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Entrepreneurial Index of Farmers Applying Specialization and Diversification Farming System: Case Study of Vegetable Farmers in Kabupaten Agam

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ABSTRACT

The research aims to see the level of entrepreneurship of vegetable farmers in six sub-districts in Kabupaten Agam, particularly specialized and diversified vegetable farmer. The research is explanatory research, using 200 respondents taken by quota sampling proportionally. Farmer entrepreneurship level is measured using the Entrepreneurship Behavior Index (EBI). The result shows the overall level of entrepreneurship of vegetable farmers in six districts in Kabupaten Agam in the medium category that is equal to 69%, Farmers who specialize in vegetable crops have higher levels of entrepreneurship than vegetable farmers who choose to diversified vegetable cultivation. The specialized vegetable farmer have greater degree of decision making ability compared to diversified vegetable farmer. Diversified vegetable farmer concerned more on economic motives than specialized farmer. Risk taking ability also revealed difference tendency among specialized and diversified vegetable farmer. Specialized vegetable farmer have bigger information seeking capability, meanwhile diversified vegetable farmers are stronger for their leadership capability. The implications of this study that the entrepreneurial spirit vegetable growers is a variable that can provide reinforcement for the implementation of specialized cultivation systems. This means that if the entrepreneurial ability of farmers can be further improved, then with the application of specialized cultivation systems in vegetable crops, farmers will be able to create value-added products or produce derivative products from vegetable commodities produced.

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1. Introduction

Kabupaten Agam is one of agriculture area that has fertile soil compared to other areas in West Sumatera Province with average temperature of 20-33 C and rainfall of 2,712,0 mm and average rain days of 227 days, (Agam Dalam Angka, 2016). It is located in the middle of the Bukit Barisan surrounded by volcanoes such as Mount Singgalang, Mount Merapi and Mount Tandikek known as Tri Arga.

Geographically, this situation is very profitable for farmers. The farmers can plant various types of crops both plantation and vegetable crops. People of Kabupaten Agam, especially in the regency of East Agam prefer to grow vegetables rather than planting plantation crops.

Types of vegetable commodities they plant are mostly cabbage, eggplant, potatoes, carrots, beans, celery, onions, onions, carrots, eggplant, chilies and so on. Based on data on Agam In Figures 2015 and Agricultural Census in 2013, in Kabupaten Agam the number of farmers' households reached 26.14 million, and the number of Horticultural farmers of 6.34 million or 37.40 percent with total farmers 55.33 percent are Gurem farmers who work on the land under 0.5 Ha.

There are many reasons for farmers in choosing vegetables to grow on their farmland they own. One is the natural factor that makes them choose vegetables as commodities, the level of soil fertility, high rainfall and climate support so the choice of vegetables as crops that they develop.

According to Ruttenberg (1971) , the cultivation system based on rotation instensity can be classified into specialized farming system and diversified farming systems. In an economic perspective, agricultural diversification contributes to the diversity of available input and output constraints in the market, so that farmers can avoid price risks, harvest risks, supply risks and profit risks (Mcnamara and Weiss 2005). Related to specialized agriculture systems, Yang and Liu (2012), in his research tested 3 models that can be used by farmers to utilize and market their agricultural products which are: autarky model (consumed and not exchanged), specialized and traded model of agricultural production , and model specialization of production organized with cooperative organization.

Farmer's decision to adopt specialized farming system or diversified farming system is dealing with safety-first principle argued by Scott (1976). He argued that farmer basically are risk averse, gradually shifted from subsistence orientation farming system. Another interesting point from observations in the field for almost two months (last month of September and November 2016) and interviews conducted with farmers found that farmers planting vegetables not only plant one type of vegetable commodity during the growing season, but they grow vegetables in different types of commodities. They grow certain types of vegetables. This means that they are not focused on just planting one type of vegetables all the time. This sort of thing is caused by several considerations such as market demand, price factor, certain planting season of commodity and other profit considerations.

