ALTERNATIVE MODEL INVENTORY FOR MANUFACTURE SYSTEM OF SOYBEAN DOMESTIC PRODUCT (INDONESIA)

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ABSTRACT: The purpose of this research is to obtain the suitable model to overcome domestically-produced soybean provisioning. This research is carried out through surveying, interviewing, and handing out questionnaires to relevant institutions which are the Department of Agriculture of Soybean, Integrated Village Service Unit, Centre for Research and Development, Farmer Group, and lastly, Soybean farmers from Jember and Banyuwangi Regency. The way to determine the factors and indicators are using Fishbone Diagram, analysis from the mean value of questionnaire results, Validation and Reliability Test, and Linearity Test using SPSS17 for Windows, Measurement Model, Model Validity Test, and Hypothesis Test using PLS Version 2.0. The result of this research indicates mean value of 4.46 which means that respondents mostly agree with the proposed factors and indicators. Data are found to be valid, reliable, and they fulfill the linear assumptions with quadratic and cubic equations. The result for hypothesis test are: significant with 85% confidence level, model is valid, the proposed model which are Y1 (High production) is 100% influenced by X2 (Sufficient capital) and is 95% influenced by X5 (Land and Intensification), Y2 (Domestically-produced Soybean inventory) is 89% influenced by X1 (Reasonable farmer selling price), 100% influenced by X6 (High productivity), and 88% influenced by Y1 (High production).

Keywords: Alternative, Model, System, Supply, Domestic Soybean production.

1. Introduction

Manufacturing system that produces soybean raw materials has its own distinct characteristic, according to the theory stating that each system differs from the others, depending on its desired goals, where important variables are a collection of interrelating attributes to reach a certain goal (Dogbe et al, 2013). In manufacturing system, to produce raw material of domestically produced soybeans, there is an urgent problem that needs to be resolved which is the supply for soybeans are drastically lower than the need for them. Usually, government conducts knowledge and technology transfer to strengthen the capability of the farmer, since knowledge and technology transfer could improve the knowledge and the capability of its transferee (Handoko et al, 2014; 2016). Various studies to overcome the national soybean deficit have been carried out, among which are: (Churi et al, 2013; Hassan et al, 2014; Hartman et al, 2011). These studies are, in fact, still partial and not thoroughly and integrally carried out. Based on the research explanations above, there are theoretical gaps between research findings and reality. Significant differences occur presumably due to the number of variables and indicators that need to be integrally examined. In regards with the systems theory and inventory model with its improvement (Monisol, 2013) discovered up until today, it is not possible to overcome domestically-produced soybeans. This is because:

1. Demands are far outnumbering supplies.
2. Manufacturing system is hard to control (below surface/subsoil)
3. Variables used in the system and inventory model of Grand Theory with its improvements are not suitable to use for domestically-produced soybean raw materials.

Which means, a suitable model needs to be thought of

2. Research Methods

Relevant factors and indicators were analyzed using 7 fishbone diagrams which were the research findings or recommendations from previous research. Data analysis was performed using 5 Likert Scales by calculating the cumulative distribution frequencies and mean, then Validation Test, Reliability Test, Linearity Assumption are performed using SPSS 17 software for Windows. Measurement Model, Model Validity, and Hypothesis Test were performed using PLS Version 2.0. Sampling was done in Jember and Banyuwangi Regency, the number 1 soybean producer in Indonesia, which was 55% through purposive samplings via direct observations, interviews, and handing out questionnaires to relevant institutions which were the Department of Agriculture of Soybean, Integrated Village Counseling Center, Centre for Soybean Research and Development, Combined Head of Farmers' Group, Head of farmers' group and individual farmers..

3. Result and Discussions

From the results of the analysis using fishbone diagram, the researchers propose a model inventory for manufacture system of domestic soybean as shown in Figure 1.

