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Impact of the Development of Industrial Bio Agricultural Model against the Additional Value of Farming on Dry Land in Tabanan Bali

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Abstract:

The main objectives of this study are (1) to analyze the impact of the development of bioindustry farming models on value added farming on dry land in Tabanan Bali (2) to analyze what factors influence farming value added in the development model of bioindustry in dry land in Tabanan Bali and . The study was conducted in Antapan Village with a sample of 45 farmers, data collected by survey techniques using questionnaires. Data were analyzed using descriptive analysis, R / C, and multiple linear regression. The results of the study found that the impact of the development of bio industry farming models could provide added value for farming from processed products in the form of fruit-flavored vegetable juice; avocado, pineapple and srikaya and processed products of spinach chips with an average value of IDR. 9,302,500 / year. The factors that influence the added value of farming in the bio industry farming model in Antapan Village are, the number of seeds, the amount of use of organic fertilizer and the amount of labor use.

Keywords: Farming, bio industry, value added, dry land, processed products

Introduction:

The agricultural development program that is centralistic or sub-sectoral in nature (partial) causes farmers as farmers to become part of the farmers to become food crop farmers, horticulture farmers, livestock farmers, plantation farmers. This bonding has a negative impact especially on smallholders (less than 0.5 ha), because the agricultural assets owned cannot be utilized optimally. Human efforts that deny the rules of ecosystems may be able to spur land productivity and yield in the short term, but in the long run can cause environmental destruction, if there is no change in policy and the existence of activities / programs to overcome these problems, one of the government efforts to overcome this problem is to develop a bioindustry-based agricultural model.

In the Strategic Plan of the Agricultural Research and Development Agency for 2015 - 2019 several things can be used as references or ideas in understanding ideal bio-industrial agriculture. The main points of thought are; agriculture is developed by producing as little useless waste as possible, so that it is able to preserve nature or reduce environmental pollution, agriculture is developed using as little external input as possible so that production costs can be minimized which will increase the competitiveness of agricultural products for food, energy and industrial raw materials, agriculture is developed by using as little energy as possible from the outside, while reducing the threat of increasing global warming in the integration system of livestock plants. Agriculture is developed to be able to play a role besides producing food products as a biomass processor and waste into new high-value bioproducts. agriculture is developed following the principles of environmentally friendly integrated agriculture, so that its products can be accepted in increasingly competitive global markets, agriculture is eventually developed as a biorefinery b advanced science and technology-based producers of high-value healthy food products and non-food products, as well as an effort to increase exports of processed products and reduce imports of various agricultural commodities such as soybeans, fruits, some vegetables, animal feed, milk and corn.

Bioinduatri agriculture is also based on the notion of the agricultural cycle as a guardian of the natural environment and must be of real benefit to all working actors, both upstream and on farm (farmers, ranchers, planters, etc.) including off-farm activities, both at household, regional / region, and nationally with products that are highly competitive.

Baturiti District, Tabanan Regency is very appropriate to be used as a model of bio-industrial agriculture, because the results of the Participatory Rural Appraisal (PRA) conducted in 2015 showed that vegetables, which are the main commodities cultivated by farmers, are entirely dependent on external inputs. The level of input dependence ranges from 67% - 100%. More specifically, the contribution of pesticide costs ranges from 8% - 18%, while chemical fertilizers range from 7% - 25%. Cabbage plants are the most dependent plants with chemical fertilizers and pesticides (Yasa et al., 2015). Baturiti Subdistrict is located approximately 30 Km north of Tabanan City, has an area of 99.17 km2 with altitudes ranging from 465-2082 from sea level. Based on the AEZ study by BPTP Bali in 2000, it included the category "wetland medium plain dry land (LKDMIB). Based on rainfall data (CH) from BMKG, from 2009 - 2014, rainfall in Baturiti District tended to decrease. Normal rainfall during the rainy season (MH) ranges between 2,276 - 3,079 mm (Sunarso and Rubiyo, 2004). CH 2014 was below the standard, because it reached 2,078 mm. So that water is a limiting factor for the sustainability of farming

Starting in 2015, the Ministry of Agriculture has designed the implementation of the Bio Industry Agriculture Model (MPBI). Renewal in the perspective of the bioindustry farming system is 1) intensive ecosystem-based agricultural business, namely maximizing income and added value through ecological engineering, through integrated farming patterns between plants, livestock or fish; 2) processing agricultural products to multiply the variety of products and add value to agricultural products and reduce waste; and 3) through the integration of biodigester-biorefinery agriculture with the hope of reducing energy dependence, the use of external inputs, being environmentally friendly, and reducing nutrient leakage from agroecosystems and economies of scale (Simatupang, 2014)

Research Methods:

Location and Research Samples:

The location of the study focused on dryland farming which was cultivated with a bioindustry-based agricultural model, namely in Antapan Village, Baturiti District, Tabanan Regency. Based on the balance, the research location was determined by puIDRosive sampling, namely in Antapan Village, farmers conducted bioindustry-based farming. Furthermore, observations and physical observations will be made of farming by farmers. The population in this study were farmers who carried out bioindustry based farming in the 2017/2018 planting season. The study sample was determined by census of the 45 farmers who carried out bio-industrial-based ushatani entirely as samples.

