

AN AGROFORESTRY CONSORTIUM: A MULTIDERMINANT IN INSTITUTING AN AGRISILVICULTURE SYSTEM TO IMPROVE WELFARE

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AN AGROFORESTRY CONSORTIUM: A MULTIDERMINANT IN INSTITUTING AN AGRISILVICULTURE SYSTEM TO IMPROVE WELFARE*Darma Surya, Maria Siti, Lestari Dirga, and Darma Dio Caisar*

Abstract. Indonesia as the largest forest owner has a huge potential in exploration. Before 1997, Indonesia had lost 91,924,300 ha of forest due to deforestation. The government bodies just planted a thousand trees with no supervision and follow-up, so most of them were damaged and did not meet expectations. This research is carried out descriptively and qualitatively. The study is informed by the secondary data from the research library and from the relevant Government Agencies. The concept of an agroforestry consortium was based on a multi determination governance as a function, academics, education, audio-visual training system, and organizational institutions, and management rights' holders to implement forest transfers. Land rights are ensured by financial institutions and advocacy. The agroforestry consortium as a facility for farmers which will accommodate inputs in developing human resources, capital, and forest land, which will later be allocated to farmers. In post-production, farmers will provide instalments of credit and forest products for agroforestry consortia. Thus, the funds can be channeled to financial institutions and forest products to practitioners. The agroforestry consortium is expected to ensure the welfare of the inhabitants in East Kalimantan Province.

Keywords: agroforestry consortium, agrisilviculture system, public welfare, farmers

JEL Classification: Q23, Q15, D60, Q12

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1. Introduction

Having a wide range of functions and benefits, forest resources can provide a variety of human needs and wants, ranging from the production function of goods and services for the benefit of direct and indirect consumption, various natural regulatory mechanisms such as water regulation, nutrient cycling, CO₂ absorption, even various other functions that until now have been unknown or inconceivable to humans (Faculty of Forestry, Bogor Agricultural University, 1999).

Forests play a role in preventing soil erosion, filter and flood control, pest and disease control, providing shelter, gathering of fauna that serves as pollinators and preventing global warming by absorbing carbon (Vinceti et al., 2008).

Furthermore, Shanley et al. (2008) suggest that non-timber forest supplies products such as medicines, food, and shelter, as well as serves a source of income for communities living around the forest. Besides, the forest also provides food directly and indirectly. As follows from the above description, the forestry sector can contribute to food security through its function as a supporter, producer, and as a depositary of the food potential diversity.

Indonesia should be a source of food that can meet its consumption and for export. Technically, the development of potential food in Indonesia is not a problem. Factors causing a decrease of food production are dominated by non-technical ones such as a lack of policy support, socio-cultural changes, and the use of technological advances that are not adapted to the natural resources potential and socio-cultural potentials (fertile land, diversity of marine potentials and agrarian cultures).

The types of food derived from forests can comprise foliage, fruit and seeds, palms, roots and tubers, mushrooms, some insects, fish, crabs, shrimps, etc. from mangrove), and animal feed (Vinceti et al., 2008).

Indonesia has a forest area of 143 million hectares, with 77 types of food sources of carbohydrates, 26 types of nuts, 75 types of oils and fats, 389 types of grains and fruits, 228 kinds of vegetables, 110 kinds of spices, 40 types of beverages, and 1260 types of medicinal plants (Suhardi et al., 2002).

The occurrence of overshoot symptoms in natural resource management is rooted in the uncontrolled amount of greed that develops in the society. Due to the fulfilment of needs there occurs environmental damage, which is sustainable, especially by the collective and organized over-exploitation, which is a reflection of the damage to cultural values that exist in society (Odum, 1998; Talmod, 2008).

In addition to having a close dependence on water, forests are also very influential in climate and weather. Forests have a very important climatological function, especially in the distributing CO₂ during photosynthesis and, at the same time, releasing O₂ in the same process. In its

evolution, the earth has been protected by gases that are often referred to as "greenhouse gases". These gases, for example, CO₂, function as a shield to infrared radiation, which is heat from sunlight that bounces back from the earth's surface. Thus, the temperature of the earth is felt now, as it has changed or adjusted. A lack of "greenhouse gas" can cause low temperatures that can reach -180⁰C. And vice versa, if the concentration of CO₂ and similar gases increases, our planet will experience global warming. Therefore, forest conservation impacts the future of our life.

