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Review Article

INCREASED PRODUCTION AND PRICE STABILITY: ALTERNATIVE SOLUTIONS TO THE POVERTY TRAP OF SMALL FARMERS

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Abstract
This article discusses the problem of coffee as an important commodity in trade and sources of foreign exchange as well as a source of income for coffee smallholders. Conditions as in the case of agriculture in general are that coffee production cannot be separated from the role of small farmers and in fact the dominant is still in the poverty line. This study aims to determine the factors that influence the income of coffee farmers in South Sulawesi Province by using a path analysis. In addition, this study also examines efforts in formulating programs aimed at increasing the income of smallholder coffee farmers. The results showed that the significant variables on the income of coffee farmers who were indicators of poverty were production variables, farm costs, number of productive trees, exchange rates, and quality of coffee produced by farmers. The main result in this study is that the exchange rate plays an important role in increasing farmers' incomes. In addition, increased production also contributes to increasing farmers' incomes. Therefore, to overcome the poverty of coffee farmers, a strategic program to increase production is needed, namely the expansion of coffee plants, the use of superior seeds, the development of post-harvest technology, improvement of quality and quantity of coffee, improvement of knowledge and skills, development of the marketing sector and optimization of the role of institutions.

Keywords: production, farming costs, productive trees, exchange rates, quality.

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INTRODUCTION

Coffee is an important commodity in global trade because it is a source of foreign exchange, employment and a source of income for farmers and other economic actors involved. The coffee commodity is also a promising commodity for farmers to improve their welfare. Market opportunities for coffee commodities have great prospects. Indonesia became the fourth producer after Brazil, Vietnam and Colombia which supplied around 5.9% of world coffee needs. Indonesian coffee exports are dominant in the form of dried beans and a small portion in the form of processed products. Coffee plantations in Indonesia consist of community plantations, government plantations (PTPN), and privately owned plantations. 90% of the production came from community plantations and the rest (± 10%) came from large estates (both state and private). This fact shows that the contribution of Indonesian small coffee farmers has an important role in increasing coffee production in Indonesia.

The condition as in the case of agriculture in general is that coffee production cannot be separated from the role of dominant small farmers who are still in the poverty line. While the percentage of production (around 95%) comes from smallholder plantations, where smallholder plantations increased 0.7% in 2017 to reach 636.7 tons (BPS, 2018) with the area of smallholder plantations reaching 1,227,787 Ha (BPS, 2016). Indonesian coffee exports in 2018 with a value of 410,073.00 (USD thousand).

When viewed from the percentage of production (90%) coming from smallholder plantations, the contribution of small farmers to the value of exports in 2013 accounted for 96.01% (US $ 1,119,688,976), a very large contribution big in the Indonesian economy. This fact indicates that Indonesia can not be separated from the role of small coffee farmers, if small coffee farmers continue to change commodities to horticultural crops, then Indonesia cannot avoid the decline in coffee production growth, and of course it will have an impact on the decline in Indonesia's foreign exchange. Therefore, an urgent problem is to immediately overcome the potential for poverty for smallholder coffee farmers as the spearhead of the production and support of Indonesia's coffee exports to the global market.

The openness of the free market limited *ASEAN Economic Community* (AEC), did not rule out the possibility of a gap against the deterioration of coffee farmers in Indonesia, due to the inability to maintain the quantity and quality needed by the market. *ASEAN Economic Community* is described as the integrity of the global economy must have several keys, namely political will, coordination and resource mobilization, capacity building and institutional strengthening, public and private sector consultations. Indonesia as a developing country cannot be separated from the problem of poverty (Arsyad et al., 2015), especially at the level of small farmers. The openness of the market does not guarantee an increase in income for smallholders of coffee, where coffee is an excellent commodity and has export value.

Efforts to increase the income and welfare of coffee farmers often face obstacles. These constraints include limited capital, narrow land, relatively low levels of knowledge, lack of skills and natural conditions (Istianah, et al, 2015). Financial or technological input is very instrumental in releasing farmers from the poverty trap (Lade, et al., 2017). The factor of public institutions as stakeholders to increase production contributes to risk and impedes production at the farm level (Jassogne et al., 2013), this provokes a decline in the quality of life of farmers as a result of high input and increasing consumption (Ruben & Fort, 2012) but the farm-gate price of coffee does not significantly improve their economy.