The independence of farmers to determine the choice of determining type of commodity and planting system is determined by these factors that can broadly be grouped into three main factors, namely market factors, entrepreneurial capacity and internal factors of the farmers themselves. The entrepreneurial spirit (entrepreneurship) is not only owned by entrepreneurs but can be owned by anyone who thinks creatively, and acts innovatively from any circle, including farmers. The essence of entrepreneurship is the ability to create something new and different through creative thinking and innovative action to create opportunities, (Hisrich, et, al, 2009 in Manurung, 2013).

The fundamental problem in developing the capability of farmers' entrepreneurship is the low quality of human resource of farmers. The

entrepreneurial spirit and entrepreneurship capability of the relatively weak farmers is one of the socio-economic factors that hampers the development of farmers' self-potential in managing productive farming in rural areas. In addition, farmers who have not and lack the ability of entrepreneurship is always difficult to manage and develop farming by applying the system of optimum specialization cultivation and the development of business diversification productively amid the potential of abundant local's resources environment.

The previous facts attributed to the existence of horticultural farmers, especially vegetable farmers in Agam regency, is triggering further research.

2. Research Methods

This research is explanatory research t by searching and collecting some data to get a picture, clear facts about things, situation exist in research object. This research was conducted in several sub-districts of Kabupaten Agam namely: Tilatang Kamang Sub-district; Baso,; Canduang, Banuhampu, Sungai Pua, and IV Koto. The method used to determine the number of samples for each sub-district taken by proportional system of total farming populations present in the six sub-districts. Furthermore, to determine the number of samples, the researcher uses quota system, that is the number of 200 vegetable farmers on the basis of the consideration that the sample size in a good study ranges between the smallest sample is 30 and the largest 100, (Dayan, 1984). Farmer entrepreneurship level is measured by using Entrepreneurship Behavior Index (EBI), K. Balasaravanan et al (2012) :

$$EBI = \frac{\sum_{i=1}^{n} SEV_i}{\sum_{i=1}^{n} MSEV_i} \times 100$$

EBI =Entrepreneurship Behavior Index
SEV = Score in Entrepreneurial Variable
MSEV = Maximum Score on Entrepreneurial Variables

The Entrepreneurship Behavior Index (EBI) in addition will classify level of entrepreneurship attributed to the farmers into five classes depending to the score result of EBI calculation level (Table 1).

Table 1 Level of Entrepreneurship Capability

Behavior Index	Criteria
Less than 20	Very Low
20-40	Low
41-60	Moderate
61-80	High
Above 80	Very High

Source: K. Balasaravanan et al (2012)

3. Results and Discussion

The farming system conducted by vegetable farmers in the six sub-districts studied is divided into agricultural systems of specialization and diversified farming system. Specialization System (one type of plant) namely: Chilli; Carrot; Red onion; Coles, Beans, Long beans, and Eggplant. While the type of diversified vegetable plant (Tumpang Sari), such as : green onion-chilli-Tomato; Sawi-cabbage-celery; Broccoli- green onion-carrot; cabbage-onion-celery-Carrots; Tomato-Onion-Sawi-Salada, and others. The choice of Specialization or Diversification by is done more by consideration of : high selling value (price); Expertise of farmers in processing as well as difficulty level of care from the plant, land area and risk, because vegetables are not durable and easily damaged.

The largest number of vegetable farmers is found in Sungai Puar sub-district, among 21,637 farmers as 16,932 people are vegetable farmers (Table 2). This number reaches 23.01% of the total number of farmers in Sungai Puar. Followed by District of Banuhampu, among 18,786 farmers as

many as 13,475 people are vegetable farmers. This amount reached 18.32% of the total number of farmers in Banuhampu.

Table 2. Population of Farmers in Research Areas

Districts	Total Population	Total Farmers	Vegetable Farmers	Sample
Banuhampu	39.415	18786	13,475	37
Sungai Puar	24002	21.637	16.932	46
IV. Koto	22.970	17886	14.211	38
Canduang	22.162	15,548	10.236	28
Tilatang Kamang	35.720	13774	8.172	22
Baso	33.182	14684	10,548	29
Total	154,481	102.315	73574	200

Source: Activity Report of Technical Implementation Unit (UPT) Implementing Institute for Agricultural Extension, Fisheries, Forestry and Food Security (BP4K2P) in 2015 from each research district.