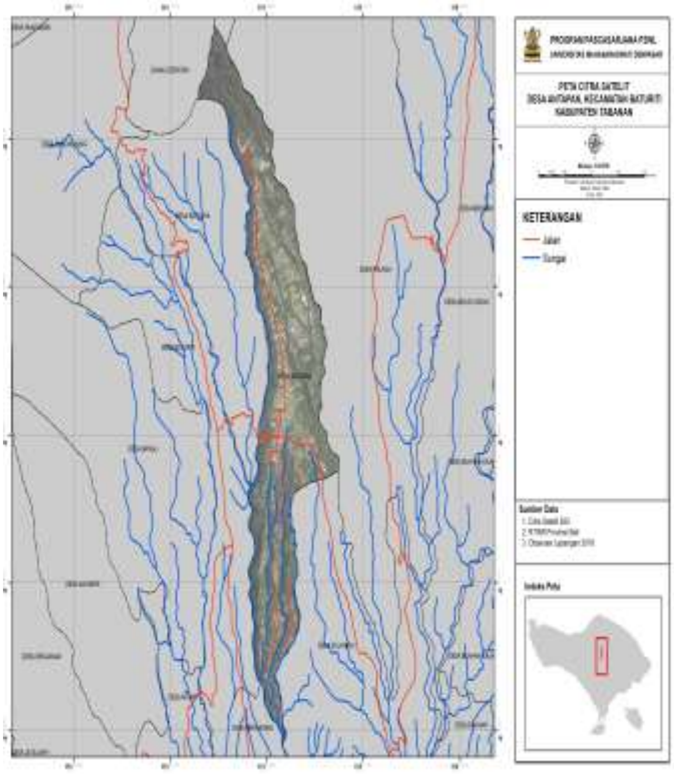

Figure 2.1 Map of the Antapan Village Satellite Image

Data Analysis:

This study uses data analysis methods, descriptive, R / C, and multiple linear regression. Descriptive analysis is used to give an overview of farm value added, R / C is used to analyze farm value added, R / C Ratio is business efficiency, which is a measure of the ratio between business income and total cost. With an R / C value, it can be seen whether a business is profitable or not profitable. Efficiency (profitable) if the value of R / C> 1 with formulation: R / C ratio, where R is the total revenue, C is the total cost. Furthermore, multiple linear regression is used to analyze the influence of production facilities variables (X1) land (X2), Seedlings (X3), fertilizer (X4) labor (Y) on farm value added with the formulation Y = f (X1, X2, X3 , X4)

Results and Discussion:

Farming Analysis and Value Added Model of Bioindustry Agriculture:

Some horticultural commodities are the leading commodities in Bioindustry activities in Antapan Village, are cayenne and red chili, and other vegetable farming such as green vegetables, mustard greens, tomatoes, carrots, cucumbers, celery. The results of horticultural commodities as a source of income for farmers are generally sold in fresh form. In this study an analysis was carried out on the farming business which was cultivated predominantly by farmers and became the largest source of income for farmers. While other farms are cultivated in small scale, which is in the area of 0.05 ha to 0.10 ha. Table 3.1 shows farming analysis and farm value added.

Chili farming with a bioindustry system has reduced the use of chemical pesticides and chemical fertilizers and has been using more cow manure than the results of processing with fermentation systems. The biggest cost of chili farming that is issued by farmers on inputs for production means is the cost of manure that has been fermented, reaching IDR 2,133,333, this is actually an added value for farming, and as additional income for farmers, but in farming analysis it is calculated as a cost component. The added value of farming is the result of farms which are not sold in fresh form, but processed products have been made, such as avocado vegetable juice, bery fruit juice, pineapple juice, and juice srikaya. Farmer's income from chlili farming reaches IDR.19,000,000 / ha / planting season. In Table 3.1, it can be seen that the Ratio of revenues and costs (R / C) is 3.478, meaning that each farmer's expenditure of IDR. 1,000 will be received again at IDR. 3,478. So in real terms there is no added value, because chilli is directly sold in the form of fresh chillers without processing.