These constraints greatly affect the production and productivity of coffee and have an impact on the level of income of coffee farmers. This condition also occurs in some coffee production centers such as in South Sulawesi Province. This study aims to determine the factors that influence the income of coffee farmers in South Sulawesi Province which causes them to remain in poverty. Therefore, it is also important to have a strategy program to increase farmers' income through increasing coffee production.

RESEARCH METHOD

To answer the problem of the problem in this study, we chose to study several coffee center areas in South Sulawesi. Where South Sulawesi has been known as a producer of specialty coffee, such as toraja coffee and kalosi coffee. Therefore, the location of this study was carried out in North Toraja and Enrekang Regencies in the Southern part of South Sulawesi. As a comparison area is the eastern part of South Sulawesi, namely Sinjai and Bantaeng Regencies that have coffee potential besides Toraja and Enrekang.

Data obtained from interviews with coffee farmers as many as 400 respondents who were selected at random simple. These farmers are included in the category of farmers who have low income from coffee farming. To answer the problem of the weak income obtained, it is done by path analysis. The data analysis used is based on the dependent variable approach namely coffee farm income (Rp / year). It is assumed if the income is influenced by several factors, namely production (kg / year), price (Rp / kg), farming costs (Rp / year), number of trees (productive trees), land area (hectares), labor (HOK) , exchange rates, coffee quality, age (years), level of education (years), and farming experience (years).

To answer the problem of poverty, the researchers tried to arrange poverty alleviation programs as a result of low coffee production. To determine the priority of the existing strategic program as an effort to increase coffee farmers' production and income, the analytical approach is carried out using the interpretive structural modeling (ISM) method. The program is based on the priority needs of farmers, where this strategic program is a key program in the development of coffee production in South Sulawesi so that it can get out of the pressures of weak incomes that cause smallholder coffee farmers to be in poverty.

To compile a key program in reducing the poverty of coffee small farmers, the preparation of a key program is carried out using a focus group discussion approach. Information sourced from informants who are in institutions both government and independent agencies engaged in coffee cultivation and marketing in South Sulawesi. Programs are determined based on priority scale results based on ISM.

RESULTS AND DISCUSSION

Profile of Respondent Farmers

The profile of respondent farmers to be described in this section are: (1) Age structure of respondent farmers, (2) Education level of respondent farmers, (3) Farmer experience of respondent farmers, and (4) Number of family members of respondent farmers .

Age of Respondent Farmers

One factor that affects a person's productivity and work ability is age. This is in line with what was stated by Nurhapsa, et al (2015) that age is one of the factors that influence one's productivity and work ability. As a person ages, his productivity and work ability also increases, and subsequently his productivity and work ability decline at a certain age. Age also affects the physical ability and mental maturity as well as the respondent's physical abilities in managing a business. The distribution of respondents by age is shown in Table 1.

Table 1. Distribution of Respondent Farmers by Age at Coffee Farms in South Sulawesi Province.

Age (years)	Number (people)	Percentage (%)
21 - 25	5	1.25
26 - 30	35	8 , 75
31 - 35	27	6.75
36 - 40	55	13.75
41 - 45	73	18.25
46 - 50	75	18.75
51 - 55	76	19.00
56 - 60	27	6.75
> 60	27	6.75
Total	400	100

Source: Processed Primary Data, 2018

Based on Table 1 it can be explained that in general the respondent farmers are still classified in the productive age range that is 93.25 percent and the remaining 6.75 percent are classified as unproductive age. This shows that the respondent farmers still have the physical ability to try optimally in managing their business so that they can obtain higher yields and profits. The results of this study are in line with the results of research conducted by Istianah, et al (2015) which shows that the age of coffee farmers in Jambu District, Semarang Regency is generally classified as productive age so that it is still strong and still eager to develop its business and

Educational Level of Respondent Farmers

The ability of farmers to accept innovation and information is highly dependent on the level of education they have. The higher the level of one's education, the easier it is to understand and accept new innovations. In addition, the level of education can be considered as a means of investment because it is considered capable of helping to increase the knowledge, skills and expertise of workers who are the capital in managing their farms and can be more productive so that they can increase their income (Nurhapsa et al, 2015). Table 2 shows the distribution of respondent farmers by education level.

