Kebun-Ghepang: ecological and institutional reference for social forestry at highlands of Sumatra

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Abstract. The government has granted Social Forestry (SF) management licenses since 2014, in the Village Forest and Community Forestry scheme, for communities around the forest in the highlands of South Sumatra. However, until early 2019, most of the SF groups still did not have a concept or vision of what was to be designed. The work area of SF is generally a stretch of monoculture coffee plantations. Within the frame of a sustainable forest management system, they are confused about making plans and actions. We conducted action research at two Village Forest groups in Muara Enim, South Sumatra, to encourage the implementation of independent SF. We use Vayda's progressive contextualization research approach. We found the desire of farmers to make Kebun-Ghepang in the SF work area, not just tree planting activities, as requested by the forester. Ghepang is a term of the Besemah ethnic people for fruit gardens that resemble forests, generally dominated by durian trees. Ghepang is a legacy of ancestors. Kebun-ghepang is an imagined forest by both the local community and foresters. The formation and conception of Kebun Ghepang would be an ecological and institutional reference in managing and building SF work areas, as analyzed in this paper.

1. Introduction
Social forestry (SF) has become the mainstreaming program of the Indonesian Government within the frame of people-center forestry development. The Government planned to allocate 12.7 million hectares of forest land to local communities. This community-based forestry management (CBFM) scheme has been formalizing since 2007, then later offered and granted extensively to various community groups in various forest functions. Explicitly, the definition and purpose of the SF program are written in the Ministry of Environment & Forestry Ministerial Decree 83/2016 as follows:

"Social forestry is a sustainable forest management system implemented in state forests or forest rights concessions/ customary forests, undertaken by local communities or customary legal communities as the main stakeholders, in order to increase their prosperity, ensure environmental balance and social-cultural dynamics, in the form of Village Forests, Community Plantation Forests, Community Forests, Customary Forests, and Forestry Partnerships."

The legal definition and objectives of Indonesian SF contain three messages, namely a sustainable forest management system that is carried out by the community, increasing their welfare, and dedicated to environmental balance. The concept and objectives of the SF Program confirm the concept of community-based forest management (CBFM) or global thinking about community-based natural resources management (CBNRM). The twin objectives of the SF Program in many countries are to...
support the active involvement of local communities in conserving and increasing the number of forest trees and increasing the socio-economic situation of the poor [1]. According to [2], The promotion of CBNRM at the global level since the 1970s has an assumption that is "because local people already use, rely on and manage natural resources, they are in the best position to conserve them (with external assistance as needed)." Have SF groups in Indonesia been actively involved in planting trees and improving their welfare? Are these activities a sustainable forest management system?

CBNRM has been criticized for its systematic failure to achieve the objectives of benefits for the community and natural resources. Most CBNRM discourses focus on technical issues related to how policies should be designed, not in ways (including politics) to achieve their goals [3]. Another criticism of the CBNRM is to question its underlying assumptions and issues related to institutional design [4]. The failure of CBNRM programs is pinned on goals that are poorly understood and implemented [1]. They believe the success of the objectives of the CBNRM is more likely to occur if implementation challenges are answered explicitly. In the case of Social Forestry in South-West Bangladesh, the program failed to be implemented more because it was done in a top-down manner, based on the ideals formed by the national and international context [1].

The challenge of Indonesia's current social forestry program is how to fulfill the SF assumptions and objectives in each locality context, rather than merely meeting the quantitative targets of program achievements. The challenges of social forestry in Indonesia are mentioned explicitly in research publications of [5]:

"In all cases, actions focused on nominal redistribution of land but ignored local participation and aspirations. CBFM was used as a tool to solve problems of forest tenure, legalization of forest communities, and forest rehabilitation rather than to empower communities and therefore address issues of social justice. Communities remained subject to land-use restrictions, limiting their opportunities. Their participation was often weak and limited to the village elites".

One case of implementation challenges in SF programs is to realize a sustainable forest management system for coffee growers in protected forest areas in the highlands of South Sumatra. The government has granted Social Forestry (SF) management licenses since 2014, within the scheme of Village Forest/Hutan Desa (HD) and Community Forestry/Hutan Kemasyarakatan (HKM). However, until early 2019, most of the SF groups still did not have a concept or vision of what was to be designed. Why doesn't the SF program work? How to make it run as intended? What do community groups imagine or want so that SF can achieve its goals? This study aims to gain an understanding of the perspective of farmers or SF managers in the highlands of South Sumatra towards achieving the objectives of SF programs.

