

INSTITUTIONAL MODEL OF COCOA PRODUCTION AND AGRICULTURAL DEVELOPMENT

Andi Nuddin¹⁾, Rustam Abd. Rauf²⁾, Muh. Fahrudin Nurdin²⁾

¹⁾Department of Agribusiness, Faculty of Agriculture, Universitas Muhammadiyah Parepare

²⁾Department of Agribusiness, Faculty of Agriculture, Universitas Tadulako

Correspondence author's: Andi Nuddin

Email : andinuddin1956@gmail.com

Submit: 1 June 2021, Revised: 19 June 2021, Accepted: 30 June 2021

ABSTRACT

Since the last 20 years, discussions about Indonesia's position and role in the International cocoa trade have attracted the interest of experts and scientists, not only those in the field of agribusiness and economics, but also able to attract the interest of scientists in the institutional field. This study analyzes how the institutional role in the development of cocoa production through interpretative structural modeling (ISM) analysis approach, with the research location of North Luwu Regency of South Sulawesi. The results of the ISM analysis showed that out of the 13 institutions analyzed, there were nine institutions as priority actors in the development of cocoa production, namely: ((1) Joined Farmer group, (2) Local office for extension services (BP4K), and (3) Extension Officer (4) Private companies, (5) Center for Research/Universities, (6) Local Office for Agriculture and Plantation services, (7) Cocoa Development Center/CDC, (8) Local office for Trade, Cooperatives and Small and Medium Enterprises, and (9) Cocoa Marketing Institute. Furthermore, based on the results of the power-dependent driver matrix mapping, there are three institutions in independent positions, and six other institutions in the linkage position. The six institutions in this linkage position, must be coordinated through effective management, because in addition to affecting the success of the program, feedback can also hinder the development of cocoa production. One of the institutions in the linkage position, namely private companies occupies a key priority position in the development of cocoa production.

Keywords: Institutional, Cocoa Production, Agriculture Development, Interpretative Structural Modeling.

INTRODUCTION

Since the last 20 years, discussions about Indonesia's position and role in the International cocoa trade have attracted the interest of experts and scientists, not only those in the field of agribusiness and

economics, but also able to attract the interest of scientists in the institutional field (Nuddin et al., 2019, 2015). One of the phenomena that attracts cocoa scientists and observers is that in the time brackets of 2001 – 2005, more than 90% of Indonesia's total cocoa production is

supplied by subsistence farmers who are economically poor (Nuddin et al., 2007) Only \pm 3% supplied by government plantations (PTPN), and \pm 4% produced by private plantations.

This fact is an indication of the large contribution of smallholder farmers to Indonesia's cocoa production, even managed to carry the Flag of Indonesia as one of the largest cocoa crop breeding countries in the world with a production value of \pm 1,315,800 tons / year (Arsyad et al., 2018). In terms of trade between countries, almost all Indonesian cocoa products are used to meet the export market (80.64%) and continued to experience growth of about 15% over the last twenty years to major importer countries such as the Americas and the Netherlands. But the fact is, this trading system cannot necessarily improve the welfare of farmers, especially cocoa farmers in Indonesia. However, Indonesia does not have strong competitiveness, indonesia's cocoa export growth has decreased (Arsyad et al., 2018).

Indonesia experienced a negative growth in cocoa exports (2009-2011). This is because the composition of Indonesian cocoa is not in accordance with the needs of the market. In addition, based on the results of SUSENAS 2003, about 70% of the poor work in agriculture and plantation sectors, including cocoa farming (Arsyad and Kawamura, 2011). In addition, the increasing number of farmers who switch from cocoa farming to other types of commodities (short-term). This shift is triggered by low income from cocoa as an annual crop to meet the needs of farmers. The inefficiency of the fulfillment of the needs of life and poverty of farmers is further exacerbated by the decline in production structures (Kherallah and Kirsten, 2010). The decline in cocoa production in Indonesia is triggered in general by the presence of old cocoa plants. This phenomenon has a further impact on low productivity. The data from the 2020 forecast shows that Indonesia's cocoa productivity only reaches 217

kg/ha/year, although it was previously determined that Indonesia's cocoa production potential could reach 2,000 kg/ha/year. Therefore, according to the Central Bureau of Statistics (BPS), Indonesia has shifted as the third largest cocoa producer in the world, slumping in the sixth place.

