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Institutional models of soybean seeding and Factors Influencing Farmer's Participation in Soybean Breeders Organization in Southeast Sulawesi, Indonesia

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Abstract: *The aim of the study was to identify institutional models of soybean seeding at the farm level and the factors that influenced farmers to participate in institutional soybean seeding. This research was conducted in three major soybean seeding districts in Southeast Sulawesi Indonesia using cross-sectional data from 81 respondents in participating in the institutional model of soybean seeding obtained by census and 15 farmers not participating in the institution. This study was conducted from April to August 2018. Data were analyzed descriptively and by regression of logit-probit models. The institutional model of soybean seeding occurs in the form of contract farming. The government as principal and soybean seed farmers as agents, in the form of input contracts, production contracts, and marketing contracts. This institutional model is an important instrument for increasing the availability of soybean seeds in Indonesia. Other analysis results showed that the number of seeds (breeder seed), amount of fertilizer, and frequency of agricultural extension of the Seed Supervision and Certification Bureau (SSCB) were factors that determined farmers tendency to join Contract farming of soybean seeding institutions. service improvements in Contract farming of soybean seeding institutions can develop institutions. Service improvements are undertaken through increased postharvest mechanization, increased quantity, and quality of agricultural extension agents, better order scheduling of seed production, more profitable pricing, and market protection.*

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I. Introduction

The utilization of superior varieties of certified soybean seeds is an important component in soybean cultivation. The development of government-formed seed breeders plays an important role in the procurement of soybean seeds at the farm level. Increasing national production faces various obstacles such as land availability, production technology, and seedlings. Seed problems play an important role in increasing soybean production because the seed is determinant of productivity in terms of genetics that cannot be changed even if done in the best possible farming and input as much as possible. One of the problems in seeding is the availability of high-quality seeds at the right time at the farm level so that farmers use their own low-productivity seeds. The only effort that is able to guarantee good seed distribution is to develop soybean seed breeders at the production center level [(1)]. Adequate seed quality is a responsive solution that can minimize constraints on land and technology aspects. High demand for seed in soybean production centers indicates good prospects in improving seed quality and productivity at the farmer level..

The performance and capacity of soybean seed breeders is not optimal because it faces constraints from capital aspects, facilities aspects, infrastructure, post-harvest handling such as drying floors, sorting, packaging and testing of seeds, a long time in the seed testing process to produce labeled seeds, storage and marketing constraints[(2)]. Given the vital position of the seed breeders on the seed availability, one effort that can be tried to develop it by increasing breeder business profitability. Increasing productivity results in increased profitability, thus it is worth cultivating compared to other farms business. The productivity of seed breeders is thought to be influenced by several factors. One obstacle is the low quality of seeds due to the delay in drying that occurs due to harvest in the rainy season. Technology is a very important thing for seed breeders to have. The next obstacle is the rapid decline in seed variability (deterioration) caused by varieties and adequate storage patterns. For this reason, it is necessary to have good seed storage[(3)]. In addition to the issue of seed legislation, it is very important to guarantee seeds quality that reaches farmers[(4)].

Purba and Rozi[5]stated that soybean seed demand would be fulfilled appropriately if the seeding institution had an optimal role, the institution was a farmer group. The procurement of seeds at the level of soybean seed breeders is often constrained by business capital. Bahari[2] found a solution these constraints can be resolved with contract farming that is applied in an institutional approach.

Ton, Vellema[6] use a more specific definition of contract farming, adapted from Prowse[7], which covers contracts in which the farmer is provided with planting material, inputs or credit. Contract farming is a contractual arrangement for a fixed term between a farmer and a firm, agreed verbally or in writing before production begins, that provides material or financial resources to the farmer and specifies one or more product or process requirements, for agricultural production on land owned or controlled by the farmer, which gives the firm legal title to (most of) the crop or livestock. Based on this, contract farming can resolve the limitations of small farmers in business because it provides certainty of production, price, marketing and reduces risk so that business sustainability can be maintained. Besides, the existence of a production contract that sets product specifications will result in farmers being able to produce high-quality products with quality inputs without fear of business failure

In contract farming allows smallholders to participate in high-value product markets, to improve quality standards, increase and stabilizing income, this is a noble goal of the contract. The importance of achieving the goal of contract farming is due to rational reasons, namely inventory quality, increased production quantity, transfer of risks and profits. This supports by the research findings of Tuan[8]; Sridharan and Saravanan[9] that some of the benefits of contract farming are mainly access to inputs, services, farmer empowerment (technical and managerial capabilities) and capacity building of farmer organizations. These benefits encourage farmers in breeding groups to participate in institutional contracts.