Table 3. Level Entrepreneurship by Cultivation System

Cultivation System	Level of Entrepreneurship Capability					
	<20	20-40	41 - 60	61 - 80	> 80	Total
Diversification	17	84	4	9	0	114
Percentage	14.9	73.7	3.5	7.9	0	100
Specialization	12	54	7	13	0	86
Percentage	14.0	62.8	8.1	15.1	0	100
Total	29	138	11	22	0	200
Percentage	14.5	69.0	5.5	11.0	0	100

Table 3 shows that among of 200 farmers sample, there are 69 percent of vegetable farmers have low entrepreneurship level, and 14.5 percent of farmers are in the category of very low level entrepreneurship. It can be said that 83.5 percent of farmers Vegetables in this area have low levels of entrepreneurship. Only 11.0 percent have high entrepreneurship level, and 5.5 percent are moderate.

The index figures imply that in general the level of entrepreneurship capability of farmers is not much developed, all farming activities run and done traditionally, based on the only experience. Even if there are rational considerations in producing a vegetable crop, it is largely determined by consideration of natural and land conditions, as well as market demand and ease of care elements. Small amount of farmer acts of innovation and creative thoughts made and produced farmers on the commodity produced.

According to the selected culture system, vegetable farmers in six districts shows that the farmers who do system specializes in vegetable crops have high levels of entrepreneurial ability is higher (on all levels of the category) than from vegetable growers who choose to exercise diversification system (intercropping) In the cultivation of vegetable crops. Nevertheless, overall as illustrated above data that 83.5 percent entrepreneurial attitude of vegetable farmers in the cultivation of vegetable crops are at relatively low category level.

Although it has been illustrated in Table 4 that overall 83.5 percent of entrepreneurial level of vegetable farmers in six research areas are in low category, but there are still 2 to 4 peasants with high entrepreneurial spirit in some vegetable species in more detail can be seen the description of entrepreneurship level Farmers on several types of vegetable crops, in the following table:

Table 4 of Entrepreneurship by Types of Vegetable Crops

Types of Vegetable Crops	Level of Entrepreneurship Capability				
	<20	21 - 40	41 - 60	61 - 80	> 80
Chili	8	29	6	4	0
Carrot	4	9	2	3	0
Bean	4	10	0	2	0
Tomato	3	8	1	0	0
Eggplant	4	10	0	1	0
Spring onion	2	9	0	3	0
Mustard greens	1	11	0	2	0
Red onion	2	7	1	3	0
Total	28	93	10	18	149
Percentage	18.8	62.4	6.7	12.1	100

The Table 4 reveals that level of entrepreneurship of farmers who planted vegetable commodities both by farmers using a specialization system and farmers who implement the diversification system in the main product of vegetable commodity, there are 12.8 percent of

cultivated farmers are having entrepreneurship spirit level of medium category and 8.5 percent are categorized high. In other words, there are 4 peasants out of 47 sample farmers who have high entrepreneurial spirit. This data implies the innovation and creative thinking of generated commodities by the continuous development of such products or derivative products, such as from chili to milled peppers and dried chili although most of them are 78.7 percent His entrepreneurship is low categorized.

At Carrot crops, there are 16.7 per cent (3) farmers have high levels of entrepreneurship, characterized by the management of the results in the form of "packing" after a good carrot sorting process and cleaning, then sold in stores, such as Super Market, Mini Market. The table shows 72.2 percent of entrepreneurship levels are relatively low.

Furthermore, the plant Beans, the situation is not much different from the previous crop, which is 12.5 percent of the high category, because there are farmers who also do further processing of beans produced in the form of packing after processing was clean, although the 87.5 percent rate of entrepreneurial category Low of 16 sample farmers. While the tomato crops, there are only 8.3 percent of the 12 farmers who have high levels of entrepreneurial samples that are or just one person, the remaining 91.7 per cent lower. In *eggplant* crops, too, only 7.7 percent (1) having a high level of entrepreneurial farmers of 15 samples, the remaining 93.3 percent of low category.