The tangible value of Unmul Forest Education and Research in Kutai Kartanegara Regency accounts for 29.01% of the total economic value, where the value of wood is only 15.28%, while the rest of 70.99% is the intangible value of servicing the environment of the forest (Roslinda, 2002). Furthermore, Roslinda (2003) also shows that the intangible value of the Taman Hutan Rakyat (TAHURA) in East Kalimantan is much higher than the tangible value, which amounts to 87% of TAHURA's total economic value and the intangible value of environmental services.

Theoretically, it is believed that forests have enormous economic value, but only a small fraction of forest resources really contribute to the revenue of the state and society. State revenue or sector contribution is often only seen from the viewpoint of the Gross Domestic Regional Product (GDRP) of the forestry sector, as well as the amount of commodity exports, the smaller a year as timber, is exhausted. Based on this, there has been applied a development approach that sees the economic value of forest resources as a whole and can be utilized significantly in development.

This study aims to consider the following alternatives: forestry condition; a multiterminal construction of an agroforestry consortium; and performance of a consortium agroforestry mechanism at the institution of Agrisilvicultural system on forest land management in the Province of East Kalimantan.

This scientific paper is expected to be useful for providing a new study topic as an alternative concept that can be developed to improve the forest land productivity and alleviate the socio-economic poverty of East Kalimantan agriculture through the Agrisilvicultural system, and the Government can apply this concept as an alternative program of accelerating economic development through managing the forest land by using the Agroforestry Consortium Concept, as well as to increase farmers' income and welfare distribution for East Kalimantan people.

2. Literature Review

According to their functions, forests are divided into several groups, namely as follows: forest areas that, due to their nature, are used for water management, flood, and erosion prevention and for maintaining soil fertility; forest areas used to produce forest products to meet the needs of the community in general, and in particular, it is a forest area which because of its characteristics is used specifically for other biological protection; and forest areas that are specifically fostered and maintained for tourism or hunting purposes (Sutikno & Maryunani, 2006).

Biodiversity has several meanings and conditions, such as: biodiversity means the richness of genes, species, populations, and ecosystems; genes, types of population, or ecosystem must occupy the appropriate "niche"; and increasing diversity with exotic species without careful consideration can cause havoc.

The evolution of forest functions has also affected the social production of the forest space. Space, in this case, is not intended as an objective and immutable element but rather, as suggested by H. Lefebvre (1974), as something that is strictly related to the social context. Indeed, according to Harvey (2006), apart from the absolute space, defined and measurable through Euclidean geometry, such as the polygon defining a forest parcel, we can identify other spaces strictly linked to social and power dynamics. These include the relative notion of space, measured in terms of time or costs, and the relational concept of space, embedded in social, political, economic, and cultural relationships. Since each forest function may have specific effects on the production of space, we can also highlight the evolution of the forest spaces through a diachronic analysis of these functions. What was in the past, and is now, the relationship between forest functions and the social production of forest spaces?

Forests with vegetation that are closely related to ecology, namely as a buffer for temperature and climate balance, maintaining water flow, preventing O₂-produced erosion and so on. By looking at the many functions of forests for ecology, it is possible to note that the sustainability of forests has maintained environmental balance. For example, what happens to the forest will affect soil and water conditions. Therefore, the act of managing forests well, in an integrated manner, is also an effort to conserve land and water. Indonesia has dozens of watersheds (DAS) which have close links with forests, as their main buffer. As in Java, ten watersheds are highly dependent on forests, namely the Ciliwung, Cisadane, Ciujung, Citarum, Cimandiri, Citanduy, Lusi, Serang, Solo and Brantas rivers (Soerjani, 1997).

Various rivers in Java have declined quite seriously with the increase of mud content in river water. This is in line with the increase in land damage and increasingly poor land-use patterns in the upper watershed. In addition to having a close connection with water, forests are also very influential in climate and weather. Forests have a very important climatological function, especially in disseminating CO₂ during photosynthesis, and at simultaneously, releasing O₂ in the same process. In its evolution, the earth is protected by gases which are often referred to as "glass chamber gas." These gases, for example, function as an infrared shield against sunlight heat that bounces back from the earth's surface. Thus, the earth's temperature is felt now as it has undergone change or adjustment. A lack of the "greenhouse gas" can cause low earth temperatures that can reach -180⁰ C. And vice versa, if the concentration of CO₂ and similar gases increases, the planet will experience global warming. Therefore, forest conservation has an impact on the planet's life.