Although there are concerns about the ability of small farmers to survive in an agribusiness environment, there are still opportunities for intermediation to link them to global or national markets in management and marketing[10]. It was reinforced by Bahari[11] that in conditions of high contract implementation increasing farmers' incomes, and increasing contract implementation would increase the trust and satisfaction level of farmers participating in the institution. It is necessary to implement a faster and more accurate information system between all parties in the institution, transparency causing no fraud in the result distribution. According to Bahari[11], the conceptual model of contract farming shows that motivation from farmers to enter into farming contracts determines contract design. Because there is a dynamic interaction between contract design and contracts fulfillment and there are external factors influencing farmers. The conceptual model also explains that contract design is dynamic and changes over time. This can help to analyze the changes that have been made in the contract design and the farmer's response to the changes made. Contract design includes terms and conditions regarding input supply, credit supply, output price, services expansion provided by the company, research and development as well as supervision benefits provided by the company, requirements for repayment by farmers, output quality, and conflict resolution mechanisms.

The disadvantages of contract farming's conceptual model are (1) it has not linked contract implementation which refers to dynamic contract design that can have an impact on changes in improved output to farmers (2) has not explained the relevance of contract implementation and the magnitude of the benefits obtained[11]. Therefore it is very important to analyze how the institutional model of the contract and how much benefits the farmer may get. The application of contract design implementation is hampered by the existence of a conflict of interest due to reasons of negligence. According to Singh[10] the strategy of avoiding negligence requires strict supervision and implementing activities in accordance with contract designs during the production process. The increase in production and availability of soybean seeds is sourced from seed breeders. However, there are obstacles in farming, seed storage, and marketing. The participation of seed breeder group in contractual institutions has not been discussed in depth. Based on these descriptions, this paper would like to achieve some of the following objectives : (1) identify institutional models of soybean seeding at the farm level and (2) factors that influence members of farmer groups to participate in soybean seeding institution.

II. Material And Methods

The data used were the case study data of Soybean Seed Breeder who was a government partner, located in Konawe District, South Konawe Regency and Kolaka Regency, Southeast Sulawesi in Agustus - December 2018.

Research data: The data analyzed in this study were data from three soybean seeding institutions in one period production. The population in the study consisted of all farmers who cultivated soybeans as breeders. Seed Breeder consist of Seed Breeder are include in Seed Breeder Institutions are referred to as contract farmers and seed breeder not include in the institutions are referred to as non-contract farmers. The technique of taking respondents either contract or non-contract farmers was carried out using the census method for all members of the soybean seeding group. Respondents of the study consisted of 81 farmers who participated in the

institutional program of cultivators (contract), namely 36 farmers of Mekar Sari Group, 20 farmers of Citra Sari Group, and 25 farmers of Karya Murni groups and 15 non-contracted soybean seed breeders. Thus the total number of respondents were 96 soybean farmers

Data analysis method

To answer the first objective, descriptive analysis was used, concerning the problems and development of seed breeders, potential, the role of each element related to institutionalization, aspects of production, cultivation, post-harvest technicality, price policy, and marketing aspects. To answer the second objective, a regression model was used with qualitative data on non-independent variables (logit function and probit function). Because in the qualitative variable logit function (dummy) where this variable is assumed to be worth 1 and the other 0, So the logit function model used has a form of equation in accordance with what was stated by Widarjono[(12)] as follows.

$P(Y=1)\ \frac{1}{1+e^{(\alpha+\beta_j x_j}}$ ....(1)

Y = 1, for soybean farmers who participate in the farmers' institutional program of soybean seed breeders, and 0 for others

P (Y = 1) = Opportunity for farmers to participate in soybean seed breeders institutions

X_j = Variables that are thought to affect farmers' decisions to participate in institutional programs for seed breeders

A, β = Estimated parameter

In the form of logarithms, equation (1) can be written as follows,

$$Ln\left[\frac{P}{1-P}\right] = \alpha + \beta_j X_j \quad ....(2)$$

Furthermore, the Probit Model is a nonlinear model that uses binary numbers (dummy variables) as the response variable and presupposes the error factor to be normally distributed. The cumulative distribution function of the probit model is almost similar to logit model, the difference lies in the probability value approaching the number 0 or 1. So the equation can be written as follows

$$P_i\ (Y_i = \frac{1}{X_i}) = \emptyset(\beta_o + \beta_1 X_i \quad ....(3)$$

Where Yi is a probability, and Xi is an independent variable, ∅ (Z) is a function of the probit model. ∅ (Z) which is based on normal distribution Z, it can be written,

$$P_i = f(Z_i) = \frac{1}{\sqrt{2\pi}}\int_{-\infty}^{z_i} e^{-z^{z/2}}\, dZ \quad ....(4)$$

The criteria for selecting the best model between the logit model and the probit model are comparing the estimated values and observations through a comparison of the deviation values between the logit model and the probit model. Then the smaller the deviance value, the better the model will be. The Residual Deviance Function is the difference between the maximum log likelihood and the model obtained. The magnitude of the probability that maximizes this event is called log of the likelihood (LL). Thus, this LL value is a measure of the goodness of the logit regression line or probit in the ML method as the squared residuals in the linear regression line.

