Characteristic of agroforestry farmer as a source of cultural information: a case study in two villages in Java, Indonesia

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Abstract. The private forest farming system in each region is established by how farmers viewed natural resources in their environment and ultimately formed a unique farming culture system. The purpose of this study is to determine the characteristics and cultural systems of farming that are applied by private forest farmers. The research was conducted in two different areas, i.e., Linggajaya Village (West Java) and Triwidadi Village (Yogyakarta). Participatory Rural Appraisal techniques collected the data. These studies showed that the cultural systems of private forest farmers in both of villages were different due to their different views on natural conditions and themselves as farmers. Different perspectives on land tenure and ownership patterns caused different ways of cropping patterns and social relationships. Linggajaya village farmers with vast land ownership have a broader social relationship with communities outside the village. They tend to buy and sell land than farmers in Yogyakarta with small land ownership and tend to manage their land intensively. According to the research, it can be recommended that beginning research on private forest culture should become the first thing to do before the community empowerment in the private forest development program.

1. Introduction

The development of community forests is one of the causes of cultural change in the lives of farming communities in Java. Each development process affects the cultural value and lifestyle of the community. Understanding the socio-cultural conditions of the farming community plays an essential role in rural development planning in maintaining land fertility and environmental sustainability. Development stakeholders can act under village community norms. Traditional culture is closely related to the community's social, economic, and ecological processes [1].

Farmers in Indonesia have variations in the development of farming patterns. Smallholding forest farmers with small land tend to plant various types of plants with agroforestry patterns. This farming pattern is a sign of the capability of farmers to meet their household consumption needs. The success of farming household consumption needs is determined through their ability to improve the productivity of land [2].

Indonesian farmers develop farming in dry land and wetlands. The use of agricultural land often also varies among farmers. The application of agriculture in wetlands (paddy fields) is different from applications in dryland (drylands/community forests). The types of commodities in wetlands are also different from those in the dry land. Wetland farmers are more dominant in planting annual crops, while dryland farmers tend to grow woody (annual) in combination with yearly crops.

Wetland farmers and dryland farmers also have differences in the behavior of allocating the resources they have. The farmers make the right choice of action following the social, cultural, political, and
psychological environment. The adaptation strategy is the action plan carried out by farmers, both consciously and unconsciously, explicitly or implicitly in responding to various internal or external conditions [3]. The choice of strategies made by farmers is seen not only as a choice based on what is inside the farmer (such as economic morals or rational decisions). Still, it is related to something outside the farmer himself, such as rules and resources [3]. Thus, it can be understood that farming is not merely an economic activity but also as a cultural system [4].

Culture is understood as a "system of values, ideas, and ideational systems" that encourage typical behavior patterns in a society [5]. Agricultural activities can also be interpreted as a "social field", namely as an arrangement of ideas "made and thought" by farmers who are not only related to developing specific farming patterns but also interpret agricultural activities as social actions [6].

Some previous studies of agroforestry community forests mostly discussed management techniques. Agroforestry is a "healthy farming system" because it makes a positive contribution to environmental services, including protecting watershed functions (DAS), reducing the concentration of greenhouse gases in the atmosphere, and maintaining biodiversity [7]. The application of agroforestry patterns in community forests has a vital role in (1) improving the quality of water availability, namely increasing base flow debit by 11.9 m³/second⁻¹ and reducing peak surface flow discharge by 4.02 m³/second⁻¹. (2) Improve the quantity of water yield, i.e. reduce sediment concentration by 90.47 mg L⁻¹ [8]. Other studies concluded agroforestry's complexity requires mapping technology of natural resources/agroforestry land, superior seed production, cultivation technology, post-harvest technology, processing technology, and distribution support technology [9]. Research on the characteristics of agroforestry smallholder forest farmers as cultural information has not been widely reported. In contrast to previous studies, this study discussed the community forest farming system from a socio-cultural perspective. The study aimed to determine the characteristics and cultural systems of farming that are applied by community forest farmers. The results of this study are expected to become one of the basic ingredients for consideration and sustainable community forest development policies.