2. Methodology

Research that intends to juxtapose the objectives of the SF program with its implementation in the field has been carried out by [6], [1], and [7]. These studies are generally carried out through field surveys. We want to answer similar questions but with different methods, namely through the participatory action research (PAR) approach, which is combined with ethnographic studies.

The concept of the action research approach stems from the idea of Kurt Lewin. According to [8], a system cannot be understood until we try to change it. PAR involves researchers and participants who work together to examine problematic situations or actions to change them for the better [9]. PAR is a collective work; researchers and participants conduct a self-reflective inquiry so that they can understand and improve existing and ongoing practices. The reflective process is directly connected to action, influenced by history, culture, and local context, and is inherent in social relations [10]. This is a tactic to study a social system while trying to provide change at the same time [11]. Kurt Lewin's idea of an iterative (or repeated) cycle of action and reflection in research [12], then continued by the researchers by developing a three-stage cycle of activities: planning, action, 'fact-finding about the result of the action. [13] and [14] used a spiral of self-contained cycles of planning, acting, observing, and reflecting. We began this research by starting from the observing stage.
We delivered an action research plan to 12 Village Forest Management Institutions (Lembaga Pengelola Hutan Desa (LPHD)) in Muara Enim District, South Sumatra, holders of protected forest management licenses in one part of Bukit Barisan Sumatera. Two LPHD, namely LPHD of Tanjung Agung Village, Semende Darat Ulu Sub-district, and LPHD of Muara Danau Village, Semende Darat Laut Village (see Figure 1, research sites) stated that they are willing to share the time and costs of starting the implementation of Social Forestry. In this case, they were making fruit trees to be planted in the working area of the Hutan Desa (HD). Several LPHD managers and farmer groups were appointed as participants in the research conducted for two years, i.e., 2018 and 2019.

The action to undertake in LPHD nurseries and planting groups begins with an evaluation of the performance of 12 LPHDs as part of the observation stage. The results of the evaluation are then reflected to be a lesson in planning what should be done at the village level. Researchers and participants took a joint observation of the Kebun kopi (coffee plantations) in the HD work area, to assess and select the types of planned trees to be propagated and planted. Planning to build nurseries and planting is done through the focus group discussion method. Action, observation, and reflection on the process of building and maintaining nurseries and planting in the field are carried out with the methods of group work and discussion, interviewing, transect walk, and vegetation analysis.

Vayda’s progressive contextualization research approach (see [15]) was used to answer the research questions. All responses, complaints, opinions, rejections, and questions submitted by participants in all processes of evaluation, planning, action on making nurseries and planting, and observing farmers’ Kebun kopi were then recorded. The data were analyzed and explored qualitatively. Data obtained in the observation process then used to carry out participant observation on topics or issues that have just emerged. The discussion with participants about the changes that need to be made in actions towards achieving SF objectives was also undertaken.

Figure 1. Two villages for the case study are located at the ridge of Bukit Barisan. (Insert: Research Location At Highland South Sumatra/Source: Maps.Google.Com)
3. Result and Discussion

3.1. Participation action research as a process and as a goal

A narrative from [16] described the results of the research process for one year use "PAR as a process and as a goal." The research began with observation activities in the area of SF and interviewing LPHD Managers. The visits to 12 LPHDs were carried out to ask questions and discuss what actions they had taken to realize the goals of SF. LPHD managers were visited to ask questions and discuss with villagers who practiced farming in the HD work area, whether their activities are in line with the objectives of SF. The results of this observation are reflective material as a continuation of the action research process, as shown in Table 1.

| Supporters                      | Activities                          | Facts finding of activities                                      |
|---------------------------------|-------------------------------------|------------------------------------------------------------------|
| By Government Institution       | *Hutan Desa* socialization           | Most of the villagers who used the HD area did not know about HD and its objective |
| By NGO Institution             | Facilitating works plan design      | LPHD managers did not understand the contents and benefits of the work plan |
| Self-initiative (LPHD)         | Few LPHD have actively stopped illegal logging activities in remnant forested area | Most of the HD area is in the form of monoculture coffee plantation |

Information about HD only reaches the elite level, specific individuals who interact with forestry officers or NGOs. LPHD is an institution formed as a requirement for villages to be granted SF license, in the HD scheme. LPHD is not a global institution under the village government structure. LPHD and the HD scheme are accepted by the village as an offer from the government so that *Kebun kopi* activities in areas declared as protected forest are not called illegal. Coffee plantation is a private matter that has been carried out as it is and is not regulated by the village government.