The variables included in the regression equation model are as follows:

$Y=A+a_1X_1+a_2X_2+a_3X_3+a_4X_4+a_5X_5+\mu$ ....(5)

Y = Participation in Contract Farming; Value = 1, meaning that decide to join Contract farming of soybean seeding institutions, and = 0, meaning that decide not to join Contract farming of soybean seeding institutions

A = Constant

X_1 = Soybean Seed Quantity (Kg)

X_2 = Quantity of SP36 Fertilizers and Urea (Kg)

X_3 = Total Use of Pesticides (Liter)

X_4 = Total Use of Labor (HPL or Hours Per Labor)

X_5 = Guidance Frequency of soybean's Agricultural Extension of Seed Agriculture Supervision and Certification Bureau (SSCB) (Times)

μ = Error term

Measurement of institutional services for seeding is measured by scores. The size of the score on the farmer's motivation to participate in soybean seeding institution, using a Likert scale with a scale of 1-5. Measured service factors are the adequacy of production facilities, frequency of technical guidance, compliance of guidance materials, response to complaints, suitability of output prices with contracts, and payment time of output. With the size of the score following the likert scale, namely: 1 = very low, 2 = low, 3 = moderate, 4 =

high, 5 = very high, as follows Ragasa, Lambrecht[13]. The criteria for institutional service for soybean seeding are classified into 3 (three) levels as follows: (1) Score 298 - 405 is Very Good, (2) Score 190 – 297 is Good, and (3) Score 189 - 81 is Poor.

III. Result andDiscussion

Descriptive Analysis to identify in institutional models of soybean seeding at the farm level

A. Model of institutional soybean seeding at the farm level

The group of soybean seedlings, also known as the Seed Breeders (SB) group in Southeast Sulawesi, is only a few farmer groups that carry out continuous seeding annually. The SB group was established to form an institutional model at the level of soybean farmers. The SB group acts as a government partner in producing labeled soybean seeds. The government, in this case, acts as the core, namely Food Crop Agriculture Service (Dinas Pertanian Tanaman Pangan), together with SB groups developing goals for mutual assistance, strengthening and mutual benefit. The government as the principal in the Contract Farming assists towards production facilities, technical guidance, supervision in conducting cultivation, undertakes certification tasks and assists in the distribution and marketing of labeled soybean seeds.

The role of government in soybean seed breeders in the research areas can be grouped into several criteria, namely Production factor aspects, Cultivation aspects, Postharvest technical aspects, Seed price policies aspects and Marketing aspects.

Production factor aspects, The roles of government in production factors are (1) the provision of superior seeds for seed breeders to increase productivity in producing seeds, and (2) fertilizer subsidies for soybean seed breeders, both urea and SP36/NPK as well as guarantee its availability for soybean breeders.Soybean seeds from the Agriculture Service, the types of seeds developed are Anjasmoro and Argomulyo, both of which are large seed soybeans. Supervision and counseling were carried out directly by the Seed Supervision and Certification Bureau (SSCB) for Food Crops and Horticulture of Southeast Sulawesi Province.

The soybean seeding group will plant soybean seeds to produce seeds if they get orders from the Agriculture Service. Furthermore, in the field, the farmers get guidance from the Regional Technical Implementation Unit (UPTD) of Seed Supervision and Certification Bureau (SSCB) for Food Crops and Horticulture in Southeast Sulawesi Province. Agricultural Extension of SSCB conducts monitoring in the field regarding the land area, the number of group farmers, and the type of seed. Monitoring is conducted once every two weeks or five times in one production process. The results of the analysis also describe the roles of each in the seed institutional model presented in Figure 1.This called the Cultivation aspect. Moreover, this aspect also serve the complaints of technical constraints from soybean breeders and to ensure the cultivation business of soybean breeders goes according to the technical aspects of soybean farming. Soybean breeders are always guided and supervised by agricultural extension agents and also provides tractor assistance for soybean breeder farmers.

In post-harvest time, the government plays a role in providing equipment assistance. Equipment assistance provided by the government in the form of the warehouse building. The warehouse building assistance aims to be a place for storing seeds before being distributed to soybean farmers. Storage warehouse buildings are allocated only one per breeder group. in addition, the government also assists in providing tractor assistance, and soybean seed cleaning machines (Seed Cleaner). This is called Postharvest technical aspects.