The forestry sector is the second non-oil foreign exchange producer after textiles. In addition, the forestry sector also employs approximately 300,000 people directly and 700,000 people indirectly. The increasing use of the forestry sector cannot be separated from the role of Law

No. 1 of 1967 concerning the role of foreign capital and Law No. 6 of 1968 concerning the role of domestic capital to be engaged in forest exploitation. Since the enactment of the Law, there has been a rapid development in the forestry sector, spurring development in Indonesia.

The concept of agroforestry is based on the expected ¹ role of on-farm and off-farm tree production in supporting sustainable land-use and natural resource management. While the aboveground and belowground diversity provides more stability and resilience for the system at the site level, the system provides connectivity with forests and other landscape features at the landscape and watershed levels (Nair et al., 2008; Garrett, 2009). ¹ These ecological foundations of agroforestry systems manifest themselves in providing environmental services such as soil conservation, carbon storage, biodiversity conservation, and enhancement of water quality.

Law No. 5 of 1967, Law No. 7 of 1990, and Presidential Decree No. 32 of 1990 are the regulations that appear related to the public interest in forest areas with the following assumptions: (1) Indonesia's biological resources and its ecosystem have an important role for life as a gift of God that needs to be managed and utilized sustainably, in harmony and balance for the welfare of the Indonesian people in particular and humanity in general, both today and in the future; and (2) Elements of biological resources and their ecosystem are interdependent with each other and influence each other so that the damage and extinction of one element will result in disruption of the ecosystem as a whole.

Forest development in the future requires a more accurate conception regarding the forest management mechanism, given the importance of forest functions. The best forest management is when the management concept includes the following: (1) Efficiency of forest management and sustainability of resources; (2) Demands of the regional autonomy; and (3) Prevention of the community empowerment as an effort to alleviate poverty in communities around the forest.

Therefore, the concept of efficient forest management is needed while preserving resources by empowering the community around the forest, while at the same time, having an impact on developing the area around the forest; this concept is then called an agroforestry system. So, the agroforestry system is a pattern of forest land management with the function of empowering surrounding communities aiming at forest conservation, while increasing the welfare of the surrounding community and developing agricultural areas.

The Agrisilviculture system is a set of elements that form smallholder agriculture in forest land areas to produce output in totality, both forest products, and agricultural products (Kamus Besar Bahasa Indonesia, 2018).

The ⁶ advantages of the Agrisilviculture system include: an increase in efficiency (labor and land use); the plant population can ⁶ be adjusted as desired; one area manufactures more than one commodity; there is still an opportunity to get results when one plant species fails, a combination of some types ⁶ plants can create biological stability by suppressing pests and diseases, and by maintaining sustainability of land resources, namely soil fertility (Arifin, 2001).

The sole agricultural crop productivity (without trees) in the northern aspect was also higher than that in the southern aspect. An obvious difference in the annual productivity of trees and agriculture crops was observed between the northern aspect and southern aspect. The overall productivity in the traditional Agrisilviculture system (crop + tree) was 24% (in northern aspect) and 21% (in southern aspect) higher than that in sole cropping system (Bijalwan et al., 2009).

3. Methods

The research focuses on the multiterminal construction of a consortium agroforestry in an institution of the Agrisilvicultural system as a form to improve the community welfare and solutions through the forestry sub-sector in East Kalimantan Province. To support this research, the authors conducted a deep literature study, namely by using descriptive research, and data used is a qualitative approach data.

A descriptive method is a method of researching the status of a group of people, an object, a system of thought; or a class of events in the present. The purpose of this research is to make a description, describe or depict systematically, factually, and accurately facts, nature, and relationship among phenomena investigated (Nazir, 2003).

Meanwhile, a qualitative approach is a procedure that produces descriptive data which include the written word on the object of research that is being conducted, supported by literature studies, based on the experience of literature review, either in the form of research data or numbers that can be understood well. Also, the qualitative approach is more sensitive and adaptable to mutual influences, as well as the value patterns encountered in the field (Moelong, 2002).

This paper is informed by the secondary data, which are the source of research data obtained indirectly through intermediate media. Secondary data generally exist in the form of evidence, records, or historical reports that have been kept in archives (documentary data), both published and unpublished (Sugiyono, 2005).

