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Agribusiness competence model of cocoa smallholders in increasing farming income

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Abstract. This paper deals with agribusiness competency level of cocoa farmers. The research objectives are; to analyze the factors influencing its competency; to explain the agribusiness competency model on the income of the farming community. The research based on the method of stratified random sampling using the Sliven formula. Data were collected using questionnaires, observation, in-depth interviews, and documentation studies. The results show that the level of agribusiness competency of cocoa farmers is influenced by internal farmers’ characteristics and self-motivation. While external factors are extension activities, empowerment intervention and environment. The improvement of cocoa farmers’ agribusiness competence is estimated to increase the productivity and cocoa farming income. The study proposed recommendations for models of extension development and empowerment community, will be able to improve the agribusiness competence of cocoa farmers on the income farms estate communities, conducted with participatory-learning and action.

1. Introduction

Competence development focuses more on the characteristics of knowledge and skills required by individuals to perform their tasks and responsibilities effectively and to improve the quality standards professionally in their work. Competency is a combination of the knowledge, skills, and attitudes that a person possesses so as to be able to do the work that has been designed for himself/herself either for now or for the future.

Competence is a person's ability to produce at a satisfactory level in the workplace, including the ability of a person to transfer and apply those skills and knowledge in new situations and increase benefits [1]. Competence of agribusiness of cocoa farmers in the management of plantation business needs to be developed through the intensity of extension activities, farmer empowerment interventions, and the farming environment as a form of businessman participation in reaching the opportunity to increase income value of smallholders plantation. Farmers as managers need to have competencies that include capabilities as a self-capacity characterized by knowledge, skills, attitudes, confidence, commitment and entrepreneurship [2,3]. Current conditions indicate that the livelihoods of millions of Indonesian people depend heavily on areas where agricultural land is dry land [4], and the conditions of the community of plantation farmers have not enjoyed so much the result of a
development that it becomes a socioeconomic phenomenon that is strongly associated with the development of smallholder rural plantations.

The agricultural resources of dry land managed by the cocoa plantation community are very likely to provide income and welfare opportunities. However, plantation participation shows limited ability of agribusiness behavior in the management of plantation cultivation, especially cocoa farmer can be told that almost all subsystem of agribusiness activity is still weak, and result in the effort of development of agribusiness system is slow and less able to give the result of a farming system that can earn farm profit which is suitable as a source of income for the cocoa plantation community.

In the agribusiness subsystem on-farm production, there are still some problems related to the production system and the low application of cultivation technology. Similarly, downstream agribusiness subsystem, off-farm processing and marketing is also weak, and some agribusiness actors which is less able to act as a ‘locomotive’ to be able to attract the farmers to grow well so that the income and living standards of farmers is still low as the perpetrator of farming cacao. The urgency of research in formulating a model of cocoa farmers agribusiness development competencies in the form of mastering the technical and managerial skills to increase the income of the cocoa plantation community farms, to achieve the welfare level of the cocoa plantation community in the rural areas.

The problem is what factors influencing the cocoa farmers’ agribusiness competency level to perform appropriate action in the management of plantation crops. How to develop the cocoa farmer's agribusiness competence in plantation management, and whether the agribusiness competence of cocoa farmers has been able to increase the productivity and income of cocoa farming in rural areas. The objectives of the research were to identify cocoa farmers' agribusiness competency level in the management of plantation farming, to analyze the factors influencing the cocoa farmers' agribusiness competency level, and to formulate the strategic plan of cocoa farmer's agribusiness development competence in increasing the income of cocoa farmers in rural areas.

2. Methods

2.1. Sample
Cocoa farmers who assigned as sample respondents were 180 people from the total of population of 2,045 households of plantation farmers recorded in cocoa production centers in Konawe Regency, Southeast Sulawesi, Indonesia. The sample was taken based on the selected village area unit of the biggest cocoa production center at the subdistrict in Konawe Regency region. The sampling technique used a stratified random sampling method formulated by Slovin, in which: sample \( n = \frac{N}{1 + N(e)^2} \), with the standard error (0.08). The size of the sample at the location of cocoa production center of Konawe Regency was based on strata of population area, including: Uepay Sub-district \( (n_1 = 51) \) or 28.33%, Besulutu Sub-district \( (n_2 = 64) \) or 35.56%, and Abuki Sub-district \( (n_3 = 65) \) or 36.11%.