Since 2014 Indonesia's cocoa production has changed the status from cocoa exporter to cocoa bean importer. Some regions in Indonesia have successfully developed cocoa industry with mechanization and seed processing technology. To meet the needs of raw materials, cocoa beans imported from Africa, with a volume of 109,000 tons in 2014, to 234,894 tons in 2019. This is a phenomenon of cocoa farming failure in Indonesia (Kherallah and Kirsten, 2010). The decline in Indonesia's cocoa production is not only caused by the presence of old crops, but also triggered by pest attacks and crop disease events that have been a challenge for farmers to date. In the development of plant cultivation, since long ago known several main pests of cocoa plants, among others: fruit borer, stem borer, helopeltis, caterpillar jenkak, and rat. In addition, some of the main types of disease that trigger damage cocoa, among others: rotten fruit, cancer stem, dead diseases shoots (VSD), mushroom upas, and anthrax. This type of pest and disease is unresolved, although pest control techniques and diseases have been adopted by farmers.

Pest and disease control challenges are becoming increasingly difficult to overcome in the direction of decreasing the motivation of cocoa farmers. This is indicated by the increasing number of cocoa farmers switching to other types of commodities. One of the techniques of pest control and disease of cocoa plants is pruning, which this technique contributes significantly to the process of cocoa growth and fertilization (Lakitan et al., 2019). But in reality, farmers are reluctant to do pruning on the grounds of the condition of cocoa plants that are very old.

Therefore, in order to increase cocoa production, sharpness of analysis and intervention through learning from past experience, for example the decrease in production is always overcome by increased production technology, as well as pest and disease attacks overcome with anti-pest and anti-disease technology. But all of these actions do not have significant benefits to the problems on the ground. It takes a through analysis and understanding of the causal factor of application of technology failure to pest and disease control efforts. In addition to the many policies to increase cocoa production that fail to be applied in the field.

One of the districts known as the best cocoa producing area in the northern part of South Sulawesi is North Luwu Regency. Where the problem as it has been stated before is also experienced by farmers in North Luwu Regency. This study aims to analyze how institutional role in the development of cocoa production. What institutions should be the priority actors in cocoa production institutions. Structurally how the position and order of interests of each institution in the development of cocoa production.

MATERIALS AND METHODS

Research Site and Analysis. The research was conducted in one of the cocoa producing regions i.e North Luwu Regency, South Sulawesi (Figure 1). The study employed Interpretative Structural Modeling (ISM) using survey method (Eriyatno, 1999).

The first step of the implementation of this research is to conduct an assessment of the institutional elements of cocoa production into sub-sub-elements through Focus Group Discussion (FGD). The results of the implementation of FGD by involving representatives from several Regional Device Work Units (SKPD) obtained 13 sub-elements (institutions) (Costa and Fernandes, 2016) in the institutional development of cocoa production in North Luwu Regency. To answer the three questions in this study, the 13 sub-elements were prepared in the form of questionnaires as instruments in conducting interviews with a number of experts / practitioners as a source of informants according to the needs of Interpretative Structural Modeling (ISM) analysis (Attri et al., 2013).



Figure 1. Research site

Table 1. Characteristics of Primary data Required in Institutional Analysis of Cocoa Production.

Type	Characteristics	Utilization	Source
Casting institutions in the development of cocoa production	<ol style="list-style-type: none"> 1. Power dependent driver score 2. Position of the institution according to the driver-power dependent matrix-independent <ul style="list-style-type: none"> - linkage - dependent - autonomous 	<ol style="list-style-type: none"> 1. To determine the strength of each institution's role 2. To map the position and relevance of each institution in the development of cocoa production 	Interview with 15 experts/practitioners as informant sources

Data Collection Techniques. Data collection is carried out with stages: First, the determination of elements and sub-elements. What is meant by the element is a variable that will be analyzed, namely the institutional cocoa production. This element is described on sub-elements through Focus Group Discussion (FGD) involving experts (LPPM, 2015), so that 13 sub-elements (institutions) related to the development of cocoa products. Second, the preparation of questionnaires through a paired comparison of each sub-element so that from the 13 sub-elements, 78 questions were obtained. Third, the determination of informant resources purposively through an expert system approach based on consideration (i) representing personnel in their respective local office, and (ii) understanding, mastering and or directly involved in cocoa farming activities.