Table 3.1 Analysis of farming and added value of hectare farming per year on bioindustry farming models in the dry land of Antapan Village

No	Description	Reception (IDR)	Cost (IDR)	R/C
A	Farming			
1	Chili	26,666,667	7,666,667	3.478
2	Large Chili	162,000,000	42,715,000	2.192
3	Mustard greens	25,781,250	12,781,250	2.017
4	Spinach	50,000,000	13.561.333	3.687
B	Value added farming			
1	Fruit flavored vegetable juice	6,750,000	2,888,250	2.949
2	Spinach chips	7,225,000	2,384,250	3.030

Source: Analysis of primary data

Farmers' income from large chili farming in the bioindustry farming system reaches IDR. 119,285,000 / ha per planting season, and the added value component of the bioindustry farming system is the result of processing cattle and chicken livestock waste, and has been used for cow and chicken manure costs, that is the value reaches IDR. 3,150,000 and IDR. 2,700,000, the two added values are calculated as the cost component. So that the large chili farming has no value added farming, because the large chilli is directly sold in the form of fresh, large chili without processing. In Table 3.1, the R / C is shown from large chili farming is 2.192, which means that every expenditure of IDR. 1,000 will be returned or received back as much as IDR. 2,192.

The income of green mustard farming is IDR. 13,617,921 ha / planting season, with the most incurred costs being chicken manure which reaches IDR. 1,837,500 / ha / year. Chicken manure is very suitable for the growth of mustard plants, plants appear fertile, this may be due to nutrients contained in high manure, which is not absorbed after the remaining digestion from chickens. The use of chemical fertilizers such as ZA and NPK fertilizers has been greatly reduced, which is only 50 kg / ha for ZA fertilizer and 70 kg / ha for NPK fertilizer. Still using pesticides, because green mustard plants are very risky with pests and diseases, but for the future has been reduced by making yellow traps. Next is the cost of planting green mustard requires 23.2 HOK with a value of IDR. 1,624,000 / ha, then followed by the cost of processing land and installing mulch, requiring 21.8 HOK with a value of IDR. 1,526,000 / ha. Table 3.1 shows R / C from usahani green mustard is 2.017, which means that every expenditure of IDR. 1,000 will be returned or received back as much as IDR. 2,017.

To get added value for farming in the bioindustry farming system, farmers have succeeded in developing very unique products and may only be found in Antapan Village, namely fruit-flavored vegetable juice. Before the development of bio-industrial agriculture, all green mustard vegetables were sold in fresh form, and now with the development of bioindustry, green mustard is sold in the form of processed products in the form of fruit-flavored vegetable juices. Fruit-flavored vegetable juices are made with a mixture: green mustard leaves, powder creamer, tape, sugar, ice, sweetened thick chocolate milk and fruit, depending on consumer demand such as pineapple, avocado, srikaya and all obtained from the farmer's farm, the labor force involved is almost 90% of female workforce (female farmer groups) From the calculation of costs, the average cost incurred by farmers for one cup of fruit-flavored vegetable juice is IDR. 1,695 / cup and with a selling price of IDR.5,000 / cup. The amount of fruit-flavored vegetable juice that can be produced in farmers is 1,350 cups / year, so that farmers get a profit or added value of farming in the amount of IDR. 4,461,750 / year. Table 3.1 shows the R / C of added value of fruit juice vegetable juice is 2.949, which means that every expenditure of IDR. 1,000 will be returned or received back as much as IDR 2,949.

Fruit-flavored vegetable juices produced by farmers are expected to be a product of Antapan Village's special characteristics, because the location of bio-industrial agriculture is promoted to become an agro-tourism destination. If you need fruit-flavored vegetable juices, you have to come to the location of the bio-industrial farm in Antapan Village, and now it has been visited by many agro tourists. And while fruit-flavored vegetable juices produced by farmers are sold in fresh form to consumers who are again visiting bioindustry farming sites in Antapan Village, and are also presented at field meetings, visits from both government and non-government agencies and educational institutions.

Spinach farming income is IDR. 36,438,667 / ha / planting season, with the biggest cost incurred by farmers on spinach usatani is the cost of manure, actually this cost is not real due to farmers, because chicken manure is produced by farmers themselves, as well as cow manure. Furthermore, the high costs incurred by farmers are for land cultivation and planting costs, most farmers use family labor, and farmers usually cultivate spinach plants in small areas of 7.5 acres to 10 acres, but in research converted or calculated with hectares. Spinach farming results are usually sold in the form of fresh spinach.