2.2. Data and instruments
The primary data was collected in the form of data with ordinal scale, interval and ratio included: the characteristics of cocoa farmers covering the age of farmers; formal education; non-formal education; cosmopolitan; cocoa production area; and farmers’ income. The secondary data was obtained from recording and documents available at the offices of local government agencies, such as population data; a number of cocoa farmers; cocoa plant area; production and productivity of cacao plants; institutional counseling; socio-economic institutions of rural communities; as well as other relevant data to complete the needs of main data research.

The instruments used in collecting primary data collected were questionnaires containing the statement items and questions relating to the variables required to be analyzed in the research. The independent variables \( (X) \) represented in internal factors included: characteristic cocoa farmers \( (X_1) \) and self-motivation \( (X_2) \), as well as external factors including extension activities \( (X_3) \), empowerment interventions \( (X_4) \) and farming environments \( (X_5) \). The independent variables \( (Y) \) were represented as the competence level of cocoa farmers \( (Y_1) \), the productivity level of cocoa farming \( (Y_2) \) and the
income level of cocoa farming ($Y_3$), with the result of the correlation and the real effect formed the cocoa farmers' competence development model to increase the income of smallholder plantation.

2.3. Data analysis
All data collected were tabulated and analyzed in accordance with the needs of the research discussion. Data analysis techniques were classified into two parts: descriptive data analysis techniques and inferential data analysis. Inferential statistics are used to analyze data by making general conclusions. The type of analysis used to test the research hypothesis is to describe the discrete data that have been obtained in the form of frequency distribution table with interval scale and ratio data scores determined by a score based on the size of 'Likert scale' (level five, that is: score 1 = very low; 2 = low; 3 = moderate / enough; 4 = high; 5 = very high).

The data were analyzed based on related components and affect the level of competence of cocoa farmers agribusiness to increase the productivity and income of the cocoa farming community in rural areas. The constraint value of each variable was analyzed by using a statistic test of multiple linear regression models.

3. Results and discussion

3.1. The description of internal and external factor of cocoa farmers

3.1.1. Internal factor of cocoa farmers. Internal factor is a specific internal power (local specific) significantly plays a role in solving its own problems. Internal power factor owned by cocoa farmers ensures business continuity. Internal factor of cocoa farmers covering the characteristics of cocoa farmers and self-motivation is the factor that can be used to improve the competence that impedes a farmer. The indicators and parameters of the characteristics and motivation of farmers in plantation farming are presented in table 1.

| Internal Factors of Cocoa Farmers | Dominant Category Score (n=180) | Percentage (%) |
|----------------------------------|---------------------------------|---------------|
| Characteristics :               |                                 |               |
| - Age                            | 3.0 (moderate)                  | 28.9          |
| - Formal Education               | 3.0 (moderate)                  | 33.3          |
| - Nonformal Education            | 1.0 (very low)                  | 41.6          |
| - Cosmopolitan                   | 2.0 (moderate)                  | 83.4          |
| - Area of production             | 1.0 (very low)                  | 48.9          |
| - Farmers’ income                | 1.0 (very low)                  | 53.9          |
| Motivation :                     |                                 |               |
| - Intrinsic                      | 4.0 (high)                      | 47.8          |
| - Extrinsic                      | 4.0 (high)                      | 55.5          |
| Total                            | n= 180                          | 100.0         |

Table 1 shows that indicators and parameters of the characteristics of cocoa farmers as a particular feature of the individual resources possessed in the management of cocoa farming in the research area included: the age of farmers, formal education, non-formal education, the cosmopolitan, the area of cocoa production, and the farmers’ income. The self-motivation element is measured from the intrinsic and extrinsic motives of cocoa farmers that can change the ability to work and determine the height and low of the management of cacao farming. The research finding indicates that 73.7 percent of the characteristics of dominant cacao farmers are low, and 26.3 percent of the motivation of farmers to
farm the dominant cocoa plantation is categorized high. This means that the internal factors of cocoa
farmers in the form of high self-motivation are still limited with the low of non-formal education,
cosmopolitanism, the area of production and income family farmers, as an aspect of the ability of
farmers who need to be developed in the management of cocoa farming with the orientation of the
agribusiness system.