Data Processing and Analysis. Information obtained through questionnaires is processed through Interpretative Structural Modeling (ISM) analysis techniques (Faisal, 2010). The stages of data processing and analysis are carried out through the stages: (i) Preparation of Structural Self-Interaction Matrix (SSIM), (ii) Preparation of Reachability Matrix table by replacing the results of sub-element comparison on the questionnaire with symbols V, A, X, and

O with the numbers 1 and/or 0, (iii) The preparation of the Matrix Driver Power-Dependent (DP-D) into four sectors (Figure 2), and (v) Interpretation of sub-element positions by their respective sectors, namely: (1) Independent positions, indicates that the sub-elements in this position are more free with a large driving force (> 0.50), while dependence on other small sub-elements (≤ 0.50). (2) The position of the linkage, indicates that the sub-element in it has a large DP-D value (> 0.50).

Indications in the institutional system of cocoa production is that institutions in this position must be brought effective management control, because in addition to supporting the development of the program, it can also be a factor inhibiting the cocoa production development program. (3) The dependent position indicates that the sub-element in it has weak drive power in addition to its dependence on other large sub-elements. This indicates that sub-elements are not a priority in program development. (4) Autonomous position, indicating that sub-elements are not a priority in cocoa production institutions.

RESULTS AND DISCUSSION

Institutions in Independent Positions

Through the Interpretative Structural Modeling (ISM) approach shows that of

the 13 agencies analyzed, there are three institutions in independent positions, namely: (1) joined Farmer group (Gapoktan) (DP = 0.92 and D = 0.46), (2) Local office for Extension Service (BP4K) (DP = 0.85 and D = 0.38), and (3) Extension Officer (DP = 0.77 and D = 0.46) (Table 2).

These three institutions have a great boost to the development of cocoa production (independent), in addition to the nature of dependence on other institutions, especially related to the main task and its function in the development of cocoa production is quite weak (average score $D = > 0.50$). As long as Joined farmer group still exists, means farmers as actors in agricultural development still exist, and during that time cocoa production is still running, although in very limited conditions (Santos et al., 2018). The continuity of cocoa farming continues despite the very limited conditions, the extension of plantation agriculture is still active in its duties and functions, under the control and coordination of Local Office for Extension Services (BP4K).

Therefore, in meeting the development of cocoa production into the

future, the role of farmer groups and extension groups must be improved (Asih and Klasen, 2017) in the coordination frame under the control of the Implementing Agency for Local Office for Extension Services (BP4K) as a movement of cocoa production improvement programs.

Institutions in Linkage Positions

Table 2 clearly show seven institutions in this position, namely: (1) Private companies, (2) Ceter For Research/University, (3) Local office for Agriculture and Plantation Services, (4) Cocoa Development Center (CDC), (5) Local Office for Trade, Cooperatives and Small and Medium Enterprises (SMEs), and (6) Cocoa marketing institutes. The six institutions in this position are unique when compared to other institutions' in institutional system, where the average score of DP and D is equally high (DP = 0.77 and D = 0.60). The high DP and D scores indicate that the institutions in the linkage position in addition to having a large influence (driver power) on the development of programs (cocoa production), dependence on other institutions is also large (dependent).

Table 2. Position of the Each Institution According To DP-D Weight in Institutional Cocoa Production.

Position	Institution	weight	
		DP	D
Independent	1.Joined Farmers Group	0.92	0.46
	2.Local Office for Extension services	0.85	0.38
	3.Extension Officer	0.77	0.46
Linkage	1.Private Companies	1.00	0.61
	2.Center for Research/ University	0.85	0.61
	3.Local office for Agriculture. and Plantation Services	0.85	0.69
	4.Cocoa Development Center	0.77	0.61
	5.Local Officer for Trade, Copperatives and SMEs	0.77	0.77
	6.Cocoa Marketing Institute	0.61	0.92
Dependent	1.Farmers	0.50	0.77
	2.Regional Development Planning Board	0.38	0.85
	3.Local Office for Animal Husbandry Services	0.31	0.92
	4.Banking	0.15	0.85
Autonomous	--	--	--

One of the institutions in this linkage position is a key priority institution. The results of the ISM analysis showed that private companies achieved a maximum DP score (DP = 1.00). This shows that the role of the company is very needed to contribute to the development of cocoa production. As a key institution can be likened to that of no other institution that strengthens the program and seeks breakthroughs for the development of cocoa production, but farmers are still trying to increase their production because there are private companies engaged in the marketing sector as well as coaching farmers. Such a concept is the hope of the community in North Luwu Regency, thus giving rise to a concept of thought that the importance of support of private companies in the development of cocoa production.