The level of entrepreneurship for onion crops is 23.1 percent, only 3 farmers are categorized as having high level of entrepreneurship, this is marked by the process of sustainability of commodities produced from Red Onion into "Fried Onion", then in packing for Sold, but 69.2 percent of low-onion farmers. Similarly, green onion there are 21.4 percent marked by 3 farmers who have high entrepreneurship level, mostly 78.6 percent with low entrepreneurship ability.

It appears that farmers have a high level of entrepreneurial namely chili plant and Carrots, Onions and Shallots Leaf followed Beans plant, Mustard greens and eggplant. Perhaps in this type of crop there is little improvement in product quality with the use of simple technology (process) that does not require special skills, because of the complexity of this type of plant care.

Table 5. Level of Entrepreneurship by Research Area

Research Area	Level of Entrepreneurship Capability					
	<20	20 - 40	41 - 60	61 - 80	> 80	Total
Banuhampu	5	17	5	10	0	37
Sungai Puar	6	35	3	2	0	46
IV. Koto	5	23	1	9	0	38
Canduang	4	22	1	1	0	28
Tilatang Kamang	4	17	1	0	0	22
Baso	5	24	0	0	0	29
Total	29	138	11	22	0	200
Percentage	14.5	69.0	5.5	11.0	0	100

Based on the data in the Table 5, sub district Banuhampu is an area that has the highest number of farmers' entrepreneurship with high category level. This is illustrated in which 27.0 per cent (10) of 37 samples of farmers in this region have a high level of entrepreneurial. Likewise on IV Koto subdistrict area, which is 23.7 percent of farmers have a high level of entrepreneurial category.

The research also shows that in the six districts of this study area, the most popular vegetables for farmers are Chillies followed by Carrot, Beans, Egg, Tomato, Leek, Red Onion and Sawi. This is due to the high market demand for these vegetable commodities, especially chili and carrots, in addition to price factors, profitability factors and harvesting period and ease of care and farmers' savings.

Table 6 shows difference Entrepreneurial Index of both Specialized and diversified vegetable farmers. There are difference of each entrepreneurial characteristics of both specialized

and diversified vegetable farmers. Specialized vegetable farmer have greater degree of decision making ability compared to diversified vegetable farmer. Diversified vegetable farmer concerned more on economic motives than specialized farmer. Risk taking ability also revealed difference tendency among specialized and diversified vegetable farmer. Specialized vegetable farmer have bigger information seeking capability, meanwhile diversified vegetable farmers are stronger for their leadership capability.

Table 6. Level of Entrepreneurial Characteristic by Cultivation System

Cultivation System	Entrepreneurship Characteristic						
	Inova-tion	Decision Making	Econo mic Motive	Risk Taking	Informa tion Seeking	Leadership	TCR
Diversification	58,8	60,5	65,4	62,5	59,6	62,0	61,5
Specialization	58,8	66,7	60,02	64,5	62,6	61,0	63,3
Average	58,8	63,6	62,7	63,5	61,1	61,5	62,4

4. Conclusion

The entrepreneurial potential of farmers who apply a specialization system is higher than that of farmers implementing diversification systems in vegetable crops. The entrepreneurial spirit of vegetable farmers is a variable that can provide reinforcement for the application of specialization cultivation system. This means that if the entrepreneurial ability of farmers can be further improved, then with the application of a system of cultivation specialization in vegetable crops, farmers will be able to create value-added products or produce derivative products from vegetable commodities produced.

To strengthen the ability of entrepreneurship spirit, need to be given more continuous and effective training and information not only limited to cultivation, but more to the processing of derivative products, then increased to the managerial stages, both resource management, finance and product marketing, so that farmers can be able to grow into entrepreneurs. Alternatively, the effort to improve the entrepreneurial capacity of farmers is to increase relationship and partnership sharing ideas of discussion and for information among farmers and agricultural activities to have mutual benefit cooperation.

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