Table 2.Distribution of Respondent Farmers by Education Level in Coffee Farming in South Sulawesi Province.

Level of Education (year)	Number (person)	Percentage (%)
Not Completed Elementary Middle	6	1.50
School School	182	45.50
Junior	111	27.75
High School	77	19.25
Diploma / Bachelor Degree	24	6.00
Total	400	100

Source: Primary Data Processed, 2018

Education level is the length of the respondent farmers in taking formal education (years). Based on Table 2 it can be explained that the level of education of farmers is generally still low, namely elementary school 182 people (45.50%), junior high school 111 people (27.75%), high school 77 people (19.25%) and Diploma / Bachelor as many as 24 people (6.00%). This shows that generally farmer respondents have a low level of education. With a low level of education it will

affect the acceptance of information or innovations related to farming. Research conducted by Istianah, et al (2015) shows that generally coffee farmers in Jambu District, Semarang Regency have a low level of education, namely elementary schools as much as 73.91 percent (51 people) of 69 respondents.

Coffee Farming

Experience The coffee farming experience in question is the length of time the respondent farmers have worked in coffee farming. Nurhapsa, et al (2015) stated that farming experience is one of the determining factors in the success of a farm. There is a tendency that the longer a farmer manages a farm, the more experience he gets related to the pros and cons of farming. Distribution of respondent farmers based on coffee farming experience is shown in Table 3.

Table 3.Distribution of Respondent Farmers Based on Farming Experience in Coffee Farming in South Sulawesi Province.

Farming Experience (years)	Number (people)	Percentage (%)
1 - 5	11	2.75
6 - 10	44	11.00
11 - 15	35	8.75
16 - 20	101	25.25
> 20	209	52.25
Total	400	100

Source: Processed Primary Data, 2018

Table 3 shows that the majority of respondent farmers had experience of coffee farming over 5 years which amounted to 97.5 percent. This shows that the respondent farmers have a long experience of coffee farming. With this experience, it is easier for farmers to accept and choose the innovations they need in coffee farming. Lack of adequate knowledge is a limitation for farmers to create and motivate them (Ngowi, 2003). Key factors increasing efficiency in coffee production include formal education and farming experience (Ho et al., 2014).

Area of Farming Farming

Land is one of the important production factors in conducting farming activities. Extensive effect on the amount of production produced and will further affect the amount of income received by farmers. Distribution of respondent farmers based on the area of coffee planted is shown in Table 4.

Table 4. Distribution of Respondent Farmers by Area of Coffee Farming in South Sulawesi Province.

Land Size (hectares)	Number (people)	Percentage (%)
0.10 - 0.50	182	45.50
0.51 - 1.00	159	39.75
1.10 - 1.50	41	10.25
1.51 - 2.00	14	3,50
> 2.00	4	1.00
Total	400	100

Source: Processed Primary Data, 2018 Small

land area shows if the farming system is inefficient compared to agriculture using large land (Rio & Shively, 2005) . Land area, of course, has an impact on volume per unit area so that income is greater per hectare and can increase farmers' yields (Rice, 2008).

Analysis of Factors Affecting Poverty of Coffee Farmers in South Sulawesi Province

Path analysis is an applied form of multi regression analysis. Using path analysis can be calculated the amount of direct influence of the independent variables on the dependent variable (Kerlinger, 2003). The results of the path analysis of the factors affecting coffee farmer poverty in South Sulawesi Province are shown in Figure 1.