Therefore, the six institutions as mentioned above, must be coordinated under management control that allows all potential power drivers to be empowered in the development of cocoa production. Similarly, the need for coordination in order to create a condition that is able to neutralize outside influences that are the cause of the failure of cocoa production development program. The six institutions in this linkage position, must have a common vision in terms of cocoa production development goals. One example of the importance of the common vision between institutions in the development of cocoa production, if the Department of Agriculture / Plantation seeks to increase production, it must be supported by the development of the marketing sector and the stability of cocoa prices. This will affect the motives of farmers in farming. Farmers will be more passionate, because through cocoa farming they can design the economy of their household.

Institutions in Dependent Positions

Dependent positions are meaningful as dependent positions. The institutions in this position do not mean it

has nothing to do with the development of cocoa production, it could even be that the relationship is very strong. But in terms of production development the role of the institution depends only on other institutions. The results of this study showed four institutions in dependent positions, namely farmers, Regional Development Planning Board, Local Officer for Animal Husbandry Services, and Banking. The four institutions in this dependent position have a small driver power rare score (DP = 0.33), but the average score is large dependent (D = 0.85). The large dependent score is an indication of the magnitude of dependence on the four institutions in this position against other institutions.

For example, farmers have a very close relationship with the development of cocoa production. They are both subjects and objects in the development of cocoa production. However, the position of interest of farmers in cocoa production institutions relies heavily on other institutions. Therefore, to maximize the contribution of farmers in agricultural development is determined among others how the efforts of institutions in the marketing sector in neutralizing the market and stabilizing prices (Lee and Law, 2016). As long as farmers can design their household economy that is sourced from the products they strive for, during that time farmers will be passionate about developing their farming.

Similarly, the Regional Development Planning Board (Bappeda), should be the coordinating agency for all Local Office Services (SKPD) of North Luwu Regency in the development of cocoa production. There is a need for local government policies that regulate the coordination relationship of government agencies in terms of continuity of coordination between institutions including in the development of agricultural products (Didu, 2001).

Role of Institution in Institutional Model of Cocoa Production

There are 13 institutions as the object of study. The results of the ISM

analysis obtained, presented in terms of illustrations through a matrix of power-dependent drivers, consists of four quadrants: (1) independent, (2) linkage, (3) dependent, and (4) autonomous (Figure 2). Of the 13 institutions studied, only nine of them as priority institutions in the development of cocoa production as distributed in two sectors (three institutions in independent), and six institutions in the linkage sector, while four other institutions in the dependent sector.

Illustration as shown in Figure 2 shows that the three institutions in the independent sector (Joined Farmer Group,

Local Office for Extension services/BP4K, and Extension Officer), are free institutions in carrying out their duties and functions towards the development of cocoa production. Furthermore six other institutions are in the linkage sector. Institutions in this sector actually have the freedom to take steps to develop cocoa production, while also having dependence on other institutions including institutions in the independent and dependent sectors. In other words, institutions in the linkage sector are institutions that can be influenced and influenced by other institutions.