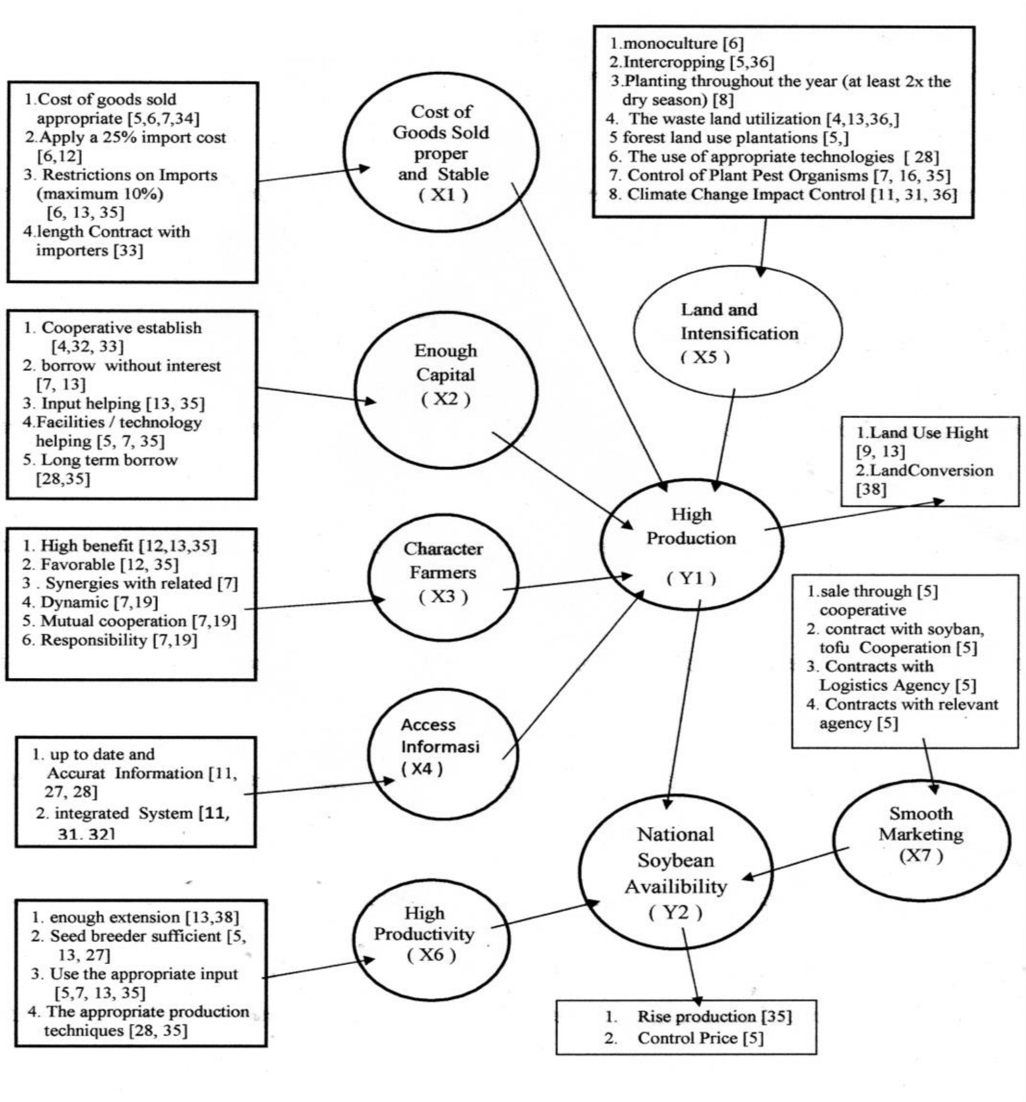

Figure 1 The proposed inventory model for manufacturing system of domestic Soybean

3.1 Variable and Indicator Analysis

Based on Table 1, it shows that respondents' answers in regards to each variable are "agree" (average scores are around 4). Data are proved to be valid and reliable with each having strong average correlation values which are 0.96 (96%) according to the theory (Handoko et al, 2014; 2016), and so is the data pattern that is corresponding to the theory (Kutner et al, 2004), which results in quadratic and cubic equations that obey linear relationship.

Table 1 The results of mean, correlation, Validity Test, Reliability Test, and Linearity

Variable	Average value	Correlation	Validity	Realibility	Equation
$X_1 – Y_2$	3.98	0.848	Valid	Reliable	Quadratic and Cubic
$X_2 – Y_1$	4.39	0.896	Valid	Reliable	Quadratic and Cubic
$X_3 – Y_1$	4.36	0.967	Valid	Reliable	Quadratic
$X_4 – Y_1$	3.73	0.965	Valid	Reliable	Quadratic and Cubic
$X_5 – Y_1$	4.28	0.958	Valid	Reliable	Cubic
$X_6 – Y_2$	4.44	0.909	Valid	Reliable	Cubic
$X_7 – Y_2$	4.44	0.871	Valid	Reliable	Quadratic and Cubic
$Y_1 – Y_2$	4.56	0.959	Valid	Reliable	Quadratic and Cubic

3.2 Model Analysis

Table 2 shows a high number of Outer Loading values being above 0.5, which indicates that the model is sufficient. R^2 value of 0,987 can be interpreted that the model is capable of explaining the soybean inventory phenomenon as much as 98.7% (99%) while the remaining 1% is explained by other variables that are not put into the researched model. Good of Fit Test result shows $\sqrt{0.830 \times 0.882} = 0.855$, where 0 < GoF < 1. This means that the model is considered to be favorable/valid/suitable.