Storage warehouses are allocated only one per breeder group. The design is following the standards of the relevant Agency complete with the soybean seed drying floor. The standard size of the aid is only 6x9 meters (56 m2) and even the Karya Murni group independently increases the size to 8x12 meters (96m2). The free provision of Seed Cleaner by the government is allocated to each group of soybean breeders.The given seed cleaner has a capacity of 2 tons per day. Soybeans that have gone through a cleaning process, are sampled to be certified by SSCB. Sampling for the certification process by SSCB as needed, and random sampling from each sack. Then testing is done to produce labeled soybean seeds ready to be distributed at the farm level in the form of Extension Seed (Benih Sebar/BR) several levels. The results of the certification from the SSCB were then given to the breeder farmer groups. Then it can be labeled, and based on the costs of the farmer group. Hence, the multiplication of labeled sacks is carried out by each of the Seed Breeder (SB) groups.

In Marketing aspects, seed marketing is based on contracts with breeders. The number of seeds that will be marketed in the upcoming growing season has previously been ordered to the breeders in the current growing season. In this case, the marketing of soybean seeds is a form of production and marketing contracts between breeders to the Government or related agencies. Based on the explanations above, we can say that the government intervenes in the economy of soybean seeds from the input of seed farming to marketing. The government's action aims to overcome various constraints of the production of quality seeds needed to increase the soybean's productivity.

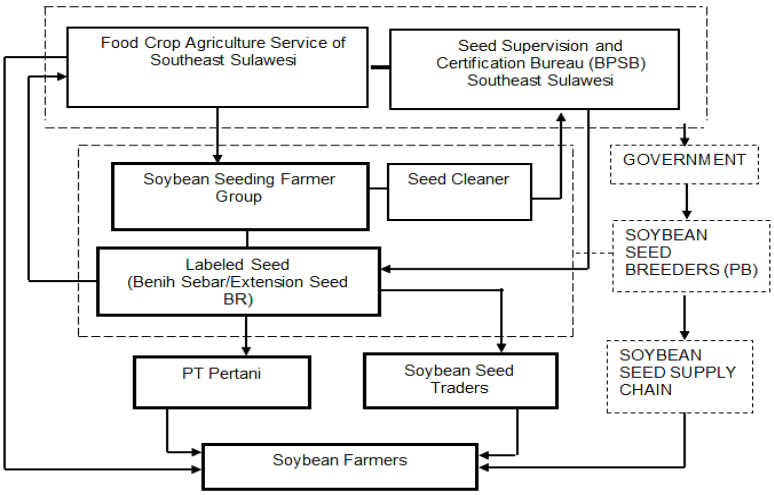

Figure 1. Institutional Model of Soybean Seeding

The aspect of Seed Price Policy, The price of soybean seeds is determined by the government who previously calculated all estimated costs incurred by the breeder farmers plus the business profits of the seed breeder. These costs are calculated starting from the cost of farming, the cost of yield loss occurs in the seed selection process, packaging costs, label costs and transportation costs. The average yield from Seed Cleaner or traditional separation process was 30 percent of the number of soybeans before separation. The selling price of labeled soybean seeds is around Rp. 11,500 to reach Rp. 13,000 per kg of labeled soybean seeds. The average yield from Seed Cleaner or manual (traditional) separation process is 25 to 30 percent of the number of soybeans before seed separation or purification.

The role of government in institutional models of soybean seeding at this farm-level shows that The government undertake full contract farming for seed farmers both in on-farm and off-farm, that is : (1) input contracts which is in the form of providing seed farm production facilities; (2) production contract which are determination of quantity, quality and production techniques under the control of SSCB; and (3) marketing contracts which are through the determination of seed prices and the selling mechanism of these seeds. The government's action in intervening in soybean seed farming is to support the provision of national quality seeds in every province in Indonesia. Quality seeds are one of the factors that can increase national productivity. Economically, in the contract farming model that was implemented, the government as principal now has full control of the income of soybean seed farmers. Such control is very important because it can reduce the risk of soybean seed farming, reduce the opportunity cost of soybean seed farming compared to other seasonal farms and is a stabilization of income for farmers. The stabilization of income and farming patterns is expected in the future to encourage farmers to develop soybean seed farming voluntarily.

B. Seed Supply Chain

The distribution of seed marketing is mostly carried out by the Government or related Institution Agencies and through seed breeding groups. Seed marketing is based on contracts with breeders. The number of seeds that will be marketed in the upcoming planting season has already been ordered by the government to cultivators in the current planting season. In this case, the soybean seed marketing is a form of production and marketing contract between breeder farmers to the Government or the related Agency. Soybean seed breeders hand over all soybean seed production to the government to determine their price and marketing distribution. Furthermore, the results of the certification process by SSCB also recommended the classification of extension seeds (BR-1, BR-2, BR-3) and selling prices. The central point of seed production is handled by t Agriculture Agency and seed breeder farmers, breeder farmers have storage warehouses, provide labels and packing. The distribution of labeled soybean seeds starts from breeder farmer groups to consumption soybean farmers.