Techniques used in collecting this data are library research ranging from direct records of documents or documents from relevant Government institutions, copying and download from the source website concerned (Moelong, 2002). Sources of data are collected or obtained from the Forestry Office, and other data support sources during 2016 or updated data.

Data collection methods used in this paper are: (1) Literature study of the related literature and supporting this writing, in the form of printed or electronic libraries (the internet data); (2) Documentation study of the previously written reports and articles accessed in the internet, books, and journals that are relevant to the problem.

As this research is literature-based, the data collected are qualitative (Rangkuti, 2001). The data analysis conducted in this research goes back and forth and interactively, consisting of data collection, data reduction, data display, conclusion drawing, and verification.

4. Results and Discussion

According to the Presidential Decree No. 32 of 1990, forest areas are divided into conservation forest, protected forest, and production forest. The data from Table 1 show if the total forest area in East Kalimantan Province in 2017 is 14,274,506 Ha. When specified according to the forest use agreement, the forest is still the largest forest type compared to the other, reaching 5,935,355 ha and the second fixed production forest is about 3,027,099 Ha. On the one hand, forests with educational/research use are the smallest and do not even have an area of use, as shown in Table 1.

Determination of critical land refers to land that has been severely damaged by a loss of vegetation cover, resulting in loss or diminution of its function as water retention, erosion control, nutrient cycling, microclimate regulator, and carbon retention. Based on the vegetation condition, land conditions can be classified as very critical, critical, somewhat critical, critical potential, and normal conditions. Therefore, the need for reforestation or forest rehabilitation is aimed at reforesting critical forest areas in watershed areas (DAS) carried out with the community in a participatory manner.

Table 1. Forest Area According to Forest Land Use Agreement in East Kalimantan Province, 2017

Type (Usage)	Large (Ha)
Protected Forest	1,844,969
Nature and Tourism Forest	438,390
Limited Production Forest	2,908,256
Permanent Production Forest	3,027,099
Permanent Forest	5,935,355
Production Forest	120,437
Education/Research Forest	-
Total	14,274,506

Source: (BPS-Statistics of Kalimantan Timur Province, 2019).

² The better growth and timber volume in the 'tree+crop' situation were mainly due to the application of fertilizers and weeding. Crop yield reduction was observed with alder, mandarin, and cherry and as the distance from trees increased, yield also improved. However, in albizzia, the proximity of the tree did not reduce crop yield. The implications of the results are discussed in the context of the species' suitability in this region and their usefulness in agroforestry systems (Dhyani & Tripathi, 1998).

Of the total reforested and rehabilitated trees, there are 60,869,495 units, of which Industrial Timber Forestry is the main priority in East Kalimantan Province with 40,432,811 units. The rest

is Government activities in the reforestation sector in 2017 reaching 17,595,114 units, and the reforestation of the tree still plays an insignificant role of 4,440 units (Forestry Office of East Kalimantan Province, 2018).

Based on *Table 2*, the production of processed wood of various types in East Kalimantan Province in 2017, as a whole, reaches 1,468,858.65 M³. According to its kind, processed chip (pulp) is the most ranged amounting to 910,478.32 M³, and plywood accounts for 473,296 M³. Meanwhile, there has been no timber processed into flooring (parquet flooring) so far.

Table 2. The Number of Trees Reforested and Rehabilitated in East Kalimantan Province, 2017

Activity	Units
Planting and Enrichment	2,837,170
Industrial forest	40,432,811
Reforestation	17,595,114
Greening	4,400
Total	60,869,495

Source: (BPS-Statistics of Kalimantan Timur Province, 2019).

With a huge forest area, East Kalimantan Province certainly turns this resource into commodity, such as processed wood and etc. Utilization of timber forest products shall mean any form of business that utilizes and seeks timber forest products without damaging the environment and does not diminish the main function of the forest. This activity can only be carried out on forest areas that have the potential for timber forest product utilization and can be implemented after obtaining a business license.

A Timber Forest Product Utilization Permit in a natural forest is a permit to utilize a production forest, whose activities consist of harvesting, planting, maintaining, securing, processing, and marketing forest wooden products. This permit may be granted to individuals, cooperatives, private enterprises, and Badan Usaha Milik Negara/Badan Usaha Milik Daerah (BUMN/BUMD). Production of primary forest products gained from forests is logging. Logs are produced from the natural forests through the Activities of Forest Concessionaires, timber permits for forest clearing, Industrial Timber Plantation development, and community forestry activities.