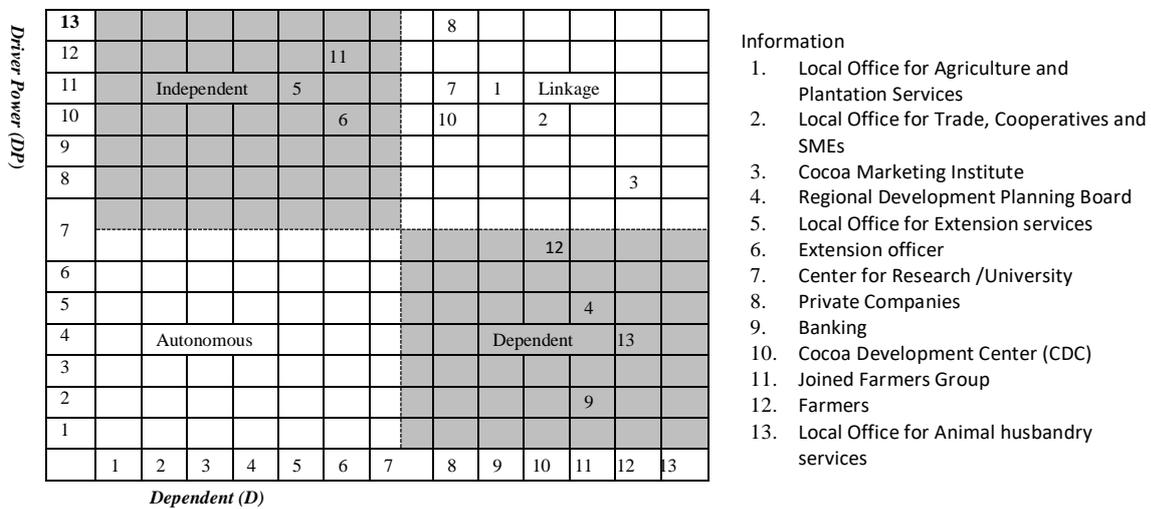


Figure 2. Matrix driver power- dependent institutions in the development of cocoa production

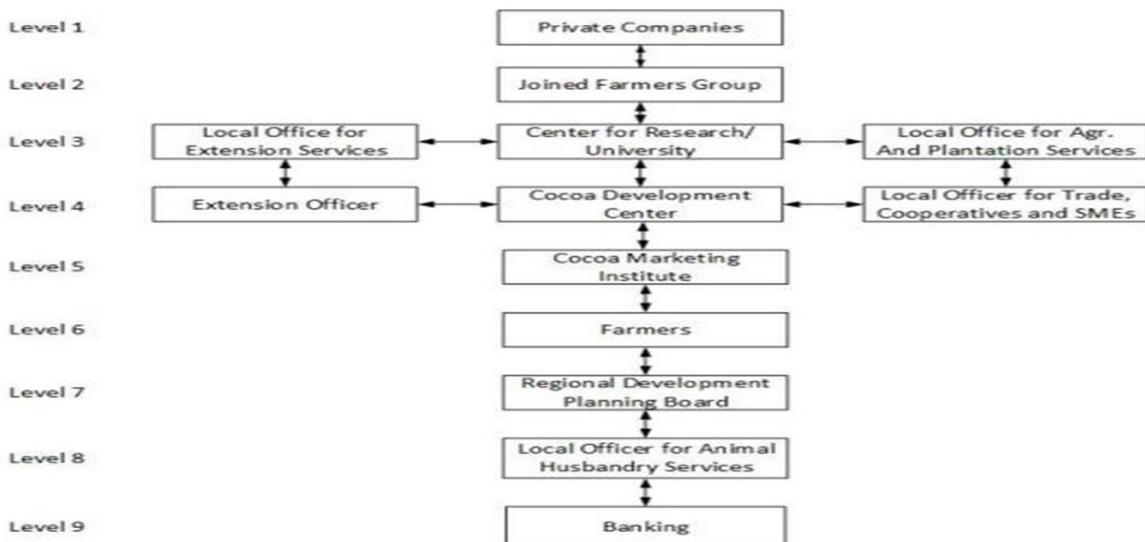


Figure 3. Institutional Structural Model of Cocoa Production

Institutional Structural Model of Cocoa Production in North Luwu Regency

The relationships of among 13 institutions analyzed through the ISM approach. It can be described structurally to produce an institutional model that illustrates how structural relationships between actors in cocoa production institutions (Arsyad et al., 2019). Structurally, inter-agency relations start from institutions that occupy the position of key priority, namely private companies (level 1), to the lowest driver power (level 9) as shown in Figure 3. Institutions in the independent and linkage sectors (Figure 2), are shown in two-way coordination relationships (Figure 3).