From Figure 1, it can be seen that the supply chain of soybean seeds can be through 4 (four) lines namely (1) Seed breeder farmers - Agriculture Agency - Consumption soybean farmers; (2) Seed breeders - to consumption soybean farmers; (3) Seed breeders - PT. Pertani - to consumption soybean farmers; and (4) Seed breeders - Seed traders - Other regional soybean farmers.

Based on this, it shows that the government intervenes in the economics of soybean seeds from input to seed farming to marketing. The government's actions aim to overcome the various obstacles of quality seed production needed to increase soybean productivity in Indonesia. The increasing role of the government will increase the chances of developing soybean seeds which have always been hampered both in terms of input,

farming or marketing. Thus the labeled soybean seed supply chain is very effective to be distributed to the hands of consumption soybean farmers.

Factors that influence farmers participate in institutional soybean seeding

A. Logit Model

To determine the determinants that influence adoption by soybean farmers in this study were analyzed using Logit and Probit regression models. The independent variable in the logit regression model which is thought to influence the participation as seed breeders in soybean farming consist of 5 variables. These variables include the number of staple seeds, the number of fertilizers, the number of pesticides, the use of labor, and the frequency of guidance from Agricultural Extension of SSCB. Whereas the dependent variable in the logit regression model is transformed into two categories, namely soybean farmers who participate in the seed breeder institutions denoted by number 1 and farmers who do not participate in the program are denoted by the number 0. The variables that influence farmers' decisions in following soybean seed institutions are presented in Table 1.

Table 1. The Estimate Results of Logit Regression Model Variables that Determine Farmer Decision to Participate in the Soybean Seed Institutional Program

Variable	Coefficient	Std. Error	t-Statistic	Prob.
Constant	-24.24451[b]	8.60138	-2.818677	0.0048
Soybean Seed Quantity (Kg)	0.220007[a]	0.09442	2.330077	0.0198
Quantity of SP36 Fertilizers and Urea (Kg)	0.100059[b]	0.045829	2.183304	0.0290
Total Use of Pesticides (Liter)	-1.846117[c]	1.033699	-1.785934	0.0741
Total Use of Labor (HPL)	-0.000747	0.071319	-0.010478	0.9916
Guidance Frequency of soybean's Agricultural Extension of SSCB (Times)	2.381566[b]	1.139656	2.089723	0.0366
McFadden R^2	0.802035	Mean dependent var		0.843750
Sum squared resid	2.524131	Log likelihood		-8.236602
LR statistic	66.73938	Prob(LR statistic)		0.00000

Description : a: real at the level of 1 percent; b: real at the level of 5 percent; c: real at the level of 10 percent

B. Probit Model

The probit model is the development of a model that uses a dependent variable in the form of a dummy variable that is a doll variable that is only worth 0 and 1. These values 0 and 1 represent representative variables or notations of success (value 1) or do not participate in seeding institutions (value 0) If a model uses dummy variables as dependent variables, there will be many weaknesses if estimated using the Ordinary Least Square (OLS) approach. The model with dummy variables as dependent variables estimated by OLS is called the Linear Probability Model (LPM). This model requires that the estimated variables must have a value between 0 and 1[(12)]. Because the LPM model has several weaknesses, a solution is needed to get the best estimate. Then Cumulative Distribution Function (CDF) was developed, namely the Logit model and refined it back to Probit. This probit is an attempt to normalize the CDF so it's also called the Probit model. With this model, we estimate the model that will be used to achieve the research objectives.

From the results of estimate regression function parameters in Tables 1 and 2, it can be seen that the model used is very good in explaining farmers' behavior in soybean seed production business. This can be seen from the coefficient of determination (R2) of 0.843, this means that the performance of farmer participation in soybean seeding business can be explained by the diversity of explanatory variables of 84.3 percent. The results of the probit model analysis applied to determine the farmers' decision to participate in the soybean seed institution, obtained 4 variables that determine the decision can be seen in Table 2. The four variables include the variable number of seeds, SP36, and Urea fertilizer, and the frequency of guidance from Agricultural Extension of SSCB has a positive effect on farmers' opportunities in soybean seed institutions. While the variable use of labor is not a determinant of farmer decision-making to participate in institutional soybean seeding. The LR Statistic value is 66.91 with a probability level (LR Statistic) 0.00, which means that there are characteristic variables that have a significant effect on the opportunities for farmer decisions to take part in the institution. McFadden R-Squared value is 0.8042, the independent variable in the probit model above is good enough to explain the non-independent variable.