The term 'agroforestry consortium' in its etymology means agroforestry cooperation or partnership. Thus, if the term 'agroforestry consortium' can be interpreted as a form of cooperation among several parties with the aim to empower the community (local farmers) to manage forest land as an effort to increase forest land productivity in conservative functions and to open agricultural land in order to provide useful output for the community.

The agroforestry consortium has complexity in its formation, through several roles that are synergized with expectations that can provide effectiveness and efficiency to the performance of agroforestry consortiums, as shown in *Figure 1*.

A determinant (influence) in the agroforestry consortium is carried out by the Government as a regulatory authority that initiates the concept. The Government also has a role in ensuring protection to the agroforestry consortium, both from bureaucratic regulations and in the course of performance processes. Therefore, the Government has a role and function that are crucial because it exercises protection through the existing bureaucracy, so the concept performance corresponds to expectations.

Academia as intellectuals play their role in providing education and training. Some knowledge and insight that should be given are the system of Agrisilviculture pattern of forest management and an institutional pattern of organizational management of the agroforestry consortium. This training is oriented at giving stimulants (stimulus) for Gapoktan to accelerate production with education that has been given.

The role of practitioners, in this case, belongs to a forest management company, acting as a forest landowner. Forest land will be transferred to the Gapoktan management right so that Gapoktan can manage through the farmers who joined. The transfer of these rights is carried out according to both time agreement and the sharing mechanism. In addition, the empirical ability of the Practitioner becomes an important point that needs to be transformed to Gapoktan as an executor to be able to run the agroforestry consortium either according to the normative theory from academia but also taking into account the empirical findings given by the practitioner.

Financial institutions perform the function of funding, financing the production process of the agroforestry consortium, because after the transfer of forest land rights by Practitioners, production will require financing so that the role of the Financial Institution is to support operation of the agroforestry consortium. This financing is divided into two forms, namely credit or capital funding and savings as an investment by Gapoktan.

Community Development (Comdev) or often called Non-Governmental Organizations (NGOs) perform an advocacy function that can provide protection ranging from legal discrimination to technical matters such as forest land disputes, for example. In addition, another form of advocacy provided by NGOs is mediation with related parties when Gapoktan has no way to interact.

Gapoktan is the construction subject of the Agroforestry Consortium which will execute forest land utilization with financing support and insight from the education given by each stakeholder. All the roles and functions of each stakeholder are efforts to realize the agroforestry consortium, which is a joint venture applying an organizational cooperation mechanism that will synergize stakeholders. In the body of this consortium, agroforestry will also run balancing control mechanisms (balanced control) among stakeholders to maintain the role and function to remain in the corridor of performance that is proportional in order to avoid overlap or void role and function.

The agroforestry consortium has complex stakeholders' synergy, so the mechanism there is slightly different from similar institutions such as cooperatives, trade partnerships, and other forms of cooperation. The complexity due to many roles is not an obstacle as long as each stakeholder is able to synergize and understand the roles and functions of each so that there is no overlap or vacancy of the stakeholder's role.