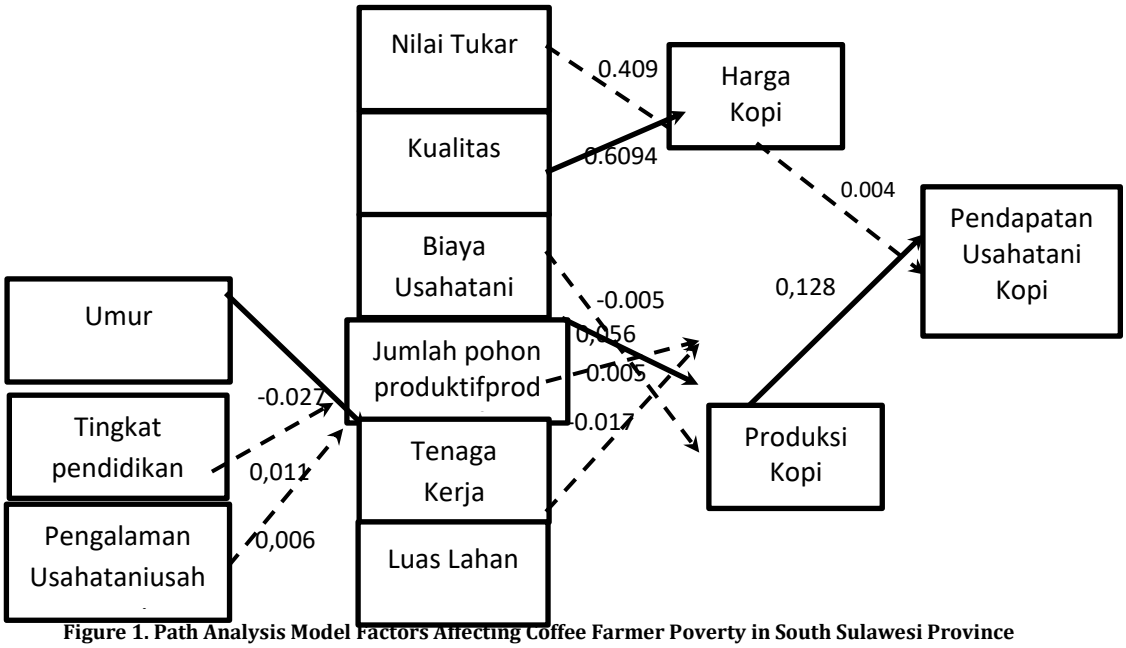

Figure 1. Path Analysis Model Factors Affecting Coffee Farmer Poverty in South Sulawesi Province

Based on the path analysis results shown in Figure 1, it can be explained that factors that directly influence coffee farmers' income as an indicator of poverty are coffee prices and coffee production. To see the effect of the independent variables on the dependent variable Anova test is performed which is shown in Table 1.

Table 1. Table ANOVA

ANOVA[a]

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	281.331	11	141	181.549	25.576,000[b]
	Residual	54.659	388			
	Total	335.990	399			

a. Dependent Variable: income

b. Predictors: (Constant), call, cost, tdtpddkn, labor, price, age, quality, production, amount, exchange rate, land area

Table 1 shows that the independent variables together have a very significant effect on the dependent variable. This is indicated by the F test where the significance value is smaller than the level of confidence used (α = 5%). These results are in line with the results of research conducted by Istianah, et al (2015) which show that together the independent variables significantly influence the dependent variable. To see the partial effect of variable X on variable Y is shown in Table 2.

Table 2.Partial Effect of Independent Variables (X) on the Dependent Variables (Y).

Variable X	Effect of X to Y	Significance
Price	0.004	Not significant
Production	0.128	Significant
Costfarming	-0159	Significant
productive trees Total	0.056	Significant
land area	-0.017	Not significant
labor	0.005	Not significant
exchange rate	0.409	Significant
Quality	0.609	Significant
Age	-0.027	Not significant
Education level	0.011	Not significant
Farming experience	-0.006	Not significant

Table 2 shows that in the aspect of production, there are two variables that do not significantly affect the level of income of coffee farming in South Sulawesi Province, namely land area and labor. Based on the conditions in the field, it shows that the average farmer uses additional labor at the time of harvest while at the time of planting or maintenance does not generally use additional labor. The area of the land has no effect on the income of coffee farmers because the conditions on the ground indicate that many farmers' coffee plants are no longer productive. The results of this study differ from the results of research conducted by Sari (2018) which shows that land area has a significant effect on the income of coffee farmers in Bintang District, Central Aceh Regency.

