	25.140	-	36.121	35.065	40.825	42.400	51.060	45.555
Net income (after rent)	Member	-	-	20.946	-	-	-	16.348	14.952
	Non-member	10.754	-	19.642	19.332	14.902	14.900	14.585	13.459
	Both	10.754	-	20.596	19.332	14.902	14.900	15.450	13.955

<sup>a</sup> Refers to the four selling systems

while the type 1 selling system generated the lowest revenues and net farm income.

These results showed that there was an incentive for the farmers to adopt the type 3 selling system. However, some problems discouraged the farmers from adopting this type of selling system, namely: 1) the farmers did not want to deal with administrative and bureaucracy issues that they felt were troublesome; 2) the farmers, especially those who had small farms, had some difficulties in getting SPTA due to minimum farm size requirement; and 3) with this type of selling system the farmers had to wait for about two weeks from harvesting time to the time they could receive their money as compared to cash money they received when they adopted the type 1 selling system.

The revenues of sugarcane farmers in Malang were much higher than those of sugarcane farmers in Jombang. However, the high land rent in Malang, which was about twice as much as land rent in Jombang, made sugarcane farmers in Malang gain lower net farm income. This high land rent was due to the more fertile and suitable land wherein the farmers could produce more cane even when other inputs applied were the same for both locations.

Data indicated that farmer non-members who adopted the type 1 and type 2 selling systems in Malang had slightly higher net farm income as compared to farmer non-members who adopted the type 3 and 4 selling systems due to lower input costs, pre-harvest and harvest costs (for type 2), and other costs as well as lower land rent. This results, however, supported the opinion of some sugarcane farmers that non-farm operating cost (cooperative internal cost) could reduce their income as reported by Amanda (2010).

Disregarding the difference due to the type of selling system, the comparison for farm costs, revenue, and income between farmer-members and non-members on per hectare basis is presented in Table 6 and Appendices 1 and 2. In general, the total costs of sugarcane production was significantly higher (at 1% probability level) for farmer-members as compared to farmer non-members. The difference was mainly due to the higher costs of harvesting, transporting, and miscellaneous (interest expense on loan, APTRI/KUD fee,

etc.) which were significant at 1 percent probability level, and land rent which was significant at 10 percent probability level. Some farmer non-members sold their sugarcane in the farm (type 1 selling system) and let the traders harvest and transport their sugarcane. Therefore, the farmers did not incur harvesting, transporting, and many items of miscellaneous costs.

This made these costs, on the average, much higher for farmer-members as compared to farmer non-members. However, when the revenues and the costs were considered together, wherein the revenues of farmer-members were higher (than those of farmer non-members, the farmer-members gained higher net farm income than farmer non-members. Both differences in revenues and net farm income between farmer-members and farmer non-members were significant at 1% probability level. These data suggested that cooperative membership increased net farm income by IDR5.225 million per hectare of sugarcane farm.

More detailed analysis that separated farmer non-members who availed cooperative services from those who did not avail and comparing each of them to farmer-members were done to separate the impact of cooperative services on the farmers. The results as presented in Table 8 and Appendices 5 and 6 showed that the costs, revenue, and net farm income of farmer-members were not significantly different from those of farmer non-members who availed cooperative services. Specifically, this means that farmer-members had almost the same costs, revenue, and net farm income as farmer non-members who availed services from the cooperatives. These results show that there were no incentives for farmer non-members who availed cooperative services to become cooperative members.

On the contrary, the data showed that farmer-members had significantly (at 1% probability level) higher costs, revenue, and net farm income than farmer non-members who did not avail cooperative services. The differences in farming costs were due to differences in input, harvesting, transporting, and miscellaneous costs which were significant at 1 percent probability level, and also in rent which was significant at 10 percent probability level.