3.1.2. External factors of cocoa farmers. External factors are the conditions formed from outside of
the farmers themselves. Indicators and parameters of extension activities, empowerment interventions,
and cocoa farming environments in the research area are presented in table 2.

Table 2. Average of dominant categories of external factors of cocoa farmers in research areas.

| External Factors of Cacao Farmers | Dominant Category | Score | Percentage (%) |
|----------------------------------|-------------------|-------|----------------|
| Extension Activity:              |                   |       |                |
| - Access technology              | 3.0 (moderate)     | 34.9  |                |
| - Extension Intensity            | 3.0 (moderate)     | 56.7  |                |
| Empowerment Intervention:       |                   |       |                |
| - Local Government Policy        | n=61(3.0= moderate)| 34.1  |                |
| - Access to means of production  | 3.0 (moderate)     | 32.8  |                |
| - Availability of cocoa market   | 3.0 (moderate)     | 33.9  |                |
| Farming Environment:             |                   |       |                |
| - Physical condition of farming  | n= 56(4.0= high)   | 31.0  |                |
| - Community social interaction   | 3.0 (high)         | 47.7  |                |
| Total                            | n= 180            | 100.0 |                |

Table 2 shows that External factors of cocoa farmers covering extension activities, empowerment
interventions, and farming environments are learning factors and socioeconomic interactions that
describe the environment of people who carry out the main functions to prevent the occurrence of
discontent of work in plantation cacao. Indicators and parameters of counseling conditions as a series
of processes of disseminating information related to efforts to improve the way of farming through the
development of knowledge, skills, and attitudes of cocoa farmers include access to appropriate
information technology and intensity of counseling to the community of cacao plantation.
Empowerment intervention is the development of the condition and situation of the cocoa plantation
community so as to have power and productively business opportunities, includes local government
policy in regulation, access to the affordability of farming production facilities, and access to market
availability for the community cacao plantations. Environmental aspects describe the physical
situation and physical condition of dryland agriculture and socio-economic interaction of the cocoa
plantation community based on the values of togetherness in the cacao plantation.

The results showed that 34.9 percent of extension activities in the cocoa plantation community
were dominantly moderate, and 34.1 percent were dominantly moderate categorized, local government
empowerment interventions to meet access to the affordability of cocoa farming facilities and cocoa
market, and 31.1 percent were dominantly high categorized as an important factor of cocoa farmers in
rural areas. This means that the cocoa farmers' external factors in the form of the cocoa plantation's
potential physical environment and the opportunities for intensive cocoa farming are supported by the
local government in implementing counseling and community empowerment to change the ability of
cocoa farmers to have competence intact agribusiness in supporting the increased productivity of cacao farm and the income of cocoa farmers in rural areas.

3.2. An analysis of factor influencing the level of agribusiness cocoa farmers’ competence

The cocoa farmers' agribusiness competence in managing plantation cultivation is measured by the knowledge and skills of cocoa farmers in managing cocoa cultivation and managerial skills of cocoa farming. Indicators of technical competence include: (a) ability to prepare production facilities appropriately; (b) the ability to properly cultivate cocoa; (c) ability to fertilize appropriately; (d) the ability to carry out integrated pest-disease control; (e) the ability to harvest properly; (f) ability to process cocoa beans; and (g) the ability to access cocoa marketing channels. Indicators of agribusiness managerial competence include: (a) farming planning capability; (b) organizational capability of farming resources; (c) ability to conduct farming partnerships; (d) farming evaluation and control capability; and (e) the ability to make decisions appropriately.

The cocoa farmers' agribusiness competency model to improve productivity and income of cocoa farming is conducted by evaluating the whole suitability of the model relating to the result of generalization of model parameter hypothesis so that it can be applied to the population, and related to testing the research hypothesis. If there is an invalid found variable indicator, it will be excluded from the measurement model to test the hypothesis [5]. The theoretical model of research is an internal and external factor applied as an independent variable related to cocoa farmer's competency level, productivity level, and income level of cocoa farming are applied as the dependent variables. Path analysis is developed as a method to investigate the direct and indirect influence from the independent variable as the cause of the dependent variable as a result [6]. The trajectory chart of parameter estimation of the cocoa agribusiness competence model to improve cocoa farming productivity and income presented in Figure 1.

