Agricultural Socio-Economics Journal ISSN: 2252-6757
Volume 16, Number 03 (2016): 143-150

ANALYSIS OF INTEGRATED AGRICULTURE FARMING PROGRAM (SIMANTRI) IN MENDOYO DAGIN TUKAD VILLAGE, JEMBRANA, BALI, INDONESIA

IGA. Angga Prasetya Budiarta[1], Sujarwo[2]

[1] Student of Socio-Economics Department, Faculty of Agriculture, University of Brawijaya, Malang
[2] Lecturer of Socio-Economics Department, Faculty of Agriculture, University of Brawijaya, Malang

*corresponding author: sujarwo.ub@gmail.com

ABSTRACT: The objectives of this study are to analyze the implementation of the Simantri program in Mendoyo Dangin Tukad Village and to analyze the profit level of the Simantri farmers and non-Simantri farmers. The analyses used are descriptive statistics and profits analysis. This study began in the first planting season, which is Januari-April 2016. The sample total is 40 farmers, which consist of 20 farmers joining Simantri program and 20 farmers are not. The non-Simantri farmers are chosen purposively considering similarity among those who join in the Simantri program. The result shows that the implementation of the program in Mendoyo Dangin Tukad runs well. The waste processing of livestock in the village has benefit in reducing external input needs, such as inorganic fertilizer and pesticides. Waste of plants and animals are useful material for raising livestock, increasing land fertility and producing bio-energy. The farmers' profit earned Simantri program is greater than the farmers who do not participate in the program. The source of the increasing farming profit is coming from reducing external inputs of fertilizer and pesticides used.

Keywords: leverage factors, performance, food commodity

INTRODUCTION

Simantri is a program planned by local government of Bali Province in order to overcome many problems in villages especially related to poverty and job creation. The integrated farming system of livestock and crops (food and horticultural crops) and is represented by decreasing waste of those productions and transforming the waste into inputs of production.

The functions of integrated farming is for not only gaining economic aspect of farmers, but also generating benefit in environmental conservation. Bali is one of wonderful islands in Indonesia taking effort in preventing from environmental destruction due to worse agricultural practices. Agriculture is a potential sector can be developed in order to support agro-tourism and preserving organic agriculture practices and resulting organic agricultural products as well.

Zero waste production in agriculture is the main goal of having this program. The orientation of integrated farming is resulting food, feed, fertilizer dan fuel or called 4Fs. This system could increase income of farmers due to reducing the use of chemical fertilizers and increasing the fertility of the soil.

The concept of integrated farming involving plants and animals actually has been long applied by farmers in Indonesia. The concept of integrated farming between crops and livestock promoted by the Institute of Agricultural Research Centre (LP3) is called with Crop-Livestock System (CLS). Farming technology Crop-Livestock System (CLS) is an appropriate alternative in line with the concept of sustainable agriculture. This technology focuses on the relationship among the sub-systems, which complement to each other. In this system, there is a principle of return to the nature law.

Local Government of Bali Province introduced Simantri program for the first time in 2009. There were eight regencies in Bali conducting Simantri program and involving 502 farmers' groups. The program is designed as an instrument to develop not only better farming but also creating new businesses, especially for growing producers of organic fertilizer. In this way, the integrated

farming can create jobs and helping farmers for increasing their income.

Several experiences of integrated farming implementation, such as Nantawan (2013), Atikah *et all* (2015), and Sotirios and Theodoros (2015), had different results. Nantawan (2013) found that entrepreneurship had significant impact in increasing efficiency in integrated farming implementation. Moreover, capital, land and labor had medium impact on efficiency in integrated farming. This study, conducting in Suratthani, Southern Thailand, also confirm that the roles of government was in low level due to the limited local government officer, insufficient budget comparing with the number of farmers.

Atikah et all (2015) conducted study regarding integrated farming and Low External Input Sustainable Agriculture (LEISA) in Sagaracipta Village, Ciparay Sub District, West Java Province, Indonesia. The combination commodities observed were paddy and fish. Those two productions combination, however, had the problem of water availability. This type of integrated farming needs more water in order to grow the fish along with irrigation for the paddy production. The result of this production technique showed that farmers tended to get lower in applying insecticide and more efficiently hindering growing of grass.

Sotirios and Theodoros (2015) studied factors affected the implementation of integrated farming in Greece. The result found that the main factor of the implementation level of integrated farming depends on the subsidy given by government. In European countries and especially Greece, the problem of integrated farming was defined differently comparing to the problem and definition of it in the two previous researchers. Study of Sotirios and Theodoros described what the concern of Greece was in food safety and the quality of products through certifications of integrated and organic farming product; while, in Indonesia and Thailand was more related to using low external input orientation for cost farming reduction.