Table 8. Mean Comparison of Cost, Revenue, and Net Farm Income between Farmer-Members and Farmer Non-Members on Per Hectare Basis, East Java, 2012 (IDR million)

Item	Member	Non-Member			Difference		
		With cooperative services	Without cooperative services	Both	With cooperative services	Without cooperative services	Both
Costs							
Input	3.591	3.749	2.848	3.261	-0.158 <sup>ns</sup>	0.743 <sup>***</sup>	0.330
Pre-harvest	7.508	8.610	7.735	7.767	-1.102 <sup>ns</sup>	-0.227 <sup>ns</sup>	-0.259
Harvest	4.115	4.282	0.523	2.221	-0.167 <sup>ns</sup>	3.592 <sup>***</sup>	1.894
Transport	3.766	3.778	0.910	2.243	-0.012 <sup>ns</sup>	2.856 <sup>***</sup>	1.523
Miscellaneous	1.806	1.634	0.551	1.061	0.172 <sup>ns</sup>	1.255 <sup>***</sup>	0.745
Rent	23.692	21.794	21.222	21.341	1.898 <sup>ns</sup>	2.470 <sup>*</sup>	2.351
Subtotal	44.477	43.846	33.789	37.893	0.631 <sup>ns</sup>	10.688 <sup>***</sup>	6.585
Revenue	65.104	61.449	46.252	53.764	3.655 <sup>ns</sup>	18.852 <sup>***</sup>	11.340
Net Farm Income	20.626	17.603	12.463	15.372	3.023 <sup>ns</sup>	8.163 <sup>***</sup>	5.255

<sup>\*\*\*</sup>, <sup>\*\*</sup>, and <sup>\*</sup> Significant at 1%, 5%, and 10% probability levels, respectively

<sup>ns</sup> Not significant at 10% probability level

Farmer non-members who did not avail services from cooperatives tended to use input less than recommendation in terms of quantity and quality. Therefore, in spite of the lower price of inputs used, input costs of the farmer-members were higher than those of the farmer non-members who did not avail cooperative services. Majority of farmer non-members who did not avail cooperative services adopted type 1 selling system, hence, did not incur harvesting and transporting, and many miscellaneous costs. Therefore, the costs of those variables were much higher for farmer-members and were found significant at 1% probability level.

While it was not significant, pre-harvest cost was negative, suggesting that farmer-members tended to have lower pre-harvest cost than farmer non-members who did not avail cooperatives services. Lower pre-harvest cost might be due to more efficient labor use and/or the type of land wherein wetland needs less pre-harvest costs (especially for irrigation) than dryland. Data showed that more farmer non-members cultivated dryland (34%) than farmer-members (22%). The data also confirmed the higher rent the farmer-members

paid because the rent for wetland was higher than that for dryland. Amanda (2010) reported that land rent depended on land position (accessibility), type of land (wetland or dryland), and soil fertility.

However, these significant impacts of cooperatives on farmer-members might not actually be due to cooperatives alone. It might also be due to the impacts of characteristics of the farmers themselves (e.g. educational attainment and sugarcane farming experience), and characteristics of the sugarcane farm (e.g. farm size and agro-ecosystem). Higher educational attainment and farming experience of the farmer-members also had important role for the success of their sugarcane farms. Moreover, farm characteristics also played an important role such as in the type of agro-ecosystem wherein wetland gives higher production than dryland (Asmara and Nurholifah, 2010). Data showed that more farmer-members cultivated wetland (78%) than farmer non-members (64%). Higher owned-land size of the farmer-members also showed that the initial capital of the farmer-members, especially in Jombang, had an important role in their farm success.

## CONCLUSIONS AND POLICY IMPLICATIONS

### Conclusions

Cooperatives had positive impacts on sugarcane price, sugarcane farm costs, revenue, and net income of the farmer-members as compared to farmer non-members who did not avail cooperative services. However, the differences in sugarcane farm costs, revenue, and net income between farmer-members and farmer non-members who availed cooperative service were not significant, suggesting that cooperative membership status had no significant impact on farm costs, revenue, and net income, which were caused by relatively the same advantages (capital, technology, inputs, marketing access) obtained by both farmer-members and farmer non-members who availed cooperative services.