REFERENCES

- Arsyad, M., Heliawaty, H., Kawamura, Y., Yusuf, S., Agricultural Development -Marketing Nexus: Is Tengkulak truly Enemy of Smallholders in Indonesian Rural Area? *Int. J. Agric. Syst*, 2018 6, 60–67. <https://doi.org/10.20956/ijas.v6i1.1498>
- Arsyad, M., Kawamura, Y., Reducing Poverty of Cocoa Smallholders in Indonesia: Is Agricultural Economic Activity Still the Pioneer?. *Economic and finance in Indonesia*. 2011. 58, 217-238.
- Arsyad, M., Nuddin, A., Jamil, M.H., Yusuf, S., *Monograf Model Kelembagaan Pertanian*. Nas Media Pustaka., Makassar. 2019
- Asih, D.N., Klasen, S., 20 Improving Food Security? Setting Indicators and Observing Change of Rural Household in Central Sulawesi. *For. Soc.* 2017 1, 154–161. <https://doi.org/10.24259/fs.v1i2.2099>
- Attri, R., Nikhil, D., Sharma, V., 2013. Interpretive Structural Modelling (ISM) approach: An Overview. *Res. J. Manag. Sci*, 2013 2 3–8.
- Costa, F. de A., Fernandes, D.A., *Agrarian Dynamics, Institutions And Territorial Governance For The sustainable Development Of The Amazon*. *J. Contemp. Econ*, 2016 20, 517–552. <http://dx.doi.org/10.1590/198055272036>
- Didu, M.S., Analisis Posisi Dan Peran Lembaga Serta Kebijakan Dalam Proses Pembentukan Lahan Kritis. *J. Teknol. Lingkungan*, 2001 2, 93–105. <https://doi.org/10.29122/jtl.v2i1.202>
- Eriyatno, 1999. *Ilmu Sistem: Meningkatkan Mutu Dan Efektivitas Manajemen*. IPB Press, Bogor. 1999
- Faisal, Analysing the barriers to corporate social responsibility in supply chains: an interpretive structural modelling approach. *Int. J. Logist. Res. Appl.*, A Leading Journal of Supply Chain Management, 2010 13 179–195 <https://doi.org/10.1080/13675560903264968>
- Kherallah, M., Kirsten, J.F. *The New Institutional Economics: Applications For Agricultural Policy Research In Developing Countries: “New institutional economists are the blue-collar guys with a hearty appetite for reality.”* *Journal Agrekon*, 2010 41.
- Lakitan, B., Lindiana, L., Widuri, L.I., Kartika, K., Siaga, E., Meihana, M., Wijaya, A., *Inclusive and Ecologically-Sound Food Crop Cultivation at Tropical Non-Tidal Wetlands in Indonesia*. *AGRIVITA J. Agric. Sci*, 2019 41, 23–31. <https://doi.org/10.17503/agrivita.v40i0.1717>
- Lee, W.C., Law, S.H., *The Roles of Formal and Informal Institutions on Innovations Activity*. *J. Ekon. Malays*, 2016 50 167–179.

<http://dx.doi.org/10.17576/JEM-2016-5002-14>

- LPPM, 2015. Badan Pemberdayaan Masyarakat dan Pemerintahan Desa Provinsi Sulawesi Barat, Usaha Ekonomi Desa di Provinsi Sulawesi Barat. Universitas Sulawesi Barat, Majene.
- Nuddin, A., Reskiana, R., Arman, A., Yusuf, S., Nuringsih, N., Arsyad, M., Bustan, A., Laapo, A., Designing New Strategy for Enhancing Robusta Coffee Production: An Application of Interpretative Structural Modeling. *Int. J. Agric. Syst*, 2019 6 156–163.
- Nuddin, A., Sinukaban, N., Murtilaksono, K., Alikodra, H.S., Analisis Sistem Kelembagaan Dalam Perencanaan DAN Strategi Pengelolaan Lahan Kritis DAS Bila. *J. Penyul*, 2007 3. <https://doi.org/10.25015/penyuluhan.v3i2.2159>
- Nuddin, A., Yusuf, S., Sulianderi, N.M.V.S., 2015. An Alternative Model of Cocoa Production Institution: A Solution in Facing Asean Economic Community. *Int. J. Agric. Syst. IJAS*, 2015 3 143–156. <http://dx.doi.org/10.20956/ijas.v3i2.103>
- Santos, L.F.D., Ferreira, M.A.M., de Campos, A.P.T., 2018. Rural development and family agriculture in the Brazilian state of Minas Gerais in the light of multivariate data analysis. *Interacões Campo Gd*, 2018 19 827–842. <https://doi.org/10.20435/inter.v19i4.1817>