Indonesia use the term of integrated farming in the perspective of lowering external input and reducing possible explicit cost due to buying external inputs. In this way, integrated farming conducted could result in increasing application of organic fertilizer and reducing application of inorganic fertilizers and reducing pesticides as well. So that, the expenses of inorganic fertilizer and pesticides is getting lower; and therefore, it will increase the farming's profit of farmers.

This study is addressed some questions concerning: (1) what is the implementation of Simantri in Jembrana, Bali Province; (2) How is the different level of income and costs of farmers in Simantri program and the other farmers outside Simantri program.

RESEARCH METHODS

Data and Location

This study is conducted in Mendoyo Dagin Tukad Village, Mendoyo Sub-district, Jembrana Regency, Bali Province, Indonesia. This selection is purposively chosen due to the location of Simantri Program.

Farmers joining this program is 20 farmers. Therefore, all farmers are chosen as research respondent. Furthermore, the farmers outside the program are selected randomly from the population of farmers in the research location who have similar performance as the farmers in the group of Simantri Program. The number of farmers outside of Simantry Program (non-Simantri Program) selected are 20 farmers. Then, the total farmers for this study are 40 farmers.

Data Analysis

Data analysis employed in this study are descriptive statistics in order to get picture of farmers in Simantri and non-Simantri Program regarding implementation of Simantri. It is also describing the socio-economic of those two groups. Moreover, analysis of profit employed is the increment between the revenue an the costs. The costs considered are variable costs and fixed cost. Those costs are calculated for one periode of paddy planting.

RESULTS AND DISCUSSION

Research Location

In the research location, the compotition of male and female are relatively equal with 47 percent of male and 52 percent of female. Among those, there are 56 percent is farmers. That represent the picture of research location as a center of crops production.

As mentioned in the previous section, the total member of Simantri program is 20 farmers; meanwhile, the number of stock farmers is just 10. Therefore, Simantri program encouraged by government is not only regarding to the transfer knowledge how to apply integrated farming system but also giving livestock to be grown for farmers.

Table 1 and Table 2 below depict in more detail related to sex and the occupation composition of the research location.

Table 1. The composition of the society in the research location

Sex	Amount (people)	Percentage (%)
Male	1436	47,43
Female	1592	52,57
Total	3028	100

Source: Mendoyo Dangin Tukad Village monograph, 2015

Table 2. The composition of occupations

No	Occupations	Amount (people)	Percentage (%)
1	Farmer	1107	56.42
2	Craftsman	40	2.03
3	Stock Farmer	10	0.5
4	Civil Servant (PNS)	126	6.42
5	Military	62	3.2
6	Merchants	32	1.63
7	Others	585	29.8
	Total	1962	100

Source: Mendoyo Dangin Tukad Village monograph, 2015

The picture of education in the society is also important point wanted to be shown. The dominant education level of the societ in the research location, which is 3028 people, is elementary school, which is 35.08 percent. However, the educational level proportion of people finishing senior high school is also high, which is 25.46. Among the population in the village, there is about 15.79 percent of it not finishing their elementary school. Moreover, five percent of the society is finishing more than senior high school level. The information for more detail is depicted in Figure 1.

Population characteristics of Tukad Village in 2013 are 56 percent on age of 15 to 56 year and 3 percent of that interval age is unemployed. From the age of 15 – 56 years, there is 37.72 percent of housewife. The other interesting figure is the number of hosehold in the poverty classification, which is 35 households among total 881 households or 3.97 percent. The level of unemployed rate on age of 15 – 56 year and the poverty level are quite close. In this case, eradicate the unemployed people will tend to imply eradicating poverty as well. Then, education levels of society and the other characteristics of population are displayed below.