Table 2 Measurement result and Model Validity

Factors	Outer Loading	Outer Weight	AVE	R^2	Communality	Average Communality	Average R^2
X1	0.846		0.74		0.739		
X2	0.895	-	0.936		0.935		
X3	0.967	-	0.773		0.751		
X4	0.864	-	0.916		0.913	0.830	
X5	0.956	-	0.829		0.829		
X6	0.820		0.804		0.803		
X7	0.911		0,677		0.678		
Y1	-	0.539	0.875	0.917			
Y2		0.519	0.927	0.846			0.882
Estimated Relevance				0.987			

As shown on the Figure 2, the values of AVE from all of the variables are above 0.5 which means that the model is sufficient (Kutner et al, 2004)

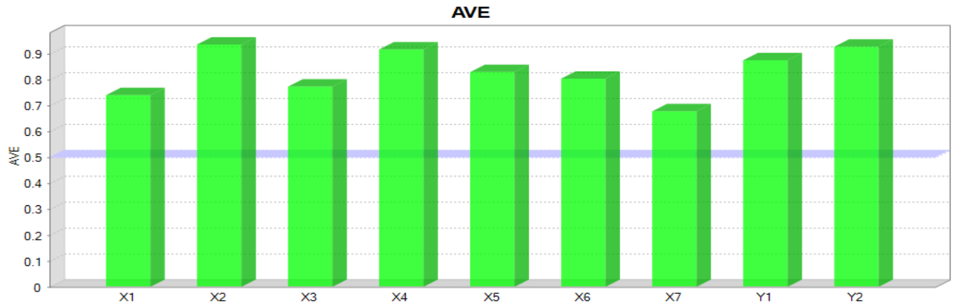

Figure 2 AVE (Average Variance Extract) value diagram

3.3 Hypothesis Test

Having performed 75 iterations, it can then be discovered that the result of model is corresponding to the theory/previous test results and to the actual field condition (Real system). The model is produced with several criteria, which are: Bootstrapping of 15% (85% Confidence Level), and disregarding X7 variable and X5 indicator, which was originally 8, and now becomes 4; X5.2, X5.3, X5.4, and X5.5. Based on Hypothesis Test, the result are found to be: Y1 variable (High production) is 100% influenced X2 (Sufficient capital) and 95% influenced by X5 variable (Land and Intensifications), Y2 (Domestically-produced Soybean inventory) is 89% influenced by X1 (Reasonable goods selling price), 100% influenced by X6 (High productivity), and 88% influenced by Y1 (High production) with Significance Table showing the degree of significance/influence among variables (in percentages), as shown on Table 3.

Table 3 Hypothesis Test Result (Significance)

	Original Sample (O)	Sample Mean (M)	Standard Error (STERR)	T Statistics (|O/STERR|)	P Values
X1 -> Y2	0.444	-0.002	0.274	1.623	0.105
X2 -> Y1	1.173	1.172	0.103	11.394	0.000
X3 -> Y1	-0.022	-0.009	0.116	0.193	0.847
X4 -> Y1	0.051	0.035	0.125	0.407	0.684
X5 -> Y1	-0.244	-0.245	0.124	1.966	0.049
X6 -> Y2	0.899	0.909	0.027	32.784	0.000
Y1 -> Y2	-0.375	0.038	0.243	1.545	0.123

3.4 Inventory Model for Domestic Soybean Manufacturing System

The inventory model for domestic soybean manufacturing system is shown in Figure 3.

4. Conclusion and Suggestions

This research produces variables with each of their indicators can be used to determine domestically-produced soybean inventory. These produced variables, along with their indicators, are a discovery that hasn't been present in the inventory model used all this time.

Research and analysis result concludes that: Respondents stated "agree" and "strongly agree" whether the 7 Independent Variables and the 2 Dependent Variables with their 35 indicators can be used in the Domestically-Produced Soybean Inventory Model. Data are proved to be valid and reliable. The correlation among variables and indicators are shown to be strong with mean value of 0.96 and are having quadratic and cubic relationship. Model is argued to be fit/valid/favorable. Y1 variable (High production) is 100% influenced X2 (Sufficient capital) and 95% influenced by X5 variable (Land and Intensifications), Y2 (Domestically-produced Soybean inventory) is 89% influenced by X1 (Reasonable goods selling price), 100% influenced by X6 (High productivity), and 88% influenced by Y1 (High production).