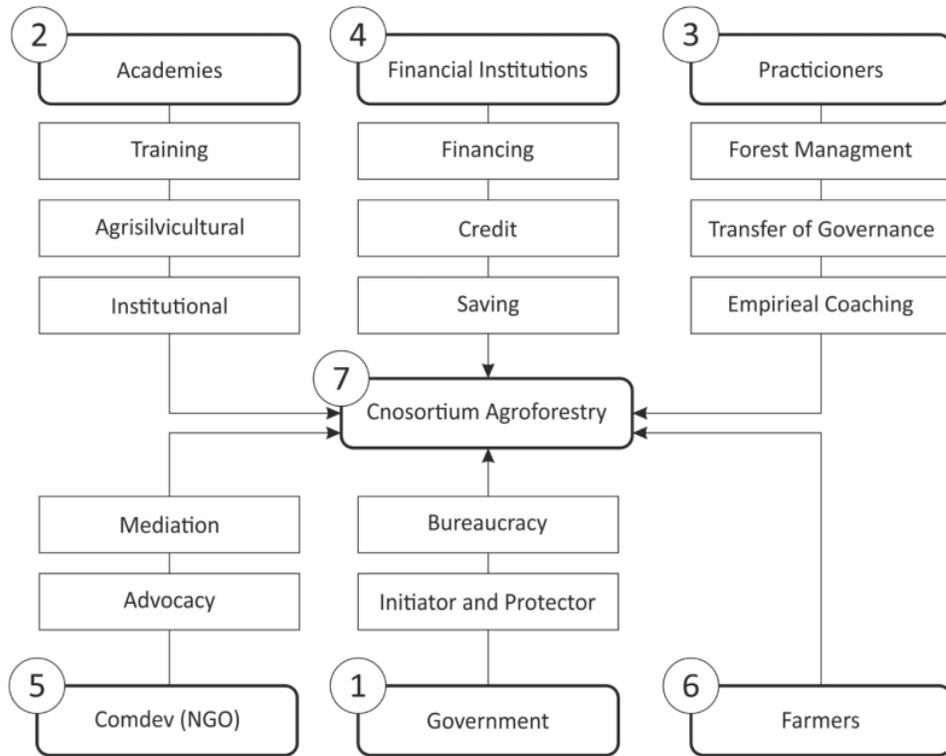


Figure 1. Mechanisms of Constructing an Agroforestry Consortium
 Source: designed by the authors.

The Agrisilvicultural system is an agroforestry system that combines forestry components (wooden plants) with agricultural (or non-wood) components. Timber crops are meant to belong to crops (tree crops) and non-timber plants to annual crops (Nair, 1985; Young, 1989).

In Agrisilviculture, multipurpose trees are planted (see more detail on the multipurpose trees) or trees in the context of protected functions on farms (multipurpose trees/shrubs on farmlands, shelterbelt, windbreaks, or soil conservation hedges).

Furthermore, the agroforestry consortium will allocate them to the farmers according to the latter's capacity. Farmers will carry out a production process with the Agrisilvicultural system of managing forest land. This process is supported by inputs in the form of trees, agricultural seeds, and capital funds, and the most important are the knowledge and skills of farmers to produce with this system in East Kalimantan Province.

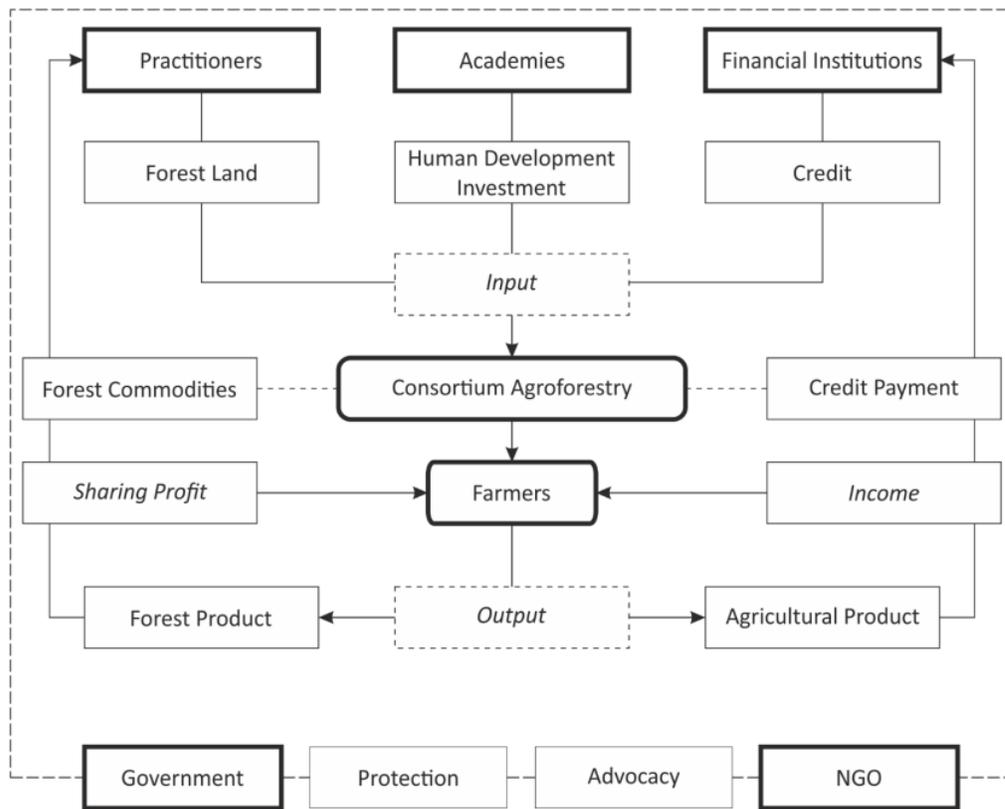


Figure 2. The Role of the Agroforestry Consortium in Instituting the Agrisilvicultural System
 Source: designed by the authors.

When the production is over and the harvest time comes, the farmer will produce two outputs, namely agricultural and forest products (see Figure 2). Agricultural produce will create income for farmers. Their income, other than individual income, will also cover the instalment of credit payments on the capital obtained from Financial Institutions through the agroforestry consortium, which will accommodate mortgage payments from farmers in East Kalimantan.

Meanwhile, forest products that become the property of practitioners or companies-owners of the right to manage forest lands will be submitted through the agroforestry consortium.

However, as forest land managers, farmers will get a share of the profit from forest products that have been produced during their management. On the external side, the Government and Non-Governmental Organizations (NGOs) provide protection and advocacy in the event of a dispute or problem both internally and externally of the agroforestry consortium.

The financial and investment cycles in the agroforestry consortium are formed on three stakeholders: (1) a financial Institution as a funding provider; (2) an agroforestry consortium as an intermediary; and (3) a farmer as a fund's manager. This cycle begins with credits granted by Financial Institutions to the agroforestry consortium to be allocated to farmers.

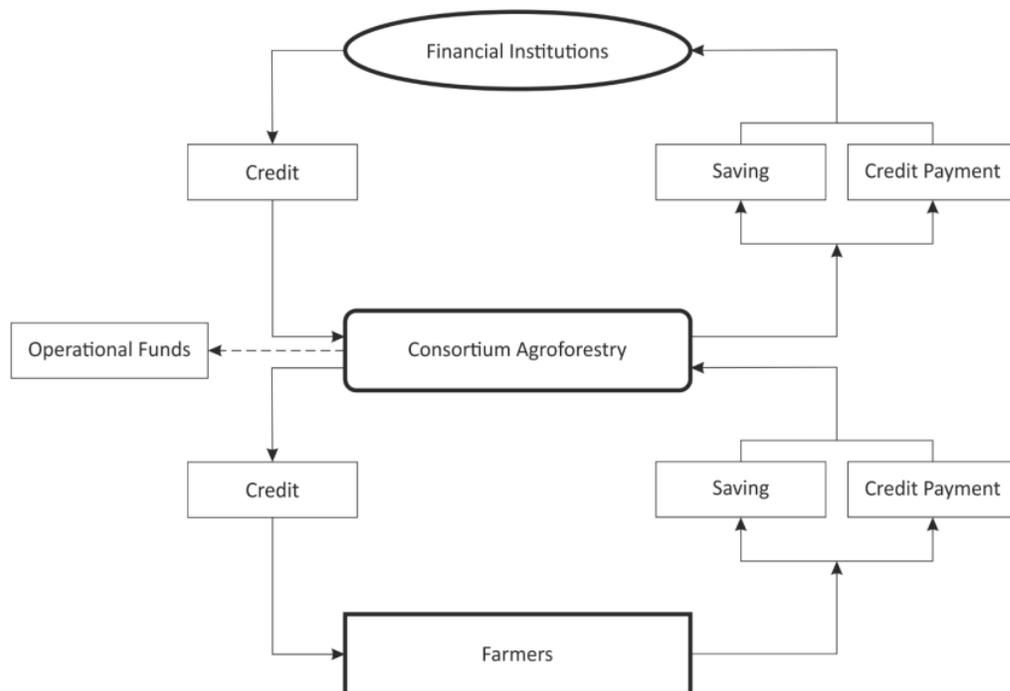


Figure 3. The Financial and Investment Cycle of the Agroforestry Consortium

Source: designed by the authors.

An agroforestry consortium has a determinant complexity to form a distinct pattern of performance mechanisms. It will also shape its own pattern on the financial and investment flows of the agroforestry consortium. Figure 3 explains the financial and investment flow of the agroforestry consortium. This agroforestry consortium will manage credit funds from financial institutions not only as a fund of the Farmers' allocation of capital in managing forest land but also to the operational costs of the agroforestry consortium. This is done as an effort to

professionalize organization so that the agroforestry consortium is truly professionally managed. Furthermore, capital funds are allocated proportionally to the existing farmers in East Kalimantan Province.