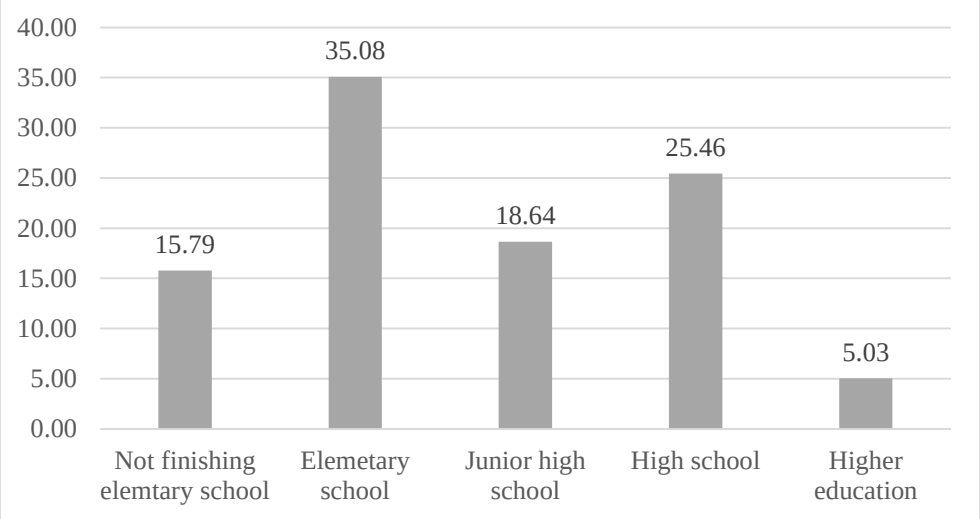

Figure 1. Education levels of society in Mendoyo Dagin Tukad Village
Source: Mendoyo Dangin Tukad Village monograph, 2015

Economic institutions characteristics of Tukad Village is representing the capacity of the society. Total income from agriculture in the village in 2013 was about $ 181,911 (exchange rate IDR 13,200/$), which is increasing from the income in 2012, which is about 155,740 at the same exchange rate level. Plantation is also the production of agriculture that increased significantly in 2013 moving from about $ 47 thousands to $53 thausands. The other significant increase is

livestock production. Livestock production in 2012 was about $ 32 thousands of total production in Tukad Village; then, it was increasing sharply to about $ 96 thousands in 2013. This sharp increase in livestock productions, then, would be relevant if the local government is attempting to connect livestock production and agriculture together in the integrated farming program, which is now called Simantri.

Table 3. Unemployment, income, economic institutions, and poverty in Tukad Village

No	Indikator	Sub-Indikator	Amount	
			2012	2013
1	Unemployment	Population 15 – 56 year	1.723 people	1.730 people
		Population 15 – 56 year unemployed	71 people	54 people
		Population 15 – 56 year as housewife	650 people	637 people
		Population > 15 year difable person unemployed	5 people	5 people
2	Income	Agriculture	IDR. 2.055.779.975	IDR.2.401.235.000
		Forestry	0	0
		Plantation	IDR.620.949.500	IDR. 704.703.400
		Livestock	IDR. 411.425.000	IDR.1.268.649.100
		Fishery	0	0
		Trading	IDR. 348.000.000	IDR. 435.000.000
		Service	0	0
		Tourism	0	0
		Domestic industry	IDR. 6.700.000	IDR. 8.500.000
3	Economic Institutions	Cooperatives	3	3
		Village-owned Enterprise – BUMDes	1	1
		Store	28	35
		Food stores	2	3
4	Poverty	The number of household	876 households	881 households
		Household in poverty level	40 households	35 households

Source: Monografi Desa Mendoyo Dangin Tukad, 2016

In Tukad Village, there are cooperative firms, BUMDes, stores, and also food stores. Three cooperative firms available in Tukad Village shows the higher trend of solid collective actions in the society and it means that the society tends to have higher social capital. BUNDes is the village owned enterprise initiated by Indonesian Ministry of Village, Disadvantaged Region Development and Transmigration. BUMDes is an instrument policy for enhancing local economic capacity and governing local resources into productive and more efficient ways.

The social capital level in Tukad Village is supposed to be the strength of the village in running BUMDes. However, the government and local government should monitor this process and get involve in developing managerial skill and capacity for running BUMDes.

Stores and food store was increase during 2012 to 2013. Stores in Tukad Village increased significantly from 28 in 2012 to 35 in 2013. This sign is positive and representing increasing demand from local people and empowering economic capacity and economic interaction in the village.

From this picture of Tukad Village, Simantri is a beneficial program and is expected to generate positive impact in economic and social environment. Externality aspect of combining those two benefits is the positive perspective of farmers in adopting production activities, which is intensely considering environment in their decision of allocationg resources into production.