Farming cost variable has a negative and significant effect on coffee production in South Sulawesi Province while the variable number of productive trees has a positive and significant effect on coffee production. This means that every addition of one unit of productive trees will increase the income of coffee farmers which has an impact on reducing the poverty level of coffee farmers in South Sulawesi Province. For the quality and exchange rate variables have a significant effect on the price of coffee. This shows that if the quality and exchange rate increases, the price of coffee also increases.

Bussolo et al. (2006), reported that farmer income and poverty reduction were high and influenced by coffee prices. Acceptance of stable prices for farmers can be an intensive offer for farmers to improve yields and quality (Ruben & Zuniga, 2011). Price is an important element in influencing the welfare of smallholder households (Ruben & Fort, 2012). Therefore, it can be said that the price is closely related to the increase in production and welfare for small coffee farmers in South Sulawesi.

The free trade of coffee commodities cannot be separated from the value of the currency as the exchange rate of international trade. The exchange rate should be a government policy to measure the income of farmers. If in the United States the devaluation of the dollar becomes important for their agriculture (Schuh, 1974), then Indonesia should not neglect the role of exchange rate policy. Exchange rate depreciation does not apply universally but is stimulative in certain conditions (Barrett, 1999).

The increase in prices on the international market does not affect domestic price speculation, this makes small coffee farmers do not feel the difference in the exchange rate against the rupiah. Price speculation tends not to stabilize but rather makes prices at the farm level unstable (Newbery, 2008). This shows that the coffee trade in South Sulawesi is still far from fair trade which prioritizes price transparency, while the coffee commodity is now a product of international trade.

Strategic Programs in Suppressing Low Coffee Farmer Income

Results of the analysis *Interpretive Structural Modeling* (ISM)related to strategic programs to encourage increased coffee production in South Sulawesi obtained 12 strategic programs (sub elements). The twelve programs are sub elements in the linkage and dependent position (Table 3). Of the 12 sub-elements there are 7 strategic programs as key elements (priority).

The higher DP value indicates that the program is an important program to be carried out in order to increase coffee production in South Sulawesi. The priority (key) program is a special program carried out by the relevant institutions. A program that is in a linkage position is a program that has a driving force where the program nets are able to influence other existing programs. The program in the linkage position is not bound by other programs but can increase the running of other programs to increase coffee production in South Sulawesi.

A large dependent value (D) indicates if the existing program is in the dependent position. Programs that are in a dependent position are programs that depend or are influenced by other programs. So to improve the program in the dependent position needed other special programs to be able to encourage the success of the dependent program.

Results *Interpretive Structural Modeling* (ISM) there are programs that are in a position independent. This shows that the increase in coffee production in South Sulawesi is the need for programs that are indirectly related to the needs of coffee farmers. Generally the problem faced by farmers is the problem of economic improvement. Therefore, the existing program must synergize with other institutions that influence the improvement of opinion. By increasing farmers' income from coffee commodities, farmers will be able to maintain an increase in coffee production in South Sulawesi.

Table 3.Comparison of DP-D weights for coffee production improvement strategy programs.

Position of	Sub Element	Weight	
		DP	D
Linkage			
1	Rejuvenation of coffee plants	1,00 *	0,92
3	Development of postharvest technology	1,00 *	0,92
8	Development of marketing sector	1,00 *	0,92
2	Use of superior seeds	1,00 *	0, 83
6	Increasing the quality and quantity of	1.00 *	0.83
7	Increasing knowledge and skills of	1.00 *	0.83
10	Optimizing the role of the institution	1.00 *	0.83
4	Assistance in increasing coffee production	0.92	0.83
11	Strengthening commitment between institutions	0.92	0.83
12	Local wisdom development	0.92	0.83
5	Capital ssupport	0.67	0.83
	Average	**0.95**	**0.86**
Dependent			
9	Provision of farmer incentives	0.08	1.00
	Average average	**0, 08**	**1.00**

Description : DP (Driver Power)
D (Dependent)*) Priority program (key)

The results of the *Interpretive Structural Modeling* (ISM) analysis show that if the program is in a linkage position, there are 11 priority programs as a strategy to increase coffee production in Sulawesi South (Figure 2). There are 7 key programs (priorities) in the coffee improvement strategy in South Sulawesi, namely (1) rejuvenation of coffee plants, (2) development of postharvest technology, (3) development of the marketing sector, (4) use of superior seeds, (5) increasing quality and quantity, (6) increasing knowledge and skills, and (7) optimizing the role of institutions. The seven programs have a DP value of 1.00.