For Semende people, clearing forests and then planting them with coffee is a common way to make a living and improve welfare. Coffee plantation is a common activity that has been carried out by parents and their ancestors.

For LPHD managers, HD is a *Kebun kopi* in a state-protected forest area that was once banned and could be subject to legal sanctions but is now permitted, not as private property but may be cultivated. In reality, HD is a *Kebun kopi*, in the worldview of the local community. In Muara Danau Village, the interaction between the community and forestry officers and NGOs was rather intensive, as a result of the conflict in the encroachment of protected forests by the community [17]. The villagers of Muara Danau call *Kebun kopi* in the HD work area as HD gardens. However, other village farmers who do not know the term of HD, think that HD *Kebun kopi* is theirs. The HD Program in Semende has a background of conflict and its potential, as is common in the SF Indonesia program [5,18].

The *Kebun kopi*, which happens to be the working area of the HD has the main goal to improve welfare, from a farmer's perspective. The next challenge is how to create *Kebun kopi* as part of a sustainable forest management system, which forms an ecological balance. Meanwhile, for communities, especially poor farmers, monoculture gardens are more valuable than forests [19]. Efforts to make the state forest area into a sustainable forest have been carried out by the government for a long time, but have not succeeded. Furthermore, currently, it is left to the community to make it happen, but it has not shown any real changes (Figure 2).
The challenge of reforesting *Kebun kopi* was carried out by the government a long time ago. This reflection concluded that a change of approach was needed from planting trees following technical concepts from outside parties, to planting following the local context. Observation and reflection, as part of the research process, concluded that Tanjung Agung villagers would produce seedlings of jackfruit (*Artocarpus heterophyllus*) and avocados (*Persea americana*). LPHD managers of Muara Danau chose *jengkol* (*Archidendron pauciflorum*), *areca nut* (*Areca catechu*), and jackfruit (*Artocarpus heterophyllus*). These species were selected by participatory suitability assessment, in their case of growth and market consideration. The participant excluded *durian* (*Durio zibethinus*) because it was considered to be detrimental to the coffee plant.

In general, the evaluation results in 12 Semendo HD confirmed the results of the study by [6, 7, 20] that there was a wide gap between the implementation of SF and its purposes. However, as a process and a goal, this research gets a new concept to offer to provide a solution to the problem. The solution offered was a community should have a reference, ecologically and institutionally, to solve the puzzle that produces an ideal social forestry outcome. This reference is not only a physical example to be built but also comes with rules that are acceptable to all parties.

**Figure 2.** The chronicle of *Hutan Desa* in Semende, Muara Enim, as part of reflection.
3.2. Ghepang as an emergent concept in participant reflection

The choice of participants for the fruit trees led us to mention this PAR process as the way to develop *Hutan Pangan* (forest for food). Participants from Muara Danau and Tanjung Agung Village, with little support from the researchers’ team, could produce seedlings well. LPHD managers offered seedlings to all *Kebun kopi* farmers in the village. Several farmers intended to plant more than 100 seedlings in their *Kebun kopi*. One of them said that he wanted to have Ghepang, from this planting activity, not a food forest.

| Executors and researchers team | Activities | Facts finding of activities |
|-------------------------------|------------|-----------------------------|
| Selecting species of trees to be reproduced in the nursery | Muara Danau selected betel nut (*Areca catechu*), jackfruit (*Artocarpus heterophyllus*), and jengkol (*Archidendron pauciflorum*) | |
| Participants’ observation and discussion toward ecologically suitable and economically feasible of trees | Tanjung Agung selected jackfruit and avocado (*Persea americana*) | All tree species should have a positive association with coffee |
| Making and maintaining selected species in the nursery | LPHD managers as farmers have their knowledge, skills, and opinion on seedlings production. | |
| Group work and discussion. | Fruit trees have social value and are a bit commercial | |
| Vegetation analysis of selected "*Kebun kopi*" | Fruit and timber trees were planted irregularly and limited in number, not detrimental to coffee production. | |
| On-field discussion about traditional ways on planting trees at "*Kebun kopi*" | Some enthusiastic farmers said that they want to build Ghepang | |
| Seedlings offering and distribution. | There was a case of replacing pole timber trees of last 'government aid' to fruit tree seedlings | |
| Interviewing with enthusiastic farmers | | |
| Monitoring and assisting fruit tree seedlings planting | | |
| Field observation on Ghepang | Most of ghepang are managing to be kebun-ghepang | |

The term "Ghepang" reminds us of *durian* agroforests scattered around settlements in Semende. "Ghepang" is the local term of the Semende community or ethnic ethnicity or Besemah ethnic that referred to the formation of fruit trees dominated forests, especially *durians* (*Durio zibethinus*). Ghepang is generally located in other land use/Area Penggunaan Lain (APL), outside protected forest areas. Ghepang is agroforests planted by their ancestors. Ghepang is the conception of the local community as a form of what John Bennet calls ecological adaptation. Ghepang is, borrowing a term from [21], a domestic forest.