Table 4. Production of agricultural products in Tukad Village

No	Commodity	Harvest area (Hectare)	Production (Tons)
1	Padi	165.36	1150.42
2	Jagung	0.5	40.05
3	Kacang Tanah	4.18	6.28
4	Kedelai	12	20.12

Source: Monografi Desa Mendoyo Dangin Tukad, 2016

Regarding crops productions, there are 4 major crops produced, which are paddy, maize, peanuts, and soybean. However, the production level in the farming production is not in the same level. Table 4 is represented this agriculture conditions in Tukad Village. Most of land resource is employed to produce paddy as the main staple food of Indonesian including Bali people. The productivity of paddy/rice is about 7 ton per hectare. That is higher level of productivity comparing to the national level, which is around 6 ton per hectare.

Table 5. Respondents characteristics of Simantri and Non-Simantri

Type	Classification	Amount	Percentage
Non-Simantri	Age (Year)		
	>40	3	15.00
	>40 – 50	9	45.00
	>50 – 60	6	30.00
	>60	1	5.00
	Education		
	Elementary	5	25.00
	Junior high school	3	15.00
	High School	12	60.00
	Higher Education	0	0.00
	Experience (years)		
	<10	2	10.00
	>10 - 15	7	35.00
	>15	11	55.00
	Land used (Ha)		
	<0.25	2	10
	>0.25 - 0.50	8	40
	>0.50 - 0.75	6	30
	>0.75	4	20
Simantri	Age (Year)		
	>40	4	20.00
	>40 - 50	10	50.00
	>50 - 60	6	30.00
	>60	0	0.00
	Education		
	Elementary	2	10.00
	Junior high school	6	30.00
	High School	12	60.00
	Higher Education	0	0.00
	Experience (years)		
	<10	0	0.00
	>10 - 15	10	50.00
	>15	10	50.00
	Land used (Ha)		
	<0.25	1	5
	>0.25 - 0.50	11	55
	>0.50 - 0.75	6	30
	>0.75	2	10

Source: Monografi Desa Mendoyo Dangin Tukad, 2016

Respondent Characteristics

Tukad village rice farming is quite intensive. Rice planting in this village could performed two to three times a year. First growing season is January to April, the next planting season is around May to August and the last season is planting around September to December. On average, paddy/rice is planted twice a year interspersed with a planting other crops, such as vegetables, soybean, or maize, in the cropping year. Before the farmer in the village start planting rice, they must first take into account the Balinese calendar, which is the local wisdom of the local farmers.

The next analysis of this study is displaying what are the charcteristics of farmers joining in Simantri program and the farmers who are not. It will be started based on the characteristics of age, education, experiences, and land used by farmers for rice production.

Farmers in Simantri program and in non-Simantri program are relatively equal in term of age, education, and land used. There are 15 respondents of Simantri and 16 respondents of non-Simantri. The proportion of senior high school for both groups are 60 percent. Elementary school is 25 percent for non-Simantri farmers and it is 10 percent for Simantri farmers. Both groups do not have farmer who have higher education than senior high school. Moreover, land used for farmers in those two groups are about 0.25 hectare to 0.75 hectare. The proportion of respondent regarding this factor is 70 percent for both groups.

The experience determine whether the farmers tend to adopt integrated farming or not. There are 50 percent of farmers who have 10 – 15 years experience in Simantri program. and there is no respondent of Simantri who has experience less than 10 year. On the other side, non-simantri group of farmers have 10 percent of farmers, who have experience less than 10 years. The farmers of this group who have the experience more than 15 years are 55 percent. For more detail, the information is provided in the table above.

The Implementation of Simantri Program

Jembrana is one of the districts that receive aid Simantri program by the provincial government of Bali. Simantri activities in the District Jembrana was implemented from 2009 to the current time with total of 55 locations. Pekutatan sub-district was the first area where the Simantri program in 2009.

The program is planned to be implemented or developed every year. The number of recipients Simantri activities in Jembrana is as follow.

Table 6. Number of Simantri in Jembrana Regency in 2009 – 2015

No	District	Number of unit/ group							Total
		2009	2010	2011	2012	2013	2014	2015	(unit)
1	Pekutatan	1	-	5	1	1	-	-	8
2	Mendoyo	-	-	3	3	3	1	2	12
3	Jembrana	-	-	3	3	2	4	-	12
4	Negara	-	1	-	3	2	2	2	10
5	Melaya	-	1	1	2	3	4	2	13
	Total	1	2	12	12	11	11	6	55

Source: Agriculture Agency of Jembrana Regency, 2016

The integrated farming as the approach of running Simantri program has been conducted and has been expected to have benefit in increasing organic fertilizer availability and reducing inorganic fertilizer applications. Tukad Village is one of the village having this program and run this program successfully in 2016.