Table 2. The Estimate Results of Probit Regression Model Variables that Determine Farmer Decision to Participate in the Soybean Seed Institutional Program

Variable	Coefficient	Std. Error	z-Statistic	Prob.
Constant	-14.30081[b]	4.823412	-2.964875	0.003
Soybean Seed Quantity (Kg)	0.131533[a]	0.053835	2.443272	0.0146
Quantity of SP36 Fertilizers and Urea (Kg)	0.058991[b]	0.026377	2.236459	0.0253
Total Use of Pesticides (Liter)	-1.118710[c]	0.603754	1.852925	0.0639
Total Use of Labor (HPL)	0.007799	0.036702	0.212505	0.8317
Guidance Frequency of soybean's Agricultural Extension of SSCB (Times)	1.329673[b]	0.578906	2.296874	0.0216
McFadden R-squared	0.804192	Mean dependent var		0.84375
Sum squared resid	2.599986	S.E. of regression		0.169967
LR statistic	66.9189	Prob (LR statistic)		0.00000

Description : a: real at the level of 1 percent; b: real at the level of 5 percent; c: real at the level of 10 percent

The variable number of seeds has a positive coefficient and significant means that the number of seeds will influence the decision of farmers to incline to participate in the soybean seed institutional program, where other variables are considered constant. The average use of farmers participating in institutions and non-institutions was 43.79 kg and 44.25 kg per hectare, respectively. The variable, number of seeds has a positive coefficient (0.0589) and significant (0.0253), which means that the amount of fertilizer used would influence farmers' decision to tend to take part in the soybean seed institutional program, where other variables are considered constant. The average use of SP36 fertilizers and urea by farmers participating in institutions and non-institutions is 243.00 kg and 165.16 kg per hectare, respectively. The use of fertilizer at the farm level is very low compared to the recommendation of 250 kg per hectare. The variable number of pesticide use has a negative coefficient (-1.1187) and significant (0.0639), which means that the use of pesticides will influence the farmers' decision to participate in the soybean seeding institutional program. The average use of pesticides for farmers joins institutions and non-institutions are 3.90 liters and 6.47 liters per hectare, respectively. This finding shows that farmers in soybean seeding groups are more efficient in using pesticides. Likewise, the use of labor is higher for farmers who do not participate in institutions. On the contrary, technical guidance from Agricultural Extension of SSCB for farmers who participated in institutions is higher compared to soybean farmers who did not participate in institutions. Based on these results indicate that the main factor in the participation of farmers in soybean seeding institutions is to get assistance with production facilities and technical guidance from agricultural extension workers in soybean seed farm that provided by the government as principals in the contract of soybean seed farming.

Provision of production facilities is important for soybean seed farmers, especially seeds and fertilizers. Because the biggest costs in general annual farming and soybean seed farming, in particular, are seeds and fertilizers. The government program in contract farming soybean seed farm to provide good seeds and the availability of fertilizers on time that can resolve the main problems of soybean seed farming in the research area, which are poor seeds for farming, high fertilizer prices, and availability of fertilizers which are often unavailable during the growing season because its demand competes with fertilizer demand in other seasonal farms. The soybean seed farming contract guarantees the sustainability of farming and income in soybean seeding.

The support of Agricultural extension of SSCB in Production Contract is very important because to produce quality seeds not only takes place on soybean seed on-farm but also takes place in the next several postharvest stages. The postharvest stages are cleaning, sorting, packing, seed storage. The four post-harvest stages are very important because they also determine the quality of soybean seeds. In those, the postharvest stage is needed guidance from agricultural extension so this cause Guidance Frequency of soybean's agricultural extension of SSCB has a significant effect on increasing the production of high-quality soybean seeds.

Institutional Services

Institutional service assessment is intended to analyze government performance in seed institutions in the implementation of input contracts (Adequacy of Production Facilities), production contracts (Frequency of Technical Guidance, Conformity of guidance material, and Response to complaints) and marketing contracts (Compatibility of output prices with contracts and payment time). The results of the analysis in Table 3, suggest that institutional services at the level of seed production. The measurement results for service factors in this study are the adequacy of production facilities, frequency of technical guidance from Agricultural Extension of SSCB, conformity of guidance material, response to complaints, the suitability of output prices with contracts, and payment time of output. The results of the measurement of all service factors can be seen in Table 3 below.