### Policy Implications

In order to promote cooperative membership differentiation of services given by the cooperatives to members and non-members should be taken at a certain level that would give some incentives for the farmers to become members of the cooperatives. The cooperatives should also have to be able to convince the farmers of the advantages of being cooperative members by offering significant incentives to them. But above all, to give high impacts the cooperatives should keep their performances well and enhance their roles, among others, through: (1) internal strengthening which covers the strengthening of leadership and management of cooperatives, (2) strengthening linkages with supporting institutions and sugar mills, and (3) improvement of cooperatives' services in supporting people sugarcane agribusiness in the context of sugarcane farmer empowerment. However, the fact that farmer non-members had significantly lower sugarcane price, sugarcane farm costs, revenue, and net income has revealed that more attention should be given to attract the farmer non-members to avail cooperative services or even become cooperative members to improve their welfare.

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Appendix 1. Socio-Economic Characteristics of Sugarcane Cooperative Farmer-Members and Non-Members, Jombang<sup>a</sup>, East Java, 2012

Item	Member	Non-Member			All
		With cooperative services	Without cooperative services	Both	
No. of respondents	30	17	18	35	65
Average age (years)	51	48	51	50	50
Average educational attainment (years)	13	11	8	9	11
Average household size (persons)	4	4	4	4	4
Average cane farming experience (years)	18	18	12	15	16
Sugarcane farming as main occupation (%)	85	70	72	71	77
Avail loan (%)	100	88	33	60	72

<sup>a</sup> Associated with KPTR Arta Rosan Tijari

Appendix 2. Socio-Economic Characteristics of Sugarcane Cooperative Farmer-Members and Non-Members, Malang<sup>a</sup>, East Java, 2012

Item	Member	Non-Member			All
		With cooperative services	Without cooperative services	Both	
No. of respondents	30	15	20	35	65
Average age (years)	52	53	53	53	53
Average educational attainment (years)	11	8	9	9	10
Average household size (persons)	5	4	5	4	5
Average cane farming experience (years)	20	21	20	20	20
Sugarcane farming as main occupation (%)	77	80	80	80	79
Avail loan (%)	100	93	55	71	85

<sup>a</sup> Associated with KUD Gondanglegi

Appendix 3. Farm Characteristics of Sugarcane Cooperative Farmer-Members and Non-Members, Jombang<sup>a</sup>, East Java, 2012

Item	Member	Non-Member			All
		With cooperative services	Without cooperative services	Both	
Average landholding size (ha)	17.2	11.5	0.9	6.0	11.2
- Average owned land size (ha)	4.5	3.8	0.6	2.2	3.2
- Average rented land size (ha)	12.7	7.7	0.3	3.9	7.9
Average sugarcane farm size (ha)	16.3	11.0	0.6	5.6	10.6
Planting system:					
- Plant cane (%)	22			16	20
- Ratoon ( <i>keprasan</i> ) (%)	78			84	80

<sup>a</sup> Associated with KPTR Arta Rosan Tijari

Appendix 4. Farm Characteristics of Sugarcane Cooperative Farmer-Members and Non-Members, Malang<sup>a</sup>, East Java, 2012

Item	Member	Non-Member			All
		With cooperative services	Without cooperative services	Both	
Average landholding size (ha)	1.9	0.9	0.8	0.8	1.3
- Average owned land size (ha)	1.1	0.8	0.7	0.7	0.9
- Average rented land size (ha)	0.7	0.1	0.1	0.1	0.4
Average sugarcane farm size (ha)	1.7	0.8	0.8	0.8	1.2
Planting system:					
- Plant cane (%)	9			4	8
- Ratoon ( <i>keprasan</i> ) (%)	92			96	92

<sup>a</sup> Associated with KUD Gondanglegi

Appendix 5. Mean Comparison of Cost, Revenue and Net Farm Income between Farmer-Members and Farmer Non-Members on per Hectare Basis, Jombang<sup>a</sup>, East Java, 2012 (IDR million/ha)

