The potential, wetlands utilization through the social forestry program in Kayan Sembakung Delta, North Kalimantan, Indonesia

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Abstract. Indonesia has approximately 39.6 million hectares of wetlands and almost 894,106 hectares in the Kayan Sembakung Delta, North Kalimantan Province. Despite in illegal status, the wetlands in the Kayan Sembakung Delta for decades have become a location where local people depend for their lives. Therefore, as part of resolving land conflicts, the implementation of Social Forestry (SF) can be offered to the community in the area. This study aims to identify problems in SF implementation in the Kayan Sembakung Delta and efforts to solve them. Data collection was obtained by interviewing the key informants, FGDs, and field observations together with the community member of 5 villages in North Kalimantan namely Liagu Village in Sekatak District - Bulungan Regency, Salimbatu Village in Tanjung Palas Tengah District - Bulungan Regency, Sengkong Village in Sesayap Hilir District - Tana Tidung Regency, Atap Village in Sembakung District - Nunukan Regency and Tepian Village in Sembakung District - Nunukan Regency. The study showed that the implementation of SF in the Kayan Sembakung Delta just in the early phase and facing numerous technical problems such as institutional, facilitating, management plan, funding, human resources, the potential for natural resource development, groups of social forestry business, and support from other parties. This study found that the main problem in implementing SF in the Kayan Sembakung Delta is the weak capacity of the human resources of SF management institution. This condition caused that the implementation of SF programs in this area must receive support from parties, especially in policy support and improving human resources.

Keywords: Kayan Sembakung Delta, local community, management, social forestry, wetlands.

1. Introduction
Indonesia has 39.6 million hectares of wetlands [1] and approximately 894,106 hectares in the Kayan Sembakung Delta, North Kalimantan Province [2]. The wide area of the Sembakung Kayan Delta covers 3 regencies and 1 city, namely Bulungan Regency, Nunukan Regency, Tana Tidung Regency and Tarakan City [3]. In general, tidal peat swamps dominate the Kayan Sembakung Delta with an area of 581,529.14 hectares. The dominant vegetation that can be found in the Sembakung Kayan Delta includes Rhizophora apiculata, Osbornia octodonta, Lumnitzera littorea, Avicennia spp., Rhizophora spp., Sonneratia spp. [4]. Meanwhile, the mangrove vegetation in Salimbatu Village and Liagu Village,
Bulungan Regency, was dominated by *Avicennia officinalis*, *Bruguiera parviflora*, *Bruguiera gymnorhiza*, *Rhizophora mucronata*, *Rhizophora apiculata*, *Ceriops spp.*, *Ceriops decandra*, and *Nypa fruticans* [5].

As is the case elsewhere in Indonesia, wetlands are attractive to people who can cultivate aquaculture to build ponds. Abandoned land or not managed by anyone, either by the government or the private sector, opens up opportunities for migrants to take advantage of it. This condition occurred in the Mahakam Delta where was initially only a political escape for the Bajau and Bugis people from Sