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Environmental study and development planning center of tomato production

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Abstract. This article from the research of [1] states that the average total production of tomatoes in one planting period is 9.74 tons and is equivalent to a monetary value of Rp. 10.17 million. It means that tomato farmers in one planting period for 3-4 months get income between Rp. 9.77 million - Rp. 10.60 million or one month between Rp. 2.44 million - Rp. 2.65 million. Socio-culture of tomato farmers must abandon traditional farming culture that is less supportive, needs to increase production. In addition, [1] stated tomatoes during the harvest season, their production exceeded market needs, so that very much production was not utilized, because the average tomato production at harvest time reached 16.74 tons per farmer in one planting period. In connection with that case, it requires a downstream planning of more production (over production). This, if not considered, will make tomato farmers suffer losses and make demotivation to grow tomatoes. Tomatoes are wasted to rot causing flies, creating an unhealthy environment. Quantitative research method, data collection by distributing questionnaires to tomato farmers at the research site. Measurement The research instrument used a Likert scale with a weight of 1-5 values to assess each statement contained in the questionnaire. The variables of this study include economic, socio-cultural and environmental factors. Data analysis was performed using the Partial Least Square. The results of this study have a significant effect between the social fields on the economic field and economic factors on a significant environment while there is no significant influence between the social and environmental fields. So that environmental studies must be analyzed before project activities (business) will be carried out. If the project (business) activities are carried out then it can improve the welfare of tomato farmers who are environmentally friendly.

1. Background

Economic development in several countries has succeeded in raising the standard of living of the people in general. Economics with a series of theories that have been born has played an important role in shaping the flow of thought and intuition of economic planners [2]. But along with the progress of economic development, several problems and environmental impacts arise both in externalities and internalities. Depleted resources, increasingly advanced technology and the emergence of various types of pollution are beginning to be considered to hinder economic progress, because they damage the environment [3].



Agriculture is one sector that plays an important role in the economy [4] in Solok District in particular and West Sumatra in general. This is due to the contribution to Solok Regency's Gross Regional Domestic Product (GRDP), which is relatively large at 26.9 percent (BPS, West Sumatra 2017). Based on the research findings of [5], it shows that the average total production of tomatoes in one planting period in Tanang Bukik Sileh Nagari Salayo is 9.74 tons and is equivalent to a monetary value of Rp. 10.17 million with a standard deviation of 0.43. This means that farmers in one planting period for 3-4 months will get income between Rp. 9.77 million - Rp. 10.60 million. So, income in one month is between Rp. 2.44 million - Rp. 2.65 million. Therefore, tomato farmers from Nagari Selayo Tanang Bukik Sileh still need to increase their production capacity, economically profitable and will improve the welfare of farmers.

In addition, [3] stated that tomato production during the harvest season exceeds market needs, so that large quantities of production are not utilized, because the average tomato production at harvest time reaches 16.74 tons per farmer in one planting period. In connection with that, it requires a downstream planning of more production (over production). It is necessary to plan the down streaming of tomato products, if not thought out, it will make tomato farmers suffer losses and make demotivation to grow tomatoes.

Therefore, an Environmental Assessment and Development Planning Center is needed for tomato production in Nagari Bukit Sileh which is analyzed by Partial Least Square by looking at the socio-cultural local linkages with the economic field and its impact on the environment.

2. Theoretical Review

Socio-cultural; Everyone learns patterns of action in interacting with others, from individuals who occupy various social roles. Socialization means the learning process of community members to recognize and appreciate the culture of the community in their environment. Culture is very closely related to society. Melville J. Herskovits and Bronislaw Malinowski suggest that everything contained in society is determined by the culture that belongs to society itself. According to Andreas Eppink, culture contains the whole notion of social values, social norms, science and overall social, religious, and other structures, in addition, all intellectual and artistic statements that are characteristic of a society [6].

In everyday life a person will not be separated from the environment [7]. A person's personality is formed from his environment, because that personality leads to positive attitudes and behavior which of course must be supported by a norm (social culture) about its truth and adhered to as a guideline in acting. Glaser et al. (1987), Organizational culture is often described in the sense of being shared. [8], Kotter and Heskett (1992); Culture has power that influences the environment. The Effect of Culture on the Environment, culture is created or realized as a result of the interaction between humans and all the contents that exist in this universe. human beings were created by God Almighty with the mind that they are able to work on this earth and in essence human beings are caliphs on this earth. In addition, humans are also given advantages in terms of reason, intelligence, will, and imagination. Culture that has existed in a community environment is not possible to avoid the culture that comes from other groups, because of the contact and also the interaction between the two. A social group will adopt a certain culture when the culture is useful to overcome the problems and demands that exist at that time.

Economy; The environment is closely related to economic activities in the fields of production, consumption and distribution. Along with this, there is concern that the quality and quantity of resources is decreasing due to economic activities which are feared to threaten the continuity of economic progress in the next stage. For this reason, a benchmarking tool is needed to determine profit losses from various activities that have an impact on the environment.

Taking into account the possible impact of a problem when a business activity is running or at the end of a project, then the protection and control measures are also an important part of environmental studies for the development of a business or project [3]. So that it can minimize the impact of negative externalities due to economic activities.

Environment; Environmental problems and the use of natural resources both for agriculture, industry, mining and so on should be deemed necessary as an issue of environmental economics. Economic activity will have an impact on the environment and even cultural problems have links with the environment. More and more technological innovations will develop new products. Innovation is a process of renewal from the use of natural resources, energy and capital, new arrangements of labor and the use of new technologies which will all lead to the existence of production systems, and the creation of new products [9]. The process of innovation is very closely related to technology and economics. In a new invention usually requires a long social process and through two special stages namely discovery and invention. Discovery is an invention of a new element of culture, both in the form of a new tool, a new idea, created by an individual or a series of individuals in the community concerned [10]. Discovery becomes invention only if the community has recognized, accepted, and applied the new invention.

The case that happens a lot in the economic activity sector is very dilemma, on the one hand it needs economic growth, to increase growth, sacrifice resources, while resources are not closely watched to damage the environment, because social culture is closely related to the economy and environment. To see the interrelationship between social, economic and environment using the SEM [11] (triple bottom line) model in the construction of the Nagari Bukit Sileh tomato plantation, a thought map was created as shown in Figure 1. below;

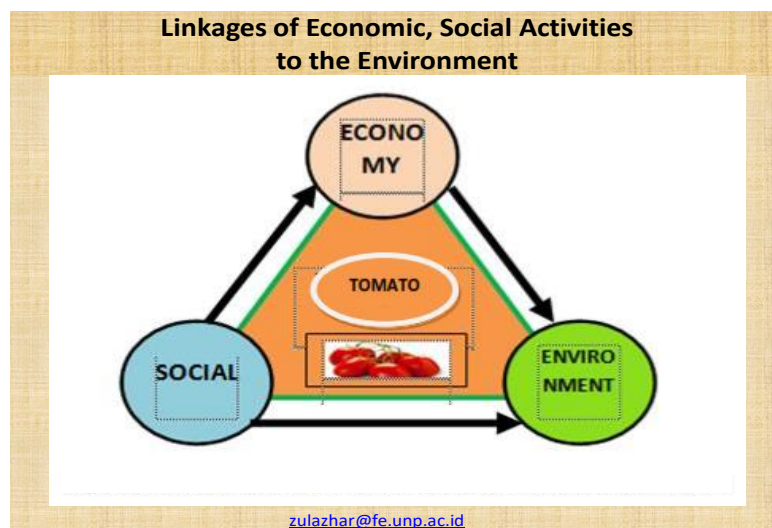


Figure 1. Model ZA Inter Variable / Construct Relationship Diagram

3. Research Methods

The research method is quantitative, the location of data collection in Nagari Bukit Sileh in 2018. The primary data obtained by questionnaires and interviews with tomato farmers or traders in the study location were 98 people. Data retrieval technique is done by sample selection method by accidental sampling.

There are three constructs as Latent variables and 20 manifest variables which consist of socio-cultural 4 indicators, Economy 6 indicators and Environment 10 indicators (see attachment 1). Each construct is measured by manifest variables or influencing indicators. The relationship between constructs (SOCIAL, EKO and LING) and indicators is formative because indicators affect constructs [12].

Then it is weighted with a Likert scale value that is value 1 (strongly disagree), value 2 (disagree), value 3 (agree), value 4 (strongly agree), and value 5 (strongly agree). The direction of the diagram is the main model of the relationship between the constructs / research variables can be seen in Figure 2 below.

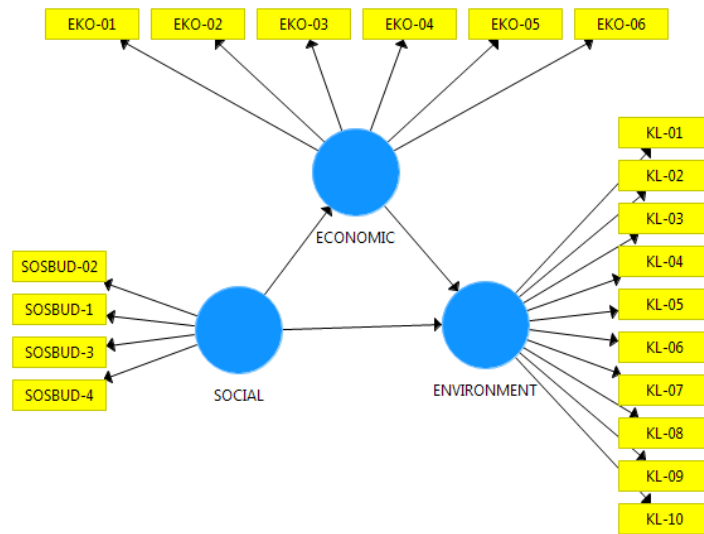


Figure 2. Interconstruct Relationship Diagram

4. Results and Discussion

After the questionnaire data was tabulated, then carried out the analysis resulting in path coefficients as shown in Figure 3 below.

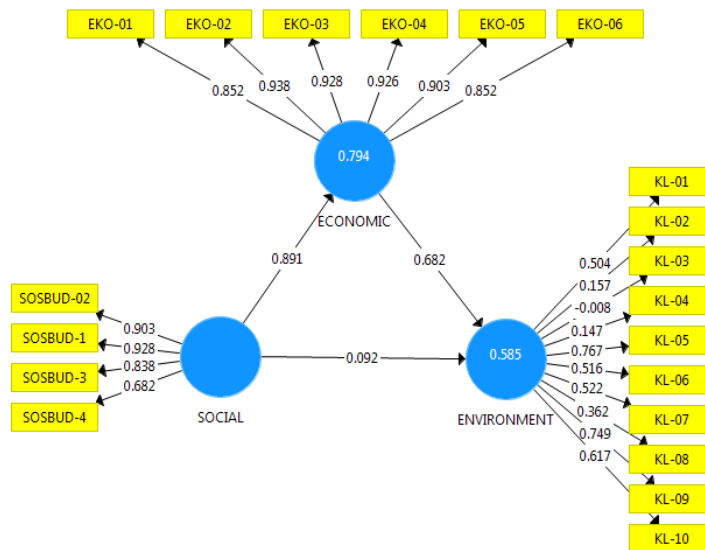


Figure 3. The output model of the path coefficient output

Based on the output of the path coefficient above the indicator which does not have a loading factor coefficient below 0.7, it is dropped from the research diagram (Haryono, 2017), namely Social Culture 04, KL1, KL2, KL3, KL4, KL6, KL7, KL8, KL10. So that the Fit Line output is obtained.

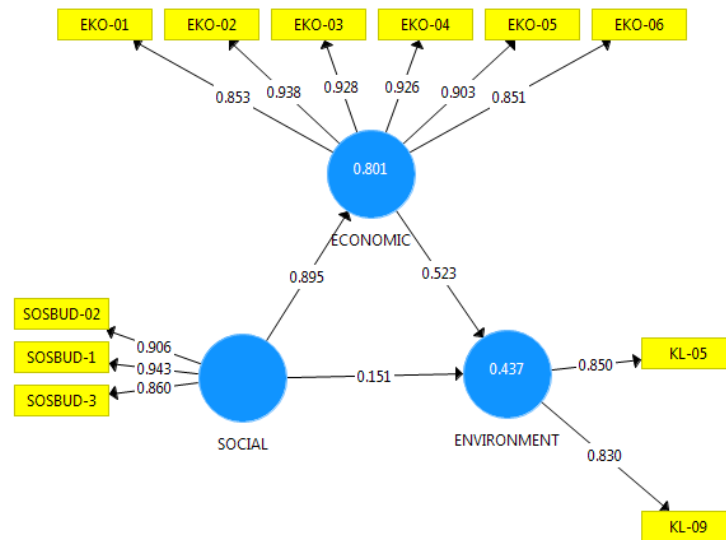


Figure 4. Output Fit Line

Next, the Calculate-Bootstrapping command produces a T Statistic coefficient as a test of the research hypothesis as shown in the following picture.

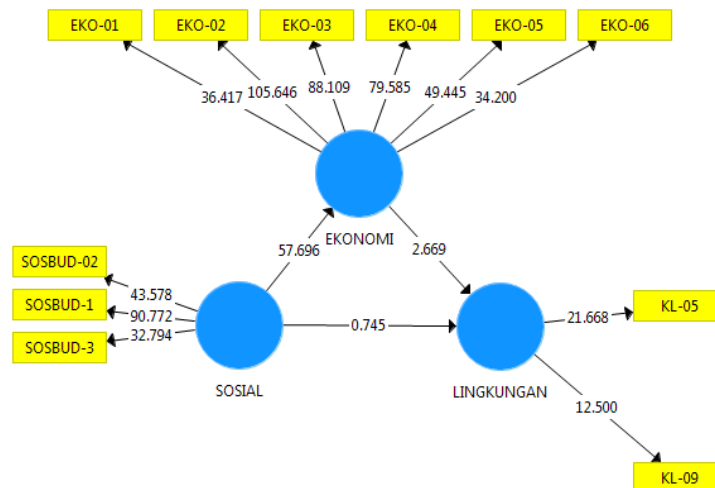


Figure 5. Output of Statistic T.

To test construct validity, the indicator validity is seen from the Loading Factor value (LF) must be equal to 0.7, which is said to be valid [13]. Based on the results of the LF in table 2 (see attachment 2) it turns out that all ≥ 0.7 , then all indicators on the model are fit. Next the results of outer weights in table 3 (see attachment 3) from the calculation of calculate Boost rapping has a T Statistic value ≥ 1.96 said to be valid besides that the indicator is also valid because it has P Value ≤ 0.05 .

So that the results of calculation of variable models that are already fit can be used to test hypotheses at the stage of structural measurement. According to [12] for testing construct reliability is measured by the value of Cronbach's Alpha and Composite Reliability. The Cronbach's Alpha value of all constructs must be equal to 0.7. Based on the results of the construct Reability based on Composite Reability, it can be done by looking at the AVE to show the magnitude of the variant indicators contained by the construct [14,12]. The big limit value is 0.5. It turns out that the AVE results in table 4 are all above 0.5. (see attachment 4). Furthermore, comparing the root AVE with the correlation between constructs where the latent variable correlation can be explained that the AVE Root for Economy is 0.657 while the correlation is maximally economic with the environment

The next step is to evaluate the structural model by looking at the significance of the construct relationship shown by the t value by looking at the output option calculate Bootstrapping in table 5 (see attachment 5). Based on the T Statistic value, the magnitude of 1.96 is said to be valid because it has a small P value of 0.05. It turns out that there is a social field to the environment that is invalid or insignificant because of the large P value of 0.05. Finally, based on the Path Coefficients above, hypothesis testing can be carried out as follows;

First hypothesis; the Social field has a positive and significant effect on the economic field. The result of t value is 52.403 96 1.96 or P Value $0,000 \leq 0.05$. So it can be concluded that there is a significant influence on the social field of the economic field.

Second Hypothesis; Social field has a positive and significant effect on the Environment. The result of t value is 0.764 96 1.96 or P Value $0.447 \geq 0.05$. So that it can be concluded that there is no significant influence on the social field on the Environment.

Third Hypothesis; Economics has a positive and significant effect on the Environment. The result of t value is 2.405 96 1.96 or P Value $0.000 \leq 0.05$. So that it can be concluded that there are significant economic effects on the environment.

Based on the results of testing the hypothesis above the relationship between constructs according to the map thought the study because the indicators are formative, the indicators affect the construct. The Social Sector has a positive and significant influence on the economic field. The result of t value is $52.403 \geq 1.96$ or P Value $0,000 \leq 0.05$. So it can be concluded that there is a significant influence on the social field of the economy. The better the socio-cultural interaction to do tomato plantations will support the production of tomatoes which ultimately improve people's welfare [5]. Effect of Organizational Culture on Motivation, Job Satisfaction and Performance of employees, especially employees in the production section. In a positive way a person's behavior will influence their performance [7].

Furthermore, the Social Sector has a positive and significant effect on the Environment. The result of t value turns out to be $0.764 \leq 1.96$ or P Value $0.447 \geq 0.05$. So that it can be concluded that there is no significant influence on the social field on the Environment. This is predicted because this area is at the foot of Mount Talang which is suitable for crops for secondary crops. Nagari Bukit Sileh is an area that is almost evenly distributed as a tomato farmer and the quality of tomato production is very good farmers also use liquid organic fertilizer in accordance with the results of research [15].

Economics has a positive and significant effect on the Environment. The result of t value is $2.405 \geq 1.96$ or P Value $0.000 \leq 0.05$. So that it can be concluded that there are significant economic effects on the environment. To improve the quality of tomato production [16], it will have an impact on the production of high yields of low tomatoes and even farmers not taking fruit from the stem, because picking costs are more expensive than the sale of tomatoes. The results of sorting from the sale of tomatoes are wasted in the field and in the streets which eventually rot bring flies that damage the environment.