The emergent of ghepang term in this PAR process led us to observe and discuss more ghepang. The villagers always refer to the current economic value of ghepang at Muara Tenang, Perapau, Tanah Abang, Penyandingan, Muara Dua, Babatan, and Muara Danau. Those villages grouped by them as old villages, which have unique culture and tradition. They had their land-use and institution (Table 3). Ghepang is a valuable property.
### Table 3. Factual land-use applied in the Semende community.

| Land-use                          | Land cover                                      | Common Land tenure |
|-----------------------------------|-------------------------------------------------|--------------------|
| Houses and settlement (new)       | -                                               | Private            |
| Houses and settlement (old)       | -                                               | Extended family    |
| Sawah/Paddy field                 | Water-paddy by season                           | Extended family    |
| **Kebun kopi/coffee plantation**  | Monoculture coffee with scattered trees          | Private            |
| Ghepang/climax agroforests        | Forest                                          | Extended family    |
| Ghimbe ulu ayek/traditionally     | Forest                                          | Communal           |
| protected forests                 |                                                 |                    |

_Ghepang_ is managed for tens or even hundreds of years. Institution of _ghepang_ is stable, like a rice field that produces food [22]. This is different from the situation of the HD work area as a coffee plantation. _Ghepang_ is not referred to as forest by the community but in the form of a forest (Figure 3). The working area of so-called the _Hutan Desa_, especially by policy paper and forester, but it is still in the form of a _kebun kopi_ (Figure 4). This finding is a reflection that requires more in-depth observation to understand. How to make a _kebun kopi_ at _Hutan Desa_ to be shaped like _ghepang_?

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**Figure 3.** One of the _ghepang_ performance at Muara Danau village.
3.3. Kebun-ghepang: Past reflection, future reference

Ghepang is a legacy of the past. Some fruit-producing tree species, such as durian (Durio zibethinus), cempedak (Artocarpus integer), duku/langsat (Lansium domesticum), rambai (Baccaurea motleyana), Pangium edule and some timber trees such as rimau (Toona sinensis) are the top strata of ghepang. We found unproductive kopi liberika (Coffea liberica, local name as kawe padang) at understorey of fruit trees. It shows that ghepang used to be a coffee plantation, although it could have started with annual crops for food. Ghepang is a climax of abandoned coffee plantation. It is also found some farmers who opened part of their ghepang area, planted it with new coffee. Even though it was planted with coffee on some of the lands, they still mentioned it as Ghepang. One of them explained that he needed land to be cultivated as coffee plantation, without eliminating precious durian trees. So, we call it Ghepang-kebun (Figure 5).

Participant at Tanjung Agung Village invited us to observe their coffee plantation in the form of ghepang, but they still call it a garden. We told them that the garden could be called as kebun-ghepang (Figure 5). There are few kebun-ghepang at the Tanjung Agung SF work area.

Figure 4. Working area of Hutan Desa at Muara Danau village.
Figure 5. The form of (a) Kebun-Ghepang at Tanjung Agung village and (b) Kebun-Ghepang at Muara Danau village.

This field discussion gave an understanding that the process of evolution of kebun into ghepang has changed or at least shows a new stage, transition. Ghepang refers to the past, while kebun is the hope of the future, especially if connected with the stability of the livelihood of each individual farmer. The stability of livelihood affects the choice of farmers to form kebun, ghepang, kebun-ghepang, or ghepang-kebun (Figure 6). The kebun-ghepang is the stage of the transition to the stability of the coffee farmers' livelihood, as the longest stage. It means that farmers' livelihoods, both on-farm and off-farm, play an essential role in realizing the kebun-ghepang and its sustainability.

