Determinant of Non-Organic Farming in Enrekang District of South Sulawesi

Ansyar [1], Hatta Jamil [2], Muhammad Arsyad [3]

[1] Program Studi Agribisnis, Sekolah Pascasarjana, Universitas Hasanuddin Makassar, Indonesia (Anshar.asing@yahoo.com)

[2]Program Studi Agribisnis, Sekolah Pascasarjana, Universitas Hasanuddin Makassar, Indonesia

[3] Program Studi Agribisnis,Sekolah Pascasarjana, Universitas Hasanuddin Makassar, Indonesia (arsyad_uh@yahoo.com)

Abstract— Non-organik farming has a great impact on creasing agricultural production, but many negative impacts such a reduced soil fertility, environment damage and also negative impact on human health. The government has launched various programs to depelop organic farming to encourage farmers to swich to organic farming but has not been successful until now. The research aims to analyze the persistent determinant of non-organic farming by using Interpretative Structural Modeling (ISM) analysis. Result of research, there are three elements becoming persistent determinant of non-organic farming, that is: Facilities dan infrastructure of organic farming available, application of production facilities (fertilizers/chemical pesticides) easy and practical, easy market access for non organic products.

Keywords— Non-Organic Farming, ISM, fertilizers.

I. INTRODUCTION

Agricultural development in Indonesia is an important part in the implementation of national development. Agriculture is placed as a leading sector in view of its role in food supply, employment provision, foreign exchange contributors through exports, encouraging business opportunities and provision of production factors.

Agricultural systems developed over several decades have contributed greatly to improving food procurement and improving living standards. The agricultural system is known for its green revolution technology with the use of superior varieties, the use of an organic fertilizer, chemical pesticides and the use of agricultural machinery for land processing and harvesting. This agricultural system has had a major impact on increasing agricultural production, but many negative impacts to the environment are reduced soil fertility and environmental degradation due to uncontrolled use of fertilizers and chemical pesticides, as well as negative impacts on human health which in the long run will accumulate in the body so that it becomes toxic to human health.

As a result of these negative impacts, the Government launched the organic agriculture development program through the commitment of "Go Organic 2010". In this commitment, it was proclaimed that in 2010 Indonesia will become the largest producer of organic agricultural products in the world. The "Go Organic 2010" program, which includes activities such as organic farming technology development, organic farming groups, rural development through organic farming, and developing organic food marketing strategies. But in fact, organic farming has not developed and is still very limited products produced. That is, not many farmers who apply organic farming business.

Other efforts by the government in encouraging farmers to shift from non-organic farming to organic farming in the form of counseling, training and assistance of organic farming equipment / materials have not fully received a good response from farmers. Therefore, a study is needed to find out the persistent determinant of non-organic farming, so that comprehensive information can be made as a basis for policy making for the development of organic farming in the future.

II. RESEARCH METHODS

A. Research Design

This research was designed using descriptive research design which was conducted in the form of field survey. This design seeks to reveal the things that occur descriptively, therefore the findings are deeper, broader and more detailed.

B. Location and Time of study

This research was conducted from August to September 2017 in Enrekang Regency. Selection of the location is done with the consideration that the area is the largest vegetable producing center in South Sulawesi so it is potentially in the development of organic vegetables. Another consideration is that in this area since a few years ago there have been some consistent farmer groups on organic vegetable farming.

Types and Data Sources

This study uses primary data and secondary data, namely:

1. Primary data, ie data obtained from field research results, other than that obtained from the results of discussions and interviews with related parties. The interviews were structured on a pre-prepared list of questions.

2. Secondary Data, obtained from literature books, printed media, online media and from agencies or institutions related to the research, among others: the Office of Agriculture and Plantation, BPS, Extension Agency of Agriculture and Forestry, Food Resilience Department and respectively District Office of research location.

Data Collection Instruments

Taking / Collecting data with the following stages:

Sample Determination

To obtain data, a survey of experts / experts who have a level of understanding, mastery, and / or directly involved in the field of technical tasks of organic farming. sample is determined by purposive sampling consisting of experts / practitioners from various institutions / agencies concerned) as follows:

a. Regional Technical Agency in the form of Agency

1) Regional Development Planning Board 1 Person

b. Regional Technical Agency in the form of agency / Office:

1) Agriculture Agency 2 Persons

2) Department of Industry and Trade 1 Person

3) Food Security Service 1 Persons

4) Department of Industry and Trade 1 person

5) Department of Cooperatives, Small and medium business, labor and Transmigration 1 person

6) Environment Agency 1 person

7) Village Community Empowerment Department 1 person

8) Department of Animal Husbandry and Fisheries 1 person

c. Higher Education 1 person

d. UPT BPTTPH Prov. Sulsel 1 person

e. Agricultural Extension Worker (PPL) 3 Persons

f. Farmer Group 2 Persons

Interviewing

In order to obtain objective data, the implementation of the interview is conducted which is preceded by the socialization of the research objectives. This socialization is intended to provide understanding, importance and relevance of elements that have been established with the purpose of this study.

Preparation of Questionnaire

The questionnaire is prepared using all the elements as a grid and arranged in the form of a question by comparing the one element to the other in pairs. The questionnaire is intended to collect data to be analyzed with Interpretative Structural Modeling (ISM), using a comparison comparison of contextual relationships using the symbols V, A, X and O.

B. Data Analysis Method

The method of analysis used in this study is Interpretative Structural Modeling (ISM) to determine the persistent determinant of non-organic farming. Eriyatno in Marimin (2004) states that the methodology and techniques of ISM are divided into two parts, namely the preparation of hierarchy and the classification of sub elements. The basic principle is the identification of structures within a system that provide a high value of benefits in order to concoct the system effectively and for better decision making. Here's a brief description of ISM steps:

1. Identification of elements: The system elements are identified and listed. This can be obtained through research, brainstorming and others

2. Contextual relationships: A contextual relationship between elements is constructed, depending on the purpose of modeling

3. Structural Self Interaction Matrix (SSIM). This matrix represents the element of respondent's perception of the element of the intended relationship. There are four symbols used to represent the type of relationship that exists between the two elements of the system under consideration:

V ... the relation of Ei to Ej, not vice versa

A ... the relation of Ej's elemen to Ei, not vice versa

X ... the interrelation relationship between Ei and Ej (can be otherwise)

O ... shows that Ei and Ej are not related

4. Reachability Matrix (RM): A prepared RM then converts the SSIM symbols into a binary matrix The following conversion rules apply:

a. If the relationship Ei to Ej = V in the SSIM, then the elements Eij = 1 and Eji = 0 in RM

b. If Ei's relationship to Ej = A in the SSIM, then the elements Eij = 0 and Eji = 1 in RM

c. If Ei's relationship to Ej = X in the SSIM, then the elements Eij = 1 and Eji = 1 in RM

d. If the relationship Ei to Ej = O in the SSIM, then the elements Eij = 0 and Eji = 0 in RM

e. RM initial modified to show all direct and indirect reachability, ie Eij = 1 and Ejk = 1, then Eik = 1

5. The level of participation is undertaken to classify elements in different levels of the ISM structure

6. Canonnical matrix: grouping elements of the same level in developing this matrix. The resultant matrix has most of the higher triangular elements is 0 and the lowest is 1. This matrix is then used to prepare the digraph.

7. Digraph is a concept derived from directional graph, a graph of interconnected elements directly and hierarchy level.

ISM is generated by moving the entire number of elements with the description of the actual elements. Therefore, ISM provides a very clear picture of the system elements and the flow of relationships.

The ISM output is divided into two according to Marimin (2004) ie the Power-Dependent Driver matrix and the structural model diagram. Power-Dependent Driver Matrix is a rank of each sub element and plot each sub element into four sectors along with its coordinates, hierarchy can be created every sub element manually. Determining the outline of the sub classification of the Power-Dependent Driver element is classified into four sectors:

Sector 1: Weak driver-weak dependent variable (autonomous) that contains variables that are generally unrelated to the system and may have small relationships although the relationship may be strong. Sub element of element entering sector 1 if, DP value <0.5 X and value D <0.5 X, X number of sub elements.

Sector 2: Weak driver-strongly dependent variable (dependent) which contains non-free variables. Sub element of element entering sector 2 if, DP value <0.5 X and value D> 0.5 X, X number of sub elements.

Sector 3: Strong driver-strongly dependent variables (linkage) that contain variables that must be carefully studied because of the unstable relationship between variables and each action in this variable can have an impact on other variables and influence feedback can magnify the impact. Sub element of element entering sector 3 if, DP value> 0.5 X and value D> 0.5 X, X number of sub elements.

Sector 4: Strong driver-weak dependent variable (independent) that contains the remaining parts of the system and called the free variable. Sub element of element entering sector 4 if, DP value> 0.5 X and value D <0.5 X, X number of sub elements.

The structural model diagram is the level level of each sub element determined by the level separation on the Reachability Matrix (RM). The determination of the levels of each sub element can be determined from the rankings of each sub element. The sub elements are interconnected directly and push each level at each level.

RESULTS AND DISCUSSION

The result of the study by experts and related parties, the persistent determinant of non organic farming in Enrekang Regency is translated into 6 elements as shown in table 1. The position and weight of each element is presented in table 2. The result of grouping into four sectors namely autonomous, dependent, linkage, and independent as presented in Figure 1. While the interpretation in the form of hierarchical structure is presented in Figure 2.

Table.1: Constant determinant element of non organic farming in Enrekang Regency

No.	Element
1.	Facilities available
2.	Application of saprodi (fertilizer, pesticide) is easy and practical
3.	Plant maintenance is easy
4.	Easy market access
5.	Low cost investment
6.	High crop productivity

The result of ISM analysis shows that from 6 (six) elements suspected to be persistent determinant of non organic farming in Enrekang Regency, there are 4 (four) elements which are strong determinant as seen in table 2 where DP> 0,50. The four determinants are: Facilities available, Easy and practical saprodi application, Easy market access and Low cost investment.

Table.2: Position and Weight of Determinant Element of Persistent Non-Organic Farming.

Posisi	Determinan	Bobot	
		DP	D
Independent Its influence on the determinant is strong, but its relation to other activities is weak	1. Facilities available	1,00	0,50
	2. The production input application is easy and practical	0,83	0,50
	4. Easy market access	1,00	0,50
	Average	0,94	0,50
Linkage (Its influence on the determinant	5. Low cost investment	0,67	0,67

and its association with other activities is strong)			
	Average	0,67	0,67
Dependent (Its influence on the determinant is weak but its association with other activities is strong)	3. Plant maintenance is easy	0,33	1,00
	6. High crop produktivity	0,33	1,00
	Average	0,33	1,00
Autonomous (Its influence on the determinant and its interrelationship with other activities is weak)	-	-	-
	Average	-	-

Determinant Element in Sector IV (Independent) Against Persistent Non-Organic Farming

The results of ISM analysis based on Driver Power (DP) - Dependent (D) as shown in Figure 4 show that there are three elements that enter into Independent sector (IV), namely: (1) Facilities available (2) Application of input (fertilizer, pesticides) easy and practical and (4) easy market access. This means that these three elements have a strong influence in the persistent determinants of non-organic farming and their association with other low factors.

Elements The available infrastructure is the main determinant of persistent non-organic farming. The availability of infrastructure facilities in addition to facilitate the farmers in terms of procurement of production facilities, cultivation of cultivation, harvest and post harvest and marketing of the results also have an impact on increasing production and productivity of agricultural products.
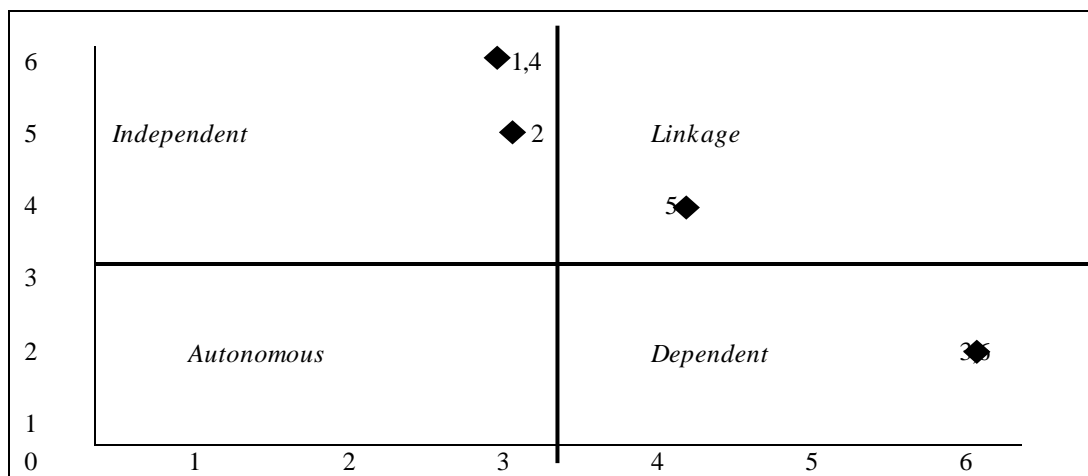