5. Conclusion

The findings from the results of research on environmental studies and the planning of the development of the tomato production center in Solok Regency West Sumatera can be summarized as follows; There is a significant influence between the social sector on the economic field in planning the development of tomato production centers. In this case there is a socio-cultural interaction between tomato farmers and the community in Nagari Bukit Sileh and other Nagari as forward linkage and linkage backwash. There is no significant influence between the social field and the environment in planning the development of tomato production centers. This is due to the quality of land due to the use of fertilizers, soil erosion and landslides. However, floods rarely occur in Nagari Bukit Sileh. There is a significant influence between the economic sector on the environmental field in planning the development of tomato production centers. This together with the progress of economic development arises several problems and environmental impacts. Depleted resources, increasingly advanced technology and the emergence of various types of pollution are beginning to be considered to hamper economic progress, because they

damage the environment. This is due to the excessive use of fertilizers so that the reduced species of other species including eels are almost difficult to find.

Suggestions for policies in the Solok district government to build infrastructure, increase the related industries so that there is a guaranteed market for tomatoes produced, so that economic activities are smooth. The local government should accommodate to create industrial businesses related to tomato plantations as a leading industrial sector. So that an integrated tomato production center is formed which can finally absorb labor in rural areas [14]. Besides maintaining environmental health so farmers reduce the use of fertilizer pesticides.

Appendix A:

Table 1. Variable and Indicator Names and Codes based on the Liker Scale

Variable	Indicator	Code	Likert Scale
STUDY OF THE ECONOMIC FIELD	a. Business development	EKO-1	Likert Scale 1 s/d 5
	b. Farmer's income	EKO-2	
	c. Farmer's lifestyle	EKO-3	
	d. The pattern of consumption of farmers	EKO-4	
	e. Infrastructure	EKO-5	
	f. The results of development are enjoyed by the community	EKO-6	
SOCIAL AFFAIRS STUDY	a. Social interaction between farmers	SOS-1	Likert Scale 1 s/d 5
	b. Social interaction between farmers and other Nagari communities	SOS-2	
	c. High-income product farmers	SOS-3	
	d. Courtesy and hospitality of extension staff	SOS-4	
ENVIRONMENTAL STUDY	a. Land quality due to fertilizer use.	KL-1	Likert Scale 1 s/d 5
	b. Soil erosion or landslide	KL-2	
	c. Flood	KL-3	
	d. Environmental Conservation Plants.	LK-4	
	e. Decreased species	KL-5	
	f. Health Quality	KL-6	
	g. Affected by lung disease, cancer and poisoning	KL-7	
	h. Decreasing Water Quality	KL-8	
	i. Excessive Use of Fertilizers	KL-9	
	j. Products rot and damage the environment	KL-10	

Appendix B:

Table 2. The outer loadings

Outer Loadings

Matrix	EKONOMI	LINGKUNGAN	SOSIAL
EKO-01	0.853		
EKO-02	0.938		
EKO-03	0.928		
EKO-04	0.926		
EKO-05	0.903		
EKO-06	0.851		
KL-05		0.850	
KL-09		0.830	
SOSBUD-02			0.906
SOSBUD-1			0.943
SOSBUD-3			0.860

Appendix C:**Table 3.** Outer Weights

Outer Weights						
	Original Sampl...	Sample Mean (...	Standard Devia...	T Statistics (O...	P Values	
EKO-01 <- EKO...	0.178	0.177	0.007	25.160	0.000	
EKO-02 <- EKO...	0.196	0.196	0.006	35.634	0.000	
EKO-03 <- EKO...	0.196	0.196	0.005	36.745	0.000	
EKO-04 <- EKO...	0.190	0.190	0.006	29.605	0.000	

Appendix D:**Table 4.** AVE, AVE Root, Composite Reability, Cronbach's Aplha dan R²

Constructs	AVE	AVE Root	Composite Reability	Cronbach's Aplha	R ²
Economy	0,811	0,657	0,963	0,953	0,801
Environment	0,706	0,498	0,823	0,584	0,437
Social	0,817	0,667	0,931	0,887	-

Source: Data Processed 2018

Appendix E:**Table 5.** Path Coefficients

Path Coefficients						
	Original Sampl...	Sample Mean (...	Standard Devia...	T Statistics (O...	P Values	
EKONOMI -> L...	0.523	0.545	0.217	2.405	0.018	
SOSIAL -> EKO...	0.895	0.896	0.017	52.403	0.000	
SOSIAL -> LIN...	0.151	0.130	0.197	0.764	0.447	

Source: Data Processed 2018

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