Figure 6. Past evolution of Kebun Kopi to be Ghepang and its contemporary changes that influenced by the stage of livelihood stability.
The stages of evolution of kebun kopi, kebun-ghepang, towards ghepang create land use categories for highland perennial crops dryland farming (Table 4). Kebun kopi is intended to produce cash income for farmers’ households. The dependence of farmers on on-farm businesses will encourage high agricultural intensity of land. Based on the experience of one of the farmers who cultivated the kebun-ghepang, the intensity of agriculture decreased without reducing total income. Off-farm work and business encourage farmers to turn monoculture kebun kopi into kebun-ghepang. Current trends, young farmers prefer the diversity of livelihoods, especially those from non-agricultural activities. The conversion from crops to trees occurs when the land is presented to the hands of a younger generation that does not prefer to farm intensively [23]. Planting trees on the farm allow households to reallocate labor to off-farm works [24]. A lesson from Southern China’s case, higher income from forest product sales boost participation in forest management [25]. Commercial fruit trees products will induce off-farm labor and income. Rural development and urban lifestyle intrusions provide these new jobs. Kebun-ghepang is the future of kebun kopi.

Table 4. Main characteristics of agricultural land-use in Semende.

| Main characteristics | Kebun | Kebun-Ghepang | Ghepang |
|----------------------|-------|---------------|---------|
| Farming intensity    | High  | Medium        | Low     |
| Purpose of management| Commercial (cash income production) | Commercial + Saving | Saving (annual income), subsistence |
| Social value         | Improving welfare | Improving welfare + Sharing | Welfare sign and sharing |
| Driving force        | Market | Market and Off-farm works | Communal/Extended family |
| Vegetation type      | Coffea sp plantation | Agroforest | Forest |
| Species composition  | Coffea spp | Coffea spp + commercial fruit trees | Commercial and subsistence fruit trees + timber trees |

Several participants’ desires so that the direction of rehabilitation of HD land into kebun-ghepang actually confirms the general characteristics of community forestry mentioned by [21], at the local level, forests are genuinely integrated with agricultural activities. According to [21], agroforests are no different from natural forests, in terms of the composition and structure of vegetation, so they are only distinguished from their use, not from their nature. That is, the kebun-ghepang is a concrete manifestation of the purpose of the SF program.

3.4. Next works for further action

These activities started with an observation and ended with observation. It is necessary to continue further observation with different community contexts and different agroecology, then take action to accelerate the change from kebun kopi to kebun-ghepang to get a more complete understanding of Ghepang and the Kebun-Ghepang.

The Village Forest is a new bureaucratic institution introduced to the community to institutionalize it into collective action, following the suggestion from [26], need to incorporate concepts and activities into socially inherent institutions, such as kebun-ghepang in this case. This effort requires a variety of interventions based on an in-depth understanding of the content, fundamental principles, and social influences of the institution.

More clarity about the power relations on the site is needed. Power relations that have been formed between farmers and their own culture, farmers and village government, farmers and market, farmers and Forest Management Unit/Kesatuan Pengelolaan Hutan (KPH). This could be the basis for the preparation of the HD zoning, taking into account the aspects of clarity of property rights: private,
extended family, and village communal. *Kebun-ghepang* managed by the village government can be differentiated based on the objectives of their management, for village cash income, and the common benefit of all villagers and descendants. CBNRM business power institutions must be related horizontally and vertically so that they can be implemented [26, 27].

Another critical intervention to be understood before action is related to off-farm business that can encourage accelerated changes in *kebun kopi* into *kebun-ghepang*. This includes but is not limited to fruits and processing products, product processing networks and marketing, and the role of the government. The formation of the *kebun-ghepang* can be accelerated by the provision of quality and commercial seedlings, and positively associated with coffee plants.

The SF Program is indeed designed top-down, especially in the aspects of policy and its legal framework. This also happened in many countries, as exemplified by [29]. In order to overcome gaps in attention to the authenticity of capacity and local demand in SF programs, it is necessary to adapt local practices and institutions such as *kebun-ghepang* into the Business Work Plan of the SF groups.

Empowering people through SF is about believing their concept and acts then supporting all outside resources to strengthen it. [6] recommends using the core of policy objectives to evaluate community forestry effectively and efficiently. Our action research suggests using traditional community practices, such as *kebun-ghepang*, as an ecological and institutional reference in planning and implementing social forestry.

### 4. Conclusion and Recommendation

This action research process has changed the approach to planting trees, namely from planting trees according to technical concepts from outside (especially from the government) to planting contextual trees and then plant trees according to local concepts with outside technical support. *Kebun-ghepang* is the concept of farmers when asked to realize the objectives of Social Forestry (SF) programs. It is a real manifestation of the purpose of SF programs, and also is an imagined forest by both the local community and foresters. The next challenge is to accelerate the transformation of *kebun kopi* into *kebun-ghepang* as a modern agroforestry model, within the framework of SF programs.

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