Corresponding to the previously carried out research result as well as the limitation of this research, several suggestions can be made, namely: It is advised for relevant and/or concerned parties regarding to the inventory of these domestically-produced soybeans to implement the indicators that can overcome Soybean deficits, if possible, self-sufficiently. The indicators to fulfill soybean needs can be performed if all parties, especially those who are relevant, are willing to do it. It is expected that soybean self-sufficiency can be achieved 3 years after the practice of this research, according to the targets by The President of Republic Indonesia, Djoko Widodo (December 2015) to the Department of Agriculture across Indonesia. A further research on Farmer Characteristics Factor (X3), Access towards Information (X4) towards the increase of domestic soybean productions and provisioning

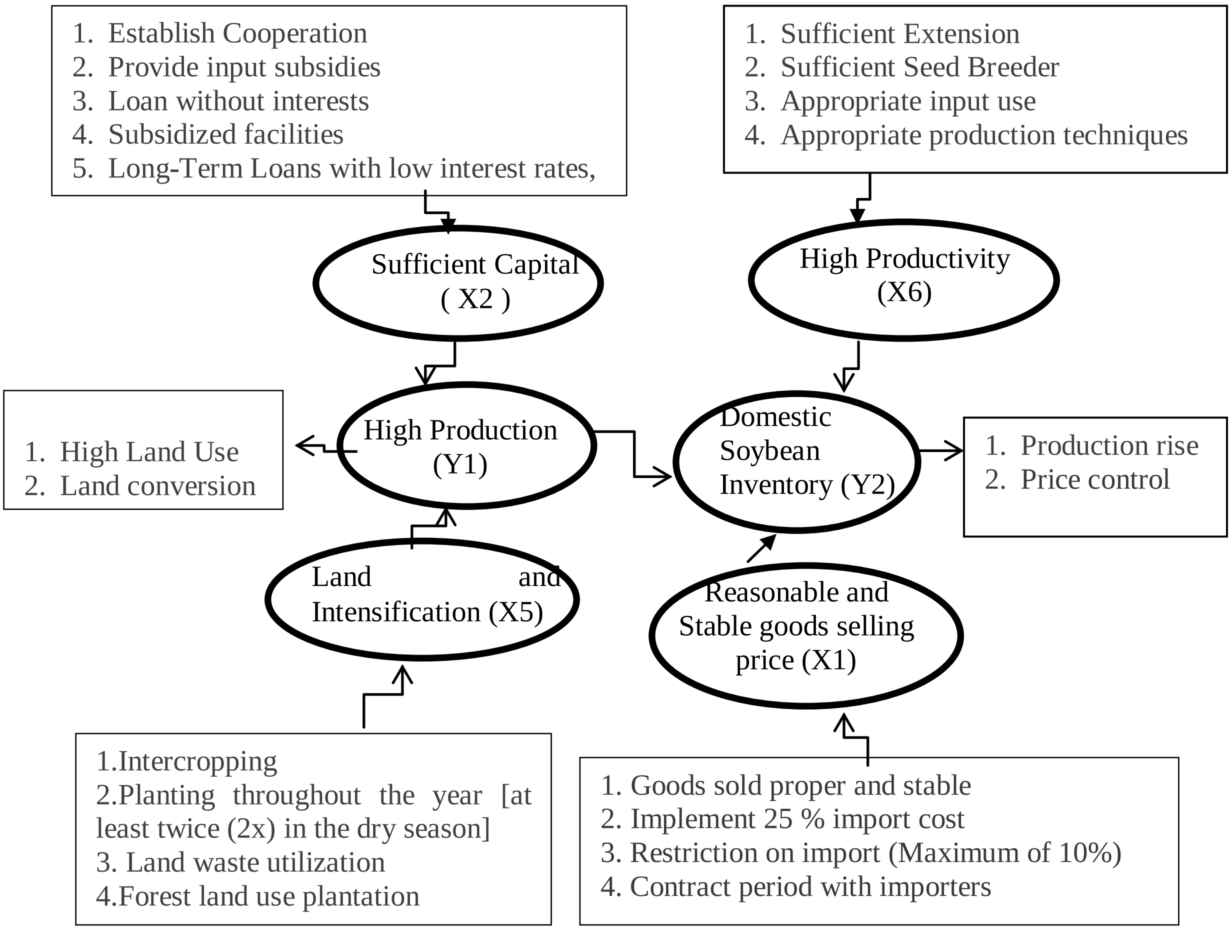

Figure 3 Model for Domestic Soybean Manufacturing System

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