Integrated farming conducted in Tukad Village supports the government effort of increasing organic matter in the soil, increasing productivity of crops. Moreover, the integrated farming also has been projected to increase livestock availability because farmers are not only considering increasing production in crops but also finding new opportunity for generating benefit in growing livestock. As a result, those will increase the farmer's income.

The Simantri Level Income

Simantri program has been successfully reducing the application of inorganic fertilizer significantly

and also reducing use of pesticides. Table 7 shows this measure.

Table 7. Cost structure of Simantri and non-Simantri farmers (IDR/Hectare)

No	Inputs	Simantri	Non-Simantri
A	Variable costs (IDR)		
1	Seed	451,366.12	452,381.95
2	Fertilizer	982,295.08	1,849,801.59
3	Pesticides	448,825.45	629,613.09
4	Herbiside	266,885.24	344,940.47
5	Labor	4,524,590.16	4,551,587.30
	Total variable cost	6,673,962.05	7,828,324.40
B	Fixed costs (IDR)		
6	Land rent	3,600,000.00	3,600,000.00
7	Depreciation costs	50,054.64	45,059.52
8	Subak	550,000.00	540,079.40
	Total fixed cost	600,054.64	585,138.92
	Total costs	10,874,016.69	12,013,463.32

Source: Primary data analyzed, 2016

This result shows that the costs of Simantri farming is reducing due to lower external inputs used, especially for inorganic fertilizer and pesticides. Considering the fixed cost of farming, Simantri farmers and non-Simantri farmers are not that significant different. Total land rent per year is about IDR 7.2 millions and assuming there are two planting season at least; therefore, it is about IDR 3.6 millions considering as fixed cost for once planting season. Meanwhile, the profit of Simantri farmers is IDR 18.62 millions and IDR 17.04 millions for non-Simantri farmers. However, this research is in basic analysis describing the Simantri program. More analysis will observe and provide more information regarding this beneficial program. Production efficiency and profit gap methodology, which has been conducted by Sujarwo and Saghaian (2013) for shallot, can be used in conducting future research of observing the effectiveness of this program in farming efficiency and observed profit gap.

The other information is the value of profit earned by farmers. The profit of Simantri income and non-Simantri are not significantly different. However, the Simantri farmers are having more sustainable farming and livelihood since the fertility of soil and the less depending on the external inputs. Furthermore, the other source of income can be generated from livestock as well.

Table 8. Farmers' income of Simantri and non-Simantry

No	Description	Simantri	Non-Simantri
1	Penerimaan	29,495,081.97	29,056,547.62
2	Biaya	10,874,016.69	12,013,463.32
3	Pendapatan	18,621,065.28	17,043,084.30

Source: Primary data analyzed, 2016

CONCLUSION AND SUGGESTIONS

1. The implementation of integrated farming in Tukad Village has been done successfully. The combination of livestock (cattle) and paddy. There are three processes involved, which are implementation of livestock production, paddy production, and livestock waste treatment application. Cummulative processes on integrated farming generate benefit not only economic benefit but also environment, which is increasing the availability organic matter in the soil and reducing application of inorganic vertilizer and pesticide. The whole process will

give positive impact for the long-run agriculture productions.

2. Integrated farming has been acquire of Tukad farmers who joining in the program. It cause reduction of cost production which is IDR 12.01 millions for non-Simantri and IDR 10.87 millions for Simantri. The short-run benefit in reducing cost and prevent losing profit when considering sustainability is the significant role of Simantri program.

REFERENCES

Changkid, N. (2013). The Factors Production Use Efficiency in the Integrated Farming in Suratthani Province, Southern Thailand. *Procedia-Social and Behavioral Sciences*, *91*, 376-384.

Nurhayati, A., Lili, W., Herawati, T., & Riyantini, I. (2016). Derivatif Analysis of Economic and Social Aspect of Added Value Minapadi (Paddy-fish Integrative Farming) a Case Study in the Village of Sagaracipta Ciparay Sub District, Bandung West Java Province, Indonesia. *Aquatic Procedia*, *7*, 12-18.

Papadopoulos, S., & Markopoulos, T. (2015). Factors Affecting the Implementation of Integrated Agriculture in Greece. Procedia Economics and Finance, 33, 269-276.

Saghaian, S. (2013). Profit Gap Analysis on the Small Scale Production of Shallot: A Case Study in a Small Village in East Java Province of Indonesia. In 2013 Annual Meeting, February 2-5, 2013, Orlando, Florida (No. 142550). Southern Agricultural Economics Association.