Table 3. Score of Service Attribute Achievements On Seed Institutional Models

No	SERVICE	Achievement Score					Total Score
		a	b	c	d	e	
1	Adequacy of Production Facilities	330 (66)	60 (15)	0 (00)	0 (00)	0 (00)	390
2	Frequency of Technical Guidance	250 (50)	124 (31)	0 (00)	0 (00)	0 (00)	374
3	Conformity of guidance material	295 (59)	88 (22)	0 (00)	0 (00)	0 (00)	383
4	Response to complaints	275 (55)	100 (26)	0 (00)	0 (00)	0 (00)	375
5	Compatibility of output prices with contracts	25 (5)	304 (76)	0 (00)	0 (00)	0 (00)	329
6	Payment time	35 (7)	296 (74)	0 (00)	0 (00)	0 (00)	331
							363,66

Description : Numbers in parentheses (...) number of Farmers participate in Seeding Institution

Based on the score provides at Table 3, it shows that the number of service scores obtained by partners or soybean seed breeders from the principal (Government) of each service factor in the contract has an average score of 363.66, thus score services Government (principal) to Farmer (partners) belong to very good category. This result indicates that the contract implementation is very high. This means that almost all service factors are implemented in the contract. The best performance of the government in the soybean seed contract farming is on the performance of input contracts in form of sufficient production facilities, then on the performance of production contracts in the form of Technical Guidance Frequency, Guidance on Material Compliance, and Response to complaints. The lowest performance of the government is the marketing contract in the form of conformity to the output price with the contract and time of payment.

If the findings of this analysis are related to the findings in tables 2 and 3, it indicates that there is a compatibility between the main cause factors farmers want to participate in soybean seed contract farming and the government's best performance in contract farming. That is the factor of input contracts (Adequacy of Production Facilities), production contracts (Frequency of Technical Guidance, Conformity of guidance material, and Response to complaints). This condition supports increasing farmer participation in soybean seed institutions.

Soybean seed production has large farming costs both in on-farm or in post-harvest stages so that soybean seed farming has a large opportunity cost when compared to other seasonal farms. Without a guarantee of the availability of production facilities and technical guidance, farmers will tend to switch to other seasonal farms. To achieve the goal of increasing domestic soybean productivity through improving seed quality, the government tends to be far more concerned with factors related to production facilities and technical guidance. This resulted in the cost of producing soybean seeds being relatively lower so that the opportunity cost was relatively not much different from other farms which would encourage farmers to participate in producing soybean seeds.

IV. Conclusion and Research Implication

The government undertake full agricultural contracts for seed farmers, that is (1) input contracts, which is providing production facilities; (2) production contract, which is determination of quantity, quality and production techniques under the control of SSCB; and (3) marketing contracts, which through the determination of seed prices and the selling mechanism of these seeds. The full contract model can reduce the risk of soybean seed farming, reduce the opportunity cost of soybean seed farming compared to other annual farms and as an income stabilization for farmers. The institution of soybean seeding is also very effective in the operation of the soybean seed supply chain. The ultimate goal is to increase soybean seed production so that domestic soybean productivity increases.

The participation of farmers in the contract farming of soybean seeding institutions is determined by several factors, which are: Soybean Seed Quantity, Quantity of SP36 Fertilizers and Urea, and Guidance Frequency of soybean's Agricultural Extension of SSCB. These findings indicate that farmers want to participate in contract farming of soybean seeding institutions because of the existence of input contracts and production contracts.

The implementation of contracts in institutions is very high. This means that almost all service factors are implemented properly in contract implementation. The best performance of the government contract farming for soybean seeds is on the performance of Input Contracts and Production Contracts. There is compatibility between the main factors that farmers want to participate in Contract Farming and the best performance of the government in the servant contract farming. This condition supports increasing farmer participation in soybean seed institutions.

The input contracts and production contracts in Contract farming of soybean seeding institutions are the most important factors in the sustainability and development of Contract farming of soybean seeding. For this reason, it is necessary to increase the quantity and quantity of service quality in input contracts and production contracts. At present, the government through Contract Farming has provided services to on-farm inputs, which are the provision of seeds, fertilizers, and pesticides so that the way of developing production facilities is directed to the provision of production facilities for post-harvest stages in the form of post-harvest mechanization. Post-harvest Mechanization Improvement in the form of (1) providing machine tools for cleaning, sorting, packaging and labeling, and (2) providing better warehousing.

Increased production contracts in the form of determining the quantity, quality and production techniques under the control of Seed Supervision and Certification Bureau (SSCB) are closely related to the improvement of technical guidance carried out by agricultural extension. In the Contract farming of soybean seeding institutions, agricultural extension plays an important and vital role because the agricultural extension has the role to provide guidance and supervision in the seed production process since on-farm, post-harvest, and marketing the soybean seeds. Along with the addition of farmer participation in Contract farming of soybean seeding institutions, it is necessary to increase the quantity and quality of agricultural extension workers to reach remote areas and increase the effectiveness of technical advice for farmers. This Contract farming model provides the best pattern of assistance for Agricultural Extension to be implemented to increase the effectiveness of Agricultural Extension in providing assistance to farmers and improving the welfare of farmers.