![Figure 1](image-url)

**Figure 1.** The trajectory chart of parameter estimation of the cocoa farmers' agribusiness competence model (Source: analysis of path diagram estimation, standardized, n = 180).
In figure 1, it can be seen that the trajectory of estimation of cocoa farmers' agribusiness competence model in the plantation community based on the research hypothesis shows the compatibility the whole data constructed from internal and external factor condition in developing cocoa farmer's agribusiness competence model to the management of cocoa farming in the plantation community. The result of the parameter estimation of the cocoa farmer competence model shows that the level of cocoa farmers' agribusiness competence model is directly influenced by real variables of farmer characteristics, extension activity variable, variables of local government empowerment intervention, and environmental variable at alpha level (α = 0.05). Partially, the direct influence of farmers’ characteristic variable has a very real and positive influence (0.197), the extension activity has real influence and negative (-0.150) additively, empowerment interventions have a very real and positive influence (0.596), and the environment has a very real influence and positive (0.288) towards the level of cacao farmers agribusiness competence in a plantation society, with a coefficient of determination ($R^2 = 0.613$).

The critical path estimation of the model is determined by the variables of the intervention of empowerment of local government ($X_4$) that has a real and very strong effect directly on the level of cocoa farmer's agribusiness competence ($Y_1$), with the characteristic variable of a farmer ($X_2$). Extension activities ($X_3$), and the environment ($X_5$) have real relationships and less strongly influence on the level of cocoa farmers' agribusiness competence ($Y_1$). The self-motivation variable ($X_1$) is a variable that is not included in the model of the effect of cocoa farmer’s competency level on cocoa farming management in the plantation community.

This condition can be explained from the result of the observation towards the respondents that the self-motivation of farmers in cacao cultivation on dry land is the choice of life and the main source of family income so that the motive aspect to develop themselves according to the competence standard of agribusiness is less owned by cocoa farmers in the plantation community. Extension activity has been implemented to the cocoa plantation community as farmers' community empowerment program (local government) to the plantation community so that the farmers respond more extensively when the project activities and assistance of local government is allocated in the plantation community, rather than the extension needs to improve their knowledge and skills, and their ability to adapt cocoa agribusiness technology. In addition, the condition of agricultural land management of dry land with the physical environment of cocoa farming is less potential to be accepted by farmers as a natural condition that is so difficult to change that farmers tend to expand the new land for their farming activities rather than to intensify their existing cocoa land and more potentially developed by the plantation community.

3.3. The strategic plan for developing agribusiness competency model to increase the income
The specific study of this research is the average condition of cocoa farmer's agribusiness competency level in plantation community is still in the medium category (average score 3.23) in applying agribusiness system of cocoa farming, with the average 519 kg (0.52 tons) of productivity condition level of cocoa farming in producing of dry cocoa beans of cocoa plantation area, and the average income of cocoa farming reached 9,342,750.00 rupiahs per hectare per year, due to the weakness of farmers ability to integrate the cocoa agribusiness behavior so that it has not reached the level of productivity and optimal farming income in the cocoa production center area.

The conditions of farmers'internal and external factors are self-motivation, farmer characteristics (age, and land area), extension activities (extension intensity), empowerment interventions (access of affordability and farm equipment), and environment (physical farmland) have 61.3 percent influence on the level of agribusiness competence of cocoa farmers in the plantation community. The constituent elements of cocoa farmers’ competence influenced and closely related to the cocoa farmers' agribusiness behavior in cocoa farming management, which then grows the cultural attitude of picking-processing-selling in the plantation society, which implies the productivity level and the income of dryland farming in Konawe Regency of Southeast Sulawesi.
The results of identification toward cocoa farmers' agribusiness competency level as measured by cocoa cultivation technical indicators and cocoa farming management capability show that cocoa farmers are generally able to master cocoa cultivation techniques, but in the control of cocoa farming management capability is categorized low. The ability of farmers to plant, fertilize, plant pest control, harvest, cocoa bean processing, and cocoa distribution channels are common behaviors that can be controlled by cocoa farmers, but in terms of ability to prepare production facilities and equipment of cocoa farming is agribusiness behavior related to the level the competence of agribusiness that is still less able to be controlled by most of cocoa farmer in plantation society.