There are 4 other programs in the linkage position, namely assistance in increasing coffee production (DP = 0.92), strengthening commitment between institutions (DP = 0.92), growth of local wisdom development (DP = 0.92), and capital support (DP = 0.67). Programs in the linkage position are sub-elements as a strategy to stabilize the increase in coffee production in South Sulawesi.

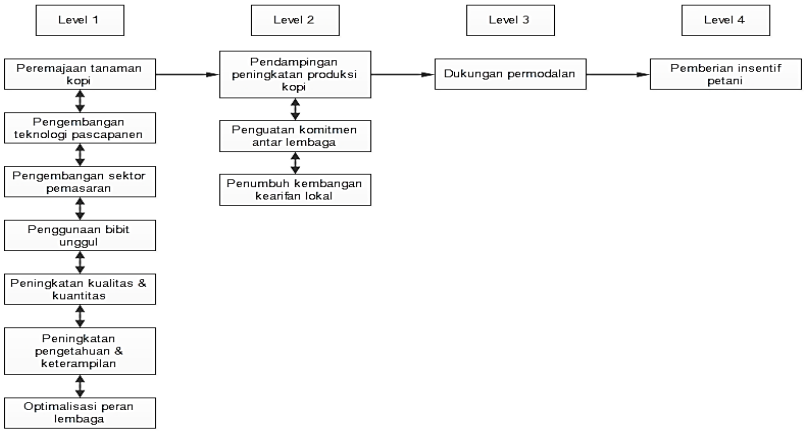

Figure 2.Structure model of the strategic program for increasing coffee production in South Sulawesi.

There are 3 strategic programs that are in the first position with a DP value = 1.00 and a value of D = 0.92, namely coffee plant rejuvenation, postharvest technology development, and development of the marketing sector. The coffee plant rejuvenation program aims to stabilize crop production, where farmers tend to grow old. Old plants will produce decreased production due to lack of productive branches. Postharvest technology development programs are needed by farmers to be able to increase the added value of the coffee commodity cultivated. With postharvest processing, farmers will not sell their produce in the form of logs (cherries). Postharvest processing will increase the selling value of coffee production. The marketing sector development program is needed to guarantee the market and especially the price for farmers in marketing their products.

Programs at level 1 consist of 7 strategy programs. The first strategy program is the rejuvenation of coffee plants. This is due to the large number of farmers' coffee plants that are no longer productive. In general, coffee plants cultivated by farmers are old and there are still less farmers who rejuvenate coffee plants. Rejuvenation aims to replace plants that are not economically productive. Plant rejuvenation can be done such as grafting, pruning, and new planting.

The second strategy program at level 1 is the development of postharvest technology. Farmers tend not to process products until post-harvest, due to the technology used is traditional methods. Where technology input for farmers is still considered difficult. In addition, the application of technology is also still considered not to have a major impact (contribution) on farmers' incomes. Whereas on the one hand, technology inputs can increase added value through processing coffee yields. The technology used today still requires a long time so that farmers' income is hampered.

The development of the marketing sector is the third strategic program at level 1. The existence of the market is an important sub element for increasing coffee in South Sulawesi. The obstacle in the development of coffee farming at present is not being accepted by the market for some types of coffee in South Sulawesi, this is due to the closed access to information and lack of promotion as a step in marketing products for coffee farmers. Partnership support is needed to conduct surveillance to the sustainable marketing stage for the development of farmers' coffee farms.

Using superior seeds is the fourth strategy program at level 1. Farmers generally use plant seeds / seeds sourced from other farmers' gardens. The source of seeds / seeds used comes from the physical characteristics of the parent plants, such as having large, healthy, green, large trees, and quite old age. While the source of broodstock is unknown origin and origin of the broodstock aside from the experiences and stories of the farmers themselves. To produce optimal production, superior seeds / seedlings are needed from reliable (certified) sources. Plant material is very influential on increasing coffee production.