Fig.1: DP-P Matrix Element Determinant persistent non-organic farming

Easy market access is another major determinant factor in persistent organic farming. Along with the increasing availability of road infrastructure, the development of information technology and the opening of market access between islands of farmers more easily in marketing their products.

Application of saprodi (fertilizer, pesticide) is also a determinant factor in persistent non organic farming. The use of fertilizers and pesticides in supporting the increase of cultivated plant production is needed. Without the use of fertilizer, plant growth will be hampered which will impact on the low productivity of cultivated plants. Similarly with pesticides, is needed in overcoming the pest and disease diseases cultivation plants. Uncontrolled attacks of pests and diseases can lead to poor quality and quantity of farmers' products and can even lead to crop failure.

Determinant Element in Sector III (Linkage) Against Persistent Non-Organic Farming

The result of ISM analysis shows there is one determinant element in Linkage sector to persistent non organic farming that is cheap investment cost. This shows that the element is strong influence on persistent non

organic farming and its dependence on other elements is strong.

Compared with organic farming, non-organic farming investment cost is much cheaper because it does not require any special treatment and requirement for farming land. Land for organic farming around the location of non-organic cultivation requires a barrier plant and this requires no small cost. Another thing that causes non-organic farming investment to be cheaper is easy transportation access; production facilities in the form of fertilizers, pesticides, seeds / seedlings are available and the price is cheaper.

Determinant Element in Sector II (Dependent) Against Persisten Non Organic Farming

The result of ISM analysis shows that there are two determinant elements in dependent sectors to persistent non organic usatani, that is easy crop maintenance and high crop productivity. This suggests that both elements have little effect on the persistent organic farming and its association with other large elements. Along with the increasingly advanced technology in the field of farming management in the form of land management, planting, plant maintenance, harvesting and post-harvest handling more easily and efficiently.
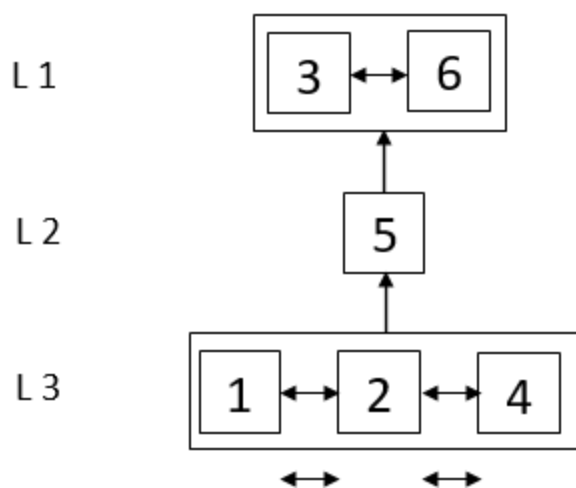

Fig.2: The hierarchical structure of persistent determinant elements of non-organic farming

The structure of the persistent determinant element of non-organic farming in Figure 5 shows that Elements of Infrastructure facilities are available; Application of saprodi (fertilizer, pesticides) is easy and practical; and easy market access at the highest level (level 3). Next on level 2 is the cost of cheap investment. While at level 1 (lowest) is easy plant maintenance and high crop productivity.

III. CONCLUSION

Elements that are strong determinants in which farmers do not switch from non organic farming to organic farming are: Facilities available, Application of production facilities (fertilizers, pesticides) easy and practical, and easy market access. These three elements are in the Independent position in the DP-P matrix which means that the three elements are very strong in the persistent Determinants of non organic farming and their interrelationship with other weak elements.

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