2. Materials and methods
The study used qualitative and quantitative approaches. The research was conducted in two locations, i.e., (1) Linggajaya Village, Cisitu District, Sumedang Regency, West Java Province, and (2) Triwidadi Village, Pajangan District, Bantul Regency, D.I. Yogyakarta. The selection of these two villages was based on the initial idea of seeing the same form of cultivated land in them, namely private forest, but the land used and planting patterns were different. Data collection was carried out using the PRA techniques consisting of participant observation, structured interviews (questionnaires) of 35 respondents in the Linggajaya Village, and 35 respondents in the Triwidadi Village. The open interview was guided by eight informants in Triwidadi Village and seven informants in Linggajaya Village. Focus group discussions were conducted in the two villages. The data collected was a description of the location (community's social economy and physical environment of the village), patterns of land tenure and ownership, cropping patterns, and patterns of social relations following Alam and Ishan [10]. The collected data was then tabulated and presented descriptively, complete with a percentage. For data validation, this study used data triangulation techniques.

3. Results and discussion
3.1. Livelihood of farmers
The characteristics of farmers in Linggajaya and Triwidadi Villages was illustrated through the respondent's livelihood profile (figure 1). It's reflected in the people of Linggajaya and Triwidadi Villages, who are predominantly engaged in agriculture, both as farmers and farm laborers. The majority of the Linggajaya Village community's livelihoods are in the agricultural sector (68%), while the Triwidadi Village community is 48% in the agriculture sector and 43% outside the agriculture sector. Furthermore, economic activities would develop according to local culture [11]. The dependence of
human life on the physical and social environment shows a reciprocal relationship with the environment to meet the needs of life.

![Livelihoods of Linggajaya and Triwidadi Villages](source: Primary data 2015, processed in 2020.)

**Figure 1.** Livelihoods of Linggajaya and Triwidadi Villages.

Farmers' dependence on natural resources in both villages remains high. It showed that the daily activities of the people inseparable from farming despite working outside the agricultural sector. The farming work was carried out by farmers who own or not own land. Farmers who do not own land continue to do their daily activities by working on rental land or agricultural labor. There are communities in both villages who work in other sectors, namely traders, construction workers, tailors, government employees, and livestock raiser. The activity of fetching/searching for animal feed was made in the afternoon. In the farmer's work activities every day, there were differences between the two villages. Linggajaya Village farmers are more intensively managing wetlands and livestock compared to their dry land. Linggajaya Village Farmers assume that dry land was not very profitable to be planted because the land is less fertile, and the location of the dry land is relatively far from home. The Triwidadi Village Farmers cultivate land intensively on dry land and wetlands. Both types of land are not far from home and they benefit from managing the two lands.

The farmers' behavior in the two villages showed that farmers had differences in assessing wetlands and drylands as agricultural resources to meet their daily needs. However, farmers in both villages believe that cultivating agricultural land was valuable work, and the inheritance of work from ancestors must be respected and preserved. This agrees with the previous study that farming is good work for farmers, having an intimate and respectful relationship to their arable land as their primary Source of livelihood even though land ownership is not a demand [6]. The main job of farmers was to carry out activities such as cultivation, and farming on the land. The livelihood of farmers was essentially closely related to the existence of land, and there will be no farmers if there is no land to cultivate [12].

The culture of farming in wet and dry land showed that the farming community of Linggajaya Village and Triwidadi Village was characterized by a system of ideas that were interpreted in various symbols and behaviors as members of the community to meet their daily needs. It means that farmers' activity in achieving their goals is by adjusting to cultural values that have been maintained in the community. A
set of knowledge systems or ideas function as a description of humans’ attitudes and behavior as members of society or citizens of their social unity, grow, develop, and change according to the needs of life [13].

3.2. Patterns of land tenure and land ownership
The Javanese community was an agrarian society that carried out farming activities either on land owned or leased. Likewise, with Linggajaya Village in West Java and Triwidadi Village in Yogyakarta. The existence of land is one of the very determining factors of production for farmers in the agricultural business. Changes in the area of land ownership change the planting pattern and culture of farmers. Changes that occur in rural areas begin with changes in the agrarian structure. It was followed by the loss of various values, institutions, and traditional social ties that have been the capital for rural communities to survive. The land was not only a factor of production but also as a source of livelihood, and land tenure is not only meant as a resource cultural values [4].