Improving the quality and quantity of coffee is the fifth strategic program at level 1. Farmers' weakness in handling the quality and quantity of the results obtained is because farmers consider it not to be an added factor to the current selling value. Many farmers in several coffee-producing regions, especially the East and South parts of South Sulawesi, harvest coffee that is still green. This factor is caused by urgent economic needs to be met.

The sixth strategy program at level 1 is to increase knowledge and skills. Knowledge is devoted to the importance of quality in increasing coffee production, where the quality of coffee achieved becomes a part that determines the sale value of each commodity, while the skills that play a role are the use and application or adoption of technology according to farmers' needs. Both of these factors are considered to be able to increase coffee production in South Sulawesi because it can affect other sub-elements such as selling value and market.

The seventh level 1 strategic program is the optimization of roles between institutions. The role of institutions both government agencies and other independent institutions become institutions that have their respective roles involved in the development of coffee production in South Sulawesi. existing institutions can provide a role to the community related to planning, implementation and control.

Level 2 there are 3 sub-elements of a strategic program that can increase coffee production in South Sulawesi, namely assistance in increasing coffee production, strengthening commitment between institutions, and developing local wisdom. Assistance is urgently needed by coffee farmers with the aim that they can increase the yield of coffee production and obtain a decent income.

One of the programs at level 2 is strengthening inter-institutional commitment. Existing institutions should be able to carry out activities together and support each other in relation to coffee improvement policies in South Sulawesi. institutions such as research institutions, extension agencies, communities and / or the private sector are able to work together to assist farmers at the upstream to downstream levels in order to increase coffee production.

Coffee management in several areas in South Sulawesi found areas that still retain the local characteristics of the local culture. Local wisdom (level 2) can be a selling point in promoting the name and type of coffee owned by each region. Each region produces a different flavor of coffee, where coffee is influenced by the topography and altitude of the coffee cultivation source area.

Level 3 is a capital support program. As a result of the length of the harvest period, farmers switch and do other business besides coffee. Capital is a factor causing many farmers to switch to other commodities. Therefore, the importance of strengthening capital at the farm level. The source of capital can be in the form of the development of cooperatives or associations based on the needs of the respective regions which are savings and loans or the development of microfinance institutions to help capitalize rural communities.

This intensive farmer program is a level 4 program. This program is a dependent program, so no special policies are needed to develop this program. Intention for farmers can be channeled through other programs such as providing production facilities in the form of fertilizers, pesticides, and other agricultural tools. In addition, the existence of synergy between institutions such as animal husbandry, agriculture / plantations, and forestry can be realized integrated (integration of livestock-coffee-forest plants).

CONCLUSIONS AND POLICY IMPLICATIONS

Based on the results and discussion described in the previous section, the conclusion of this study is the effect of the independent variable (X) as a whole on the dependent variable (Y) of 83.7% and the remaining 16.3% is influenced by other factors not included in the equation model research. The big variable that influences the income of coffee farmers which affects the poverty of coffee farmers is the production aspect.

Farming cost variable has a negative and significant effect on coffee production in South Sulawesi Province while the variable number of productive trees has a positive and significant effect on coffee production. This means that every addition of one unit of productive trees will increase the income of coffee farmers which has an impact on reducing the poverty level of coffee farmers in South Sulawesi Province. For the quality and exchange rate variables have a significant effect on the price of coffee. This shows that if the quality and exchange rate increases, the price of coffee also increases. The coffee trade in South Sulawesi is still far from fair trade which

prioritizes price transparency, while the coffee commodity is now a product of international trade.

Strategic programs to increase the income of smallholder coffee farmers in South Sulawesi are 7 key programs, namely (1) rejuvenation of coffee plants, (2) development of postharvest technology, (3) development of the marketing sector, (4) use of superior seeds, (5) quality improvement and quantity, (6) increasing knowledge and skills, and (7) optimizing the role of institutions. The seven programs are in linkage position.

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