With the development of bioindustry farming models, to obtain added value for farming, women farmers make processed products of spinach leaves into spinach chips. The ingredients used are spinach leaves, rice flour, herbs and cooking oil. Based on the calculation, every one packet of spinach leaf chips costs IDR. 1,650 / pack, the spinach leaf chips that farmers can produce annually is 1,445 packs with a selling price of IDR. 5,000 / pack. So that the profit or added value of farming received by farmers is IDR 4,840,750 / year. the total value added of farming received by farmers for one year from green mustard and spinach farming is IDR. 9,302,500 / year

Factors that influence the added value of the bio-industrial farming model in Antapan Village:

To obtain the factors that influence the added value of farming. (Y) specified as a function of land area (X1), number of seeds (X2), amount of organic fertilizer (X3), labor (X4), estimation results obtained F-count 43.602 significantly different from the real level of 1 percent. The coefficient of determination of R-squared 0.813 means that 81.13 percent of farm value added can be explained by the model built, and the remainder is explained by other variables that are not in the model.

Table 3.2 Factors that influence the value added of farming in the bioindustry farming model in Antapan Village

Variable	Coefficient	Prob (t-statistik)
Constants	. 0.938	0.001
Land of area X_1	0.163	0.098 (1.692)
Number of seeds X_2	0.306	0.001 (3.513)***
Amount of organic ferlizer X_3	0.176	0.001 (3.854)***
Amount of labor X_4	0.187	0,008 (2.769)***
R-squared 0.813 Adjusted R-squared 0.795 F-statistic 43.602 Prob(F-statistic) 0.000		

Description: Numbers in parentheses are t-count
*** = significantly different at 1% significance level

The added value of farming in the bioindustrial farming model is influenced by land area, use of the number of seeds, use of the amount of organic fertilizer, and amount of labor use. The farm area (X1) has no significant effect on farm value added, the probability value (t-statistic) 0.098 is greater than 0.0500, meaning that the land area has no significant effect on the significance level of 5% (0.0500) on farm value added, this is due to the fact that the land area is not necessarily high in productivity, depending on the level of plant fertility and there is no attack of plant diseases, and not necessarily extensive land followed by extensive farming that produces crop products which are processed products such as fruit juices and chips spinach. And usually farmers plant in small areas in monoculture, so that in one agricultural land will be found a wide variety of vegetable and horticultural plants.

The number of seedlings (X2) has a significant effect on farm value added, the probability value (t-statistic) of 0.001 is smaller than 0.01, meaning that the number of seeds has a significant effect on the significance level of 1% (0.0100) on farm value added. This is due to the increasing number of seeds planted there is a tendency for the amount of farm production produced which has added value will also be greater, especially farming whose production can be processed into processed products in the form of fruit-flavored vegetable juice and spinach chips. Therefore it is necessary to plant more number of seeds, especially for businesses whose production can be processed into processed products, such as mustard greens, pineapples, srikaya, avocados, tomatoes, and spinach to increase the added value of farming

The amount of organic fertilizer (X3) has a very significant effect on the added value of farming. The probability value (t-statistic) of 0.001 is smaller than 0.0100, meaning that the amount of organic fertilizer has a significant effect on the significance level of 1% (0.0100) on the added value of farming. It means that more and more use of organic fertilizer within the limits of the recommended dosage there is a tendency for farming productivity to increase, so that farming production that can be processed as processed products is also increasing and the value added of farming is also increasing.

The amount of labor (X4) has a very significant effect on the added value of uasamanani. The probability value (t-statistic) 0.008 is smaller than 0.0100, meaning that the number of workers has a significant effect on the significance level of 1% (0.0100). This means that the more number of workers used means there is a tendency for more and more value added farming. It can also be explained that the more farm products that are processed, the more labor needed, the results of the study find that the development of bioindustry farming models has opened up new jobs and at the same time can increase farmers' income. Especially opening up opportunities for female workers, because in making processed products from farm produce requires 90 percent more female labor. Therefore, the development of a bioindustry farming model needs to be continuously developed.

Conclusion:

Based on the results of the research and discussion it can be concluded as follows:

1) The impact of the development of the bioindustry farming model can provide added value for farming from processed products in the form of fruit-flavored vegetable juices; avocado, pineapple and srikaya and processed products of spinach chips with an average value of Rp. 9,302,500 / year.

2) Factors that influence the value added of farming in the bioindustry farming model in Antapan Village are, the number of seeds, the amount of use of organic fertilizer and the amount of labor use.

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