![Graph showing land ownership patterns in Linggajaya and Triwidadi Villages](image)

Source: Primary data 2015, processed in 2020.

**Figure 2.** The area of farmer's land ownership in Linggajaya and Triwidadi Village.

![Bar chart showing land tenure in Linggajaya and Triwidadi Villages](image)

**Remarks (Noted):**

| A | B | C | D | E | F | G | H | I | J | K |
|---|---|---|---|---|---|---|---|---|---|---|
| Inheritance | Purchase | Land for profit sharing/tenant | Village land | Inheritance + village land | Purchase + Profit Sharing | Reanting + Profit Sharing | Inheritance + Village Land | Inheritance + Purchasing + Village Land | Purchase + Village Land + Profit sharing | Inheritance + Government assistance |

Source: Primary data 2015, processed in 2020.

**Figure 3.** Land tenure in the Linggajaya and Triwidadi Villages.
The farmers' area of cultivated land in the two villages shows the similarity of the dominant developed land area <0.25 ha (51% of Linggajaya farmers and 42% of Triwidadi farmers). Farmers with land > 1 ha in Linggajaya Village (26%) and Triwidadi Village (9%). Land ownership in the two villages also has differences in its acquisition. Land ownership in Linggajaya Village is predominantly derived from inheritance and purchase (31%), while in the Triwidadi Village was mainly inherited (66%) (figure 2). It showed that the farmers in Linggajaya Village have more ability to buy land than the farmers in the Triwidadi Village. The high purchasing capacity of farmers in Linggajaya Village is due to their income from routine money transfers. The remittances received by these farmers come from household members who work in the city. The recipients of remittances (remittances) are usually the elderly and work in the agricultural sector only. Children send money to supplement their parents' needs in the village [14]. This condition can occur because many persons from Linggajaya Village work in the city and have succeeded in the economic aspect to send cash assistance regularly to their parents. The money was not used for the farmers' daily needs but was collected and then used to buy land. The sale of land occurs because the landowner (farmer) needs funds to meet requirements such as school fees, weddings, hospitals, and others. Other farmers as land buyers come from the village community or from outside Linggajaya village. The study showed that some farmers owned more land than other farmers. Farmers in Linggajaya Village, especially in Cikucing Hamlet, could play more roles as farmers than peasants because they have a large area of land and were commercially oriented in managing them. As explained by Syahyuti [15] that the characteristics of peasants are small-scale farmers, tenants, sharecroppers, farm laborers, cooperative attitude, family's labor, and prioritizing self-consumption. Meanwhile, a farmer is a modern farmer who did business by applying modern technology and has a business spirit under agribusiness demands.

In cultivating their land, farmers in Linggajaya Village, especially Cikucing Hamlet, need additional labor from neighbors and farmers outside the hamlet. The main reason for hiring neighbors is the existence of a good relationship called social capital, which can be used as access to income [14]. Employing neighboring workers as laborers on the land to help neighbors with small land or new households who do not own land to earn income. Another advantage of this collaboration is that you have confidence in your neighbors to work honestly and diligently. Good relations between farmers and their neighboring workers will continue to be maintained because there is a need for mutual interaction.

The attitudes of farmers in Linggajaya Village and Triwidadi Village were different in respecting and appreciating their ancestral heritage in the form of "land". The farmers in Triwidadi Village are more conservative, namely trying to protect the inherited land to not be traded to other people outside the family. Therefore, the next generation would know the family's history and provide economic security for the next generation, even though the land they own is getting smaller. Farmers in Linggajaya Village show a more moderate attitude, namely considering land as a production item that can be used for economic purposes so that the inherited land can be traded to anyone.

Changing in the area of land ownership in Linggajaya Village altered the management of private forest lands. Previously farmers managed land for household needs (peasants), now most of them have shifted to becoming entrepreneurs in agriculture (farmer). On the other hand, the livelihoods of the people of Linggajaya Village were shifted to the non-agricultural sector. Meanwhile, in Triwidadi Village, the private forest land management is still carried out by the family and to fulfill household needs. In fact, because of the strong desire to maintain each young generation's ancestral traditions in each household, they are taught and accustomed to participate in managing the land they own even though they already have jobs outside the agricultural sector.

3.3. Planting pattern
The development of science and technology affects the farming culture in rural areas. At present, the ever-increasing economic needs require farmers also to change their livelihood strategies. One of the strategies adopted by farmers in Linggajaya Village and Triwidadi Village is to apply agroforestry
cropping patterns, which are better known as mixed gardens by farmers. Agroforestry patterns give new colors to the dynamics of their livelihood systems.

The farming community in both Linggajaya Village and Triwidadi Village stated that their ancestors had practiced land cultivation using a mixed garden pattern from ancient times until now. It just that the spacing and types of plants are now slightly different. In the past, the spacing between plants was relatively more prolonged than it is today. Because the land area is smaller than its ancestors, a mixed cropping pattern is an option. The composite pattern referred to is planting various types of plants with different harvest seasons. By applying this pattern, the farmers assured to provide sustainable results (daily, monthly, and annual).

The plant species cultivated by farmers around their houses are quite varied, as shown in figures 4 and 5. The cropping pattern applied was mixed gardens, which were initially garden crops, but as plants grew, they changed to crops. The cropping pattern is almost the same as the agroforestry pattern [16]. It explains that agroforestry is a land-use system that combines annual crops (plantation and forestry), agriculture, and livestock the same land to increase profits, both economic, social, and ecological.

The agroforestry pattern has been widely practiced and applied by farmers in both locations. Unfortunately, there are still a few farmers who understand the agroforestry pattern. There are 40% of respondents admitted to knowing the term. Twenty-six percent of the respondents knew about this agroforestry system's benefits for their household economy and their village environment. Improving the knowledge and socialization of agroforestry planting patterns are needed for private forest landowners to increase their people's forests' productivity. The results from the 2013 to 2030 National Strategy Book for Agroforestry Research showed that agroforestry knowledge was crucial in maximizing income by determining the types of commodities (timber and understory plants) and setting/structuring livestock land and ponds [17]. The determination of the type of commodity must consider the geographic, socio-cultural conditions of the local community and the local climate.

![The combination of private forest plants types in Linggajaya village](image)

**Figure 4.** The combination of plant commodities on the private forest in Linggajaya Village [18].

With various species of crops grown by farmers, the income of farmers in both villages looks stable. The indicator is monthly, quarterly, every 4 months, semester, and yearly income. The agroforestry pattern was farming resistance (resilience) to farmers as smallholder forest farmers [2]. The advantage of agroforestry is that it provides sustainable income throughout the year and meets farmers' household needs in the short term. The medium-term obtained from livestock and fisheries and was from fruit trees and wood in a long time. The combination of wood plant types developed by farmers in
Linggajaya Village, Cisitu, Sumedang, and farmers from Triwidadi Village, Pajangan, Bantul, is shown in table 1.

| Plant Type | Percentage |
|------------|------------|
| Wood       | 14%        |
| Wood + Fruits | 11%     |
| Wood + Fruits + Palawija | 6% |
| Fruits + Vegetables | 3% |
| Wood + Fruits + Vegetables + Palawija | 3% |
| Vegetables | 3%         |

*Figure 5. Combination of plants on the private forest in Triwidadi Villages [19].*

Both men and women were involved in managing the community forest land management in Linggajaya Village and Triwidadi Village. The study showed that the work carried out by employees is not only the responsibility of men but also women. The previous study showed that community forestry activities were not only in demand by men but also women [20]. However, there were several different types of work that men and women can do. The men's jobs were plowing and hoeing. Meanwhile, women's jobs were planting, weeding, harvesting of crops, and processing the crops before consumed/sold. The agricultural timing in the two villages was also relatively the same, namely planting (rice, wood, vegetables, spices, and fruits) was carried out during the rainy season, except for tuber crops grown in the dry season.

Plant maintenance activities in Triwidadi Village were carried out by old and young farmers generation during off-farm work. In addition to cultivating land, they also work in the non-agricultural sector, such as working in factories, trading in cities, construction workers, workshops, and others. Meanwhile, the farmers in Linggajaya Village, for peasants, generally in the dry season, have a shift in professions, especially the younger generation, namely working outside the agricultural sector (odd laborers and traders). The activity of peasants at present is a strategy to meet the economic needs of their household. Meanwhile, for farmers, there is no difference in both the rainy season and the dry season. They still manage the land even though it is not as intensive as the farmers in Triwidadi Village by hiring workers in their village. Activities carried out by farmers in the two villages during the dry season are to build/renovate houses. There are very few activities related to community forest activities. This activity is almost the same as the conditions of farmers in Sumbawa, where during the dry season, farmers rarely do activities related to gardening, but do activities, such as "nerabas" (clearing fields by hoeing then burning) and fixing garden guardrails [21].

Harvesting of fruit trees is carried out in annual terms and vegetables in monthly terms. Harvesting root crops is carried out once a year. Meanwhile, the harvesting of wood crops was carried out after 5 years. Sales of cow/goat livestock at ripe age are carried out when large funds are needed. Harvesting wood and/or cows was mostly done in the months of June-July (when children need school fees), holidays (Eid al-Fitr and Eid al-Adha), and the need for wedding ceremonies and circumcisions. Farming communities in both villages show that planting wood and cattle/goats is a saving. The cattle for rural communities are savings known as "Rojo Koyo" (the king of wealth) [22]. Likewise, the cultivation of timber plants for community forest farmers has a function as a tool for symbolic interaction between...
members of the community/their social environment and not just for profit [23]. Farmers want a sense of security by planting wood as “savings” to meet relatively large needs such as various ritual ceremonies, school fees, social events and others.

Table 1. Types of the commodity in private forest’s.

| Commodity                      | Linggajaya Village                                                                 | Trividadi Village                                                                 |
|-------------------------------|------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|
| Timber/Wood                   | Swietenia machrophylla, Maesopsis eminii, Hibiscus macrophyllus, Paraserianthes falcataria, Tectona grandis, bamboo, Syzygium cumini, Anthocephalus cadamba, Acacia mangium, Anthocephalus cadamba. | Swietenia machrophylla, Tectona grandis, bamboo, Syzygium cumini, Anthocephalus cadamba, Acacia mangium, palm, Hevea brasiliensis |
| (Non timber forest product/NTPFP) (Fruit) | Archidendron pauciflorum, jackfruit, Nephelium lappaceum, mangosteen, mango, sapodilla, banana, guava, Parkia speciosa, mices, grapefruit, sunkist orange, avocado, coffee, coconut, sugar palm, durian. | Jackfruit, Spondias dulcis, sapodilla, banana, tamarind, soursop, mix, guava, longan, avocado, coconut |
| (Non timber forest product /NTFP) (Oil) | Clove                                                                              | -                                                                                |
| Plants under wood stands      | Herbs: ginger, turmeric, Alpinia galanga, turmeric, lemongrass, fragrant pandanus, Syzygium polyanthum. | Herbs: ginger, turmeric, Alpinia galanga, lemongrass, Ocimum sanctum. |
|                              | Rice, cayenne pepper, red chilies, sweet corn, tomatoes, leks, celery, peanuts.   | Rice, cayenne pepper, red chilies, hybrid corn, sweet corn, tomatoes, leeks, celery, peanuts. |
| Pond                          | Kaempferia galanga, cassava.                                                      | Taro, cassava.                                                                   |
| livestock                     | Tilapia, Cyprinus carpio                                                          | Clarias sp                                                                       |
|                              | Chicken, goat, cow.                                                               | Chicken, goat, duck, cow                                                         |

Adapted from several sources [1, 2, 18, 19].