One of the main objectives in Contract farming of soybean seeding institutions is to increase the profitability of soybean seed production so that prices, patterns of soybean seed payments and marketing are also important factors. Meanwhile, government services on marketing contracts are still low. For this reason, several policies that can be taken, which are better scheduling of ordering seed production to seed breeders, setting a price that is more profitable to farmers, and market protection for local and domestic soybean seeds against imported soybean seeds.

References

[1]. Suastika IB, Kariasa IK, editors. Kajian Sistem Penyediaan Benih Unggul Bermutu Kedelai dalam Mendukung Program Strategis Peningkatan Produksi Kedele di Wilayah Bali [Study of Soybean-Quality Superior Seed Supply System in Supporting Strategic Programs for Increasing Soybean Production in the Bali Region]. Seminar Nasional : Kedaulatan Pangan dan Energi [National Seminar: Food Sovereignty and Energy]; 2012; Faculty of Agriculture, University of Trunojoyo Madura, Indonesia. doi:http://pertanian.trunojoyo.ac.id/semnas/wp-content/uploads/KAJIAN-SISTEM-PENYEDIAAN-BENIH-UNGGUL-BERMUTU-KEDELE-DALAM-MENDUKUNG-PROGRAM-STRATEGIS-PENINGKATAN-PRODUKSI-KEDELE-DI-WILAYAH-BALI.pdf: University of Trunojoyo Madura.

[2]. Bahari, Arif N, Bahari DI, Nur M. Impact of Socio-Economic Condition of Farmer on Productivity Level of Soybean Farming in Indonesia. Journal International Business Management. 2017;11(8):1611-9.

[3]. Hipi A, Fitratunnisa, Herawati N, editors. Kajian Daya Simpan Benih Beberapa Varietas Kedelai [Study of Seed Saving of Several Soybean Varieties]. Seminar Nasional Inovasi Teknologi Pertanian [Proceedings of the National Seminar on Agricultural Technology Innovation]; 2016; Indonesia. doi:http://kalsel.litbang.pertanian.go.id/ind/images/pdf/Semnas2016/94_awaludin_hipi.pdf.

[4]. Darwis V. Implementasi Legislasi Benih Dalam Mensukseskan Swasembada Pangan [Implementation of Seed Legislation in the Success of Food Self-Sufficiency]. SEPA [Journal of Agribusiness Agriculture Social Economics]. 2016;12(2):133 – 45.

[5]. Purba R, Rozi F, editors. Kapasitas Penyediaan Benih Kedelai Oleh Kelembagaan Produksi Benih di Provinsi Banten [Soybean Seed Supply Capacity by Institution of Seed Production in Banten Province]. Seminar Hasil penelitian Tanaman Aneka Kacang dan Umbi [Seminar on Research Results of Various Peanut and Bulb Plants]; 2011; Indonesia, doi:http://balitkabi.litbang.pertanian.go.id/wp-content/uploads/2012/09/50_Resmayeti-1.pdf: Balitkabi – Balai Penelitian Tanaman Aneka Kacang dan Umbi [Research Institute for Various Nuts and Bulbs].

[6]. Ton G, Vellema W, Desiere S, Weituschat S, D'Haese M. Contract farming for improving smallholder incomes: What can we learn from effectiveness studies? World Development. 2018;104:46-64.

[7]. Prowse M. Contract farming in developing countries: a review. A Savoir 2012;2012(12):1-95.

[8]. Tuan NP. Contract Farming And Its Impact on Income and Livelihoods for Small-Scale Farmers : Case Study In Vietnam. Journal of Agribusiness and Rural Development. 2012;4(26):147-66.

[9]. Sridharan A, Saravanan R. A Study On Motivating Factors To Enter Into Poultry Farming With Special Reference To Suguna Broiler Contract Farms In Coimbatore District. International Journal of Marketing, Financial Services & Management Research 2013;2(3):207-15.

[10]. Singh S, editor Contract Farming for Agricultural Development in India: A Small Holders Perspective. Policy Options And Investment Priorities, For Accelerating Agricultural Productivity And Development In India; 2011; India: India International Centre.

[11]. Bahari. Contract Farming dan Upaya Peningkatan Pendapatan Usaha Ternak Ayam Potong (Broiler) (Studi Kasus di Kecamatan Bululawang Kabupaten Malang) [Contract Farming and the effort in increasing Broiler farm income (Case Study at Bululawang subdistrict, Malang Regency)] [Dissertation]: Brawijaya university; 2010.

[12]. Widarjono A. Ekonometrika (Pengantar dan Aplikasinya) Disertai Panduan EViews [Econometrics (Introduction and Application) Accompanied by EViews Guide]. Yogyakarta-Indonesia: UPP STIM YKPN; 2013.

[13]. Ragasa C, Lambrecht I, Kufoalor DS. Limitations of contract farming as a pro-poor strategy: The case of maize outgrower schemes in upper West Ghana. World Development. 2018;102:30-56.