Item	Member	Non-Member			Difference		
		With cooperative services	Without cooperative services	Both	With cooperative services	Without cooperative services	Both
Costs							
Input	2.995	2.815	2.138	2.467	0.180 <sup>ns</sup>	0.857 <sup>***</sup>	0.528 <sup>ns</sup>
Pre-harvest	6.508	7.537	6.290	6.896	-1.029 <sup>ns</sup>	0.218 <sup>ns</sup>	-0.388 <sup>ns</sup>
Harvest	4.226	4.549	0.000	2.21	-0.323 <sup>ns</sup>	4.226 <sup>***</sup>	2.017 <sup>***</sup>
Transport	3.125	3.431	0.396	1.87	-0.306 <sup>ns</sup>	2.729 <sup>***</sup>	1.255 <sup>***</sup>
Miscellaneous	1.414	1.149	0.442	0.786	0.265 <sup>*</sup>	0.972 <sup>***</sup>	0.628 <sup>***</sup>
Rent	15.467	15.700	15.386	15.539	-0.233 <sup>ns</sup>	0.081 <sup>***</sup>	-0.072 <sup>***</sup>
Subtotal	33.735	35.182	24.652	29.766	-1.447 <sup>ns</sup>	9.083 <sup>***</sup>	3.968 <sup>***</sup>
Revenue	54.681	54.714	34.406	44.27	-0.033 <sup>ns</sup>	20.275 <sup>***</sup>	10.411 <sup>***</sup>
Net Farm Income	20.946	19.533	9.754	14.504	1.413 <sup>ns</sup>	11.192 <sup>***</sup>	6.443 <sup>**</sup>

\*\*\*, \*\*, and \* Significant at 1%, 5%, and 10% probability levels, respectively

<sup>ns</sup> Not significant at 10% probability level

<sup>a</sup> Associated with KPTR Arta Rosan Tijari

Appendix 6. Mean Comparison of Cost, Revenue and Net Farm Income between Farmer-Members and Farmer Non-Members on per Hectare Basis, Malang<sup>a</sup>, East Java, 2012 (IDR Million/ha)

Item	Member	Non-Member			Difference		
		With cooperative services	Without cooperative services	Both	With cooperative services	Without cooperative services	Both
Costs							
Input	4.187	4.807	3.487	4.055	-0.620 <sup>ns</sup>	0.700 <sup>*</sup>	0.132 <sup>ns</sup>
Pre-harvest	8.508	9.826	9.035	8.638	-1.318 <sup>ns</sup>	-0.527 <sup>ns</sup>	-0.130 <sup>ns</sup>
Harvest	4.004	3.979	0.994	2.232	0.025 <sup>ns</sup>	3.010 <sup>***</sup>	1.772 <sup>***</sup>
Transport	4.407	4.171	1.372	2.615	0.236 <sup>ns</sup>	3.035 <sup>***</sup>	1.791 <sup>***</sup>
Miscellaneous	2.198	2.183	0.649	1.335	0.015 <sup>ns</sup>	1.549 <sup>***</sup>	0.862 <sup>ns</sup>
Rent	31.917	28.700	26.475	27.143	3.217 <sup>**</sup>	5.442 <sup>***</sup>	4.774 <sup>*</sup>
Subtotal	55.220	53.666	42.012	46.019	1.554 <sup>ns</sup>	13.208 <sup>***</sup>	9.201 <sup>ns</sup>
Revenue	75.527	69.082	56.914	63.259	6.445 <sup>ns</sup>	18.613 <sup>***</sup>	12.268 <sup>**</sup>
Net Farm Income	20.307	15.415	14.901	16.240	4.892 <sup>ns</sup>	5.406 <sup>ns</sup>	4.067 <sup>***</sup>

\*\*\*, \*\*, and \* Significant at 1%, 5%, and 10% probability levels, respectively

<sup>ns</sup> Not significant at 10% probability level

<sup>a</sup> Associated with KUD Gondanglegi