3.4. Patterns of social relations
Humans, in their creation, are destined as personal and social creatures. As personal beings, humans try to fulfill all their needs for their survival. As social beings, in living their lives, humans always involve other people with individual goals. In living their lives, the communities in both villages formed social relationships that last a relatively long time. In the management of community forests in the two villages, there are differences in the social relations that are formed. This is due to differences in the arable area. Farmers owning small land areas tend to manage their land on their own, while farmers owning large areas tend to need more labor to work the land. Farmers with a little land area in both villages (<2,500 m²) tend to manage land independently with farmer households. The decision on land management rests entirely with each family without any outside interference. Meanwhile, farming in the medium land areas (2,500 - >10,000 m²) was carried out by outsider peoples who followed the instructions from the owner of the land.

Management of large areas of land is assisted by workers who come from male and female farm laborers. This guarantees labor availability for landowners and living for farm laborers/farmers with small land or landless villagers. The existence of farmers with small land provides space for
investment in the availability of extensive labor. The employment system by taking labor from neighbors can improve the economy's stability of farmer household. This can increase in village communities with mutual cooperation and strengthen mutual trust between them [24]. Social relations are processes of cooperation, accommodation, assimilation, and acculturation between individuals until they are united [25].

Land management activities in the two villages fostered different social relations. Farmers in Linggajaya Village do business not only with their families but also outside their families. Meanwhile, the farmers in Triwidadi Village only have business relations with their families and neighbors in the village. The social relationships formed in community forest management activities affect village communities' socio-cultural life, namely the culture of cooperation. The process of developing value for money and commercialization concerned in the village community's life contributed to the growth of individualism in them.

During the dry season, the two villages' people usually work together to build houses for the villagers. Initially, the construction of houses was carried out in cooperation, starting from laying the first stone to the completion of the house. The house that was built was also not a luxury house but a simple one. The cooperation system only covers the house construction workforce's needs, while the owner provides the building materials. The entire community involved in the house's construction and the owner of the house included food and drinks. This condition shows the unity and integrity of all members of society by helping each other. However, this culture is now starting to disappear, and a culture of buying and selling transactions is growing. Workers who are involved in the construction of houses will get wage payment. Besides that, not all people were involved, but only a few people. The study showed that housing construction activities were made in the two villages. Usually, one week at the beginning of the construction/renovation was done by communal and free paid, but waged labor was done for the completion. It seems that there has been a change in the cultural activities in the farming community in these two villages.

The consequence is that the work pattern was oriented towards meeting economic needs, which reduces the time spent together ("gathering") with villagers. It means it is much different from their parents or ancestors who have a lot of time to do activities with other residents. Activities to meet the economic needs of the family can be fulfilled only by cultivating the land. This gives rise to variations in the forms of cooperation running in the economic life of farmers. This is what appears in the two villages when there are the orientation of money value and commercialism in the peasants; the form of cooperation was not carried out correctly. Rahman [26] explained that the community in Santan Tengah Village, Marangkayu District, has experienced a change in cooperation since the presence of coal mining companies and high economic demands. The community, who initially worked as farmers, turned into employees at a coal mining company; therefore, it brings a new culture to the village community's life. The form of cooperation, initially purely helping each other without wages, turned into an activity with a wage system.

Cultural value is a mutual agreement in society and cooperation, which means working together and helping each other because there is a sense of togetherness and mutual need in each individual's conscience as a member of society. "Gotong royong" activities had formed solidarity and harmony in neighboring and social environments. Meanwhile, forestry development in Indonesia for economic and environmental benefits requires social capital as a form of synergy among stakeholders. For this reason, cooperation is a cultural value that must be re-agreed and its implemented in social life so that people's welfare could be realized without experiencing inequality.

4. Conclusions
The cultural system of farmers in farming in private forests in Linggajaya Village and Triwidadi Village differed each other. The community forest in Triwidadi Village covered smaller land areas but were more intensive than in the Linggajaya Village. The social relations of farmer in the Linggajaya Village were relatively intensive. This was shown by the interaction with farmers inside and outside the village. Meanwhile, the social relationship in Triwidadi Village was still within the family or village.
Differences in tenure and land ownership patterns lead to differences in private forest management and social relations intensification. The study suggests that the difference in the cultural system of farmers in farming in the two villages located on the Island of Java is a lesson in applying for the private forest development program so that the cultural system is evaluated first to follow the conditions of the community's thinking.

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