After producing output, farmers will return credit funds to the agroforestry consortium in accordance with the income earned. This is done so that the farmers are stimulated to produce in the next period because the credit funds are not fully disbursed, but in low-interest instalments with low-interest rates. In addition to credit instalments, Farmers can also invest or save their income. Furthermore, funds from farmers in the form of credit instalments and savings will be accommodated by an agroforestry consortium. Funds that have been accommodated will be handed to the Financial Institution as well as the funds' deposits that are huge. Deposits in the Financial Institutions become an effort to secure the funds of the agroforestry consortium so that the cash funds of the agroforestry consortium are only short-term and just operational funds in East Kalimantan Province.

The construction and implementation of the agroforestry consortium are expected to realize the expansion of agricultural land from former deforestation forest land. Thus, it is expected to increase economic growth through the agricultural sector, which has been plagued by land issues (see Figure 4).

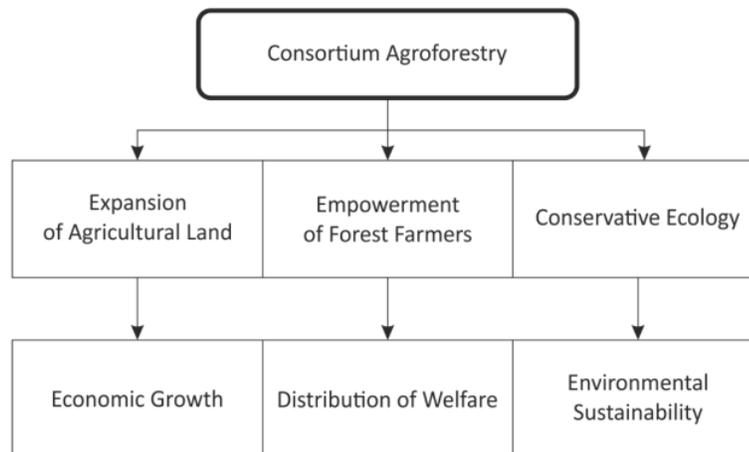


Figure 4. Expectations of the Agroforestry Consortium in Realizing the Development Trilogy

Source: designed by the authors .

The concept of empowerment in agroforestry will encourage the farmers' empowerment around the forest migration outside the forest area so that this will support the equitable distribution of welfare in the community of farmers. The system of agroforestry empowerment and the Agrisilvicultural system will make forest land become greener. And with the forest's conservation, it is expected that natural resources in the forest can be sustainable in East Kalimantan Province.

⁵ The increase of population and its associated pressures on agricultural land have threatened tropical forests with the production of food, fuel, and timber. After deforestation, it is often difficult to sustain annual crop production since nutrients are rapidly leached from the soil due to high rainfall in the tropics (Kayatama & Luna, 1998).

5. Conclusions

The agroforestry consortium as an institutional system of Agrisilviculture is formed on several determinations of several stakeholders, namely the Government as bureaucratic protection, Academia as intellectuals conducting education and training, Practitioners who will give rights to forest land and NGOs as a function of advocacy.

The concept of an agroforestry consortium as an accommodation among farmers (Gapoktan) will mediate inputs in the form of investment of human resources development, capital credit, and forest land, which will then be allocated to farmers. The post-production of farmers will provide credit instalments and forest products to the agroforestry consortium so that funds can be channeled to Financial Institutions and forest products to Practitioners. The agroforestry consortium concept is expected to help the society prosper (absorbing the workforce) of East Kalimantan Province.

This study comparison with research of other countries demonstrated that ³ India has been at the forefront of agroforestry research, since the organized research on agroforestry began 25 years ago around the world. Given ³ the country's unique land use, demographic, political, and socio-cultural characteristics and strong record in agricultural and forestry research, India's experience in agroforestry research is important for agroforestry development, especially in developing countries. In India agroforestry has received much attention from researchers, policymakers, and others because of its ability to contribute significantly to economic growth, poverty alleviation, and environmental quality. Progressive legal and institutional policies must be created to avoid the historical dichotomy between agriculture and forestry and encourage integrated land-use systems. The Government policy holds the key to adopting agroforestry (Puri & Nair, 2004).

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