The aspects of cocoa farming capabilities of cocoa farmers are moderately categorized, size indicators toward cocoa farmers' agribusiness competence, is showed by the ability to prepare means of production and farm equipment (medium), cocoa planting ability, cocoa fertilization ability (medium), pest control capability plant diseases according to IPM (medium), cocoa harvesting ability (medium), ability to process cocoa beans (medium), and the ability of the use of distribution channels cocoa farmers (medium).

Indicator of cocoa farmers' agribusiness competency related to cocoa cultivation technical aspect is the mastery of cocoa farming management capability of cocoa farmers based on categorized average score (low) which is indicated by low planning ability (low), organizational capability of farming resources (medium), the ability of farming business partnership (low), farming control and supervision (low), and decision-making ability of farming risk (low) in the plantation community in the research area.

The steps of developing cocoa farmers’ agribusiness competencies in plantation communities are as follows:

- The focus of the implementation of extension in the term of "soft skills" of cocoa farmers' agribusiness competency is conducted by the learning approach of "agribusiness school" to members of the plantation business group (farming group).
- Education and training developed in improving the competence of cocoa farmers’ agribusiness by the participatory method that is farming management planning according to farmer requirement as the organizer of plantation agribusiness system.
- Training to the learning groups and production units within the community of dryland farmers plantation by government and non-government institutions, the results can be measured individually or in groups as plantation agribusiness actors;
- Development of production facilities and farming equipment facilities to access the needs of plantation communities in the area, so that the plantation community can more creatively apply appropriate technology in the management of dryland farming.
- The linkage of plantation communities and local government, and universities in the implementation of extension and community empowerment programs is an integrated system in the development of the area of production centers of plantation commodities in the region.

The extension and empowerment condition of the plantation community at present should consider the magnitude of the influence of a factor towards other factors by prioritizing the path of greater influence to achieve the intended goal that is cocoa farmers should have a standard competence (minimal) to apply the agribusiness system as a form of self-ability or capacity independently in the effort to achieve the welfare of their life. Policy strategy of plantation community development program choice with participatory, learning and action approach (PLA), that is: (a) extension and empowerment program of society give participation opportunity on farmer ability to fully behave as agribusiness actor and build up a work culture of cocoa farmer (b) extension and community empowerment programs encourage the effectiveness of the process of developing the competence model of cocoa farming business in the management of dryland agricultural resources; (c) extension
and community empowerment programs encourage the active role of cocoa agribusiness actors to initiate local government policies in implementing extension systems for plantation community development; (d) the program of extension and community empowerment mobilize sustainably and effectively the development of the center of Industrial Estates of Plantation Communities (KIMBUN) in Konawe Regency, Southeast Sulawesi.

4. Conclusion
The development of cocoa farmers’ agribusiness competencies in the cocoa farming community is largely determined by the knowledge, skills and attitudes of the farmers who are crystallized in the form of cocoa agribusiness behavior. The indicators of productive age, formal education, and the area of cocoa production as a characteristic of cocoa farming in the management of plantation farming are still weak on the level of cocoa farmers' competence in both cocoa cultivation and cocoa farming management capabilities to fully integrate on-farm and off-farm activities, and less able to develop cocoa farming business partnerships, as well as less able to compete and have good position in the cocoa consumer market. The improvement of cocoa farmers' agribusiness competence in the model is estimated to increase the productivity of cocoa farming by 32.1 % or 167 kg/ha, and increase the cultivation income by 32.6 % or 3,045,736.50 rupiahs per hectare per year in the cocoa farming community in rural areas. Formulation of a long-term strategy of extension and community empowerment to improve cocoa farmer's agribusiness competence in research-based plantation communities is implemented through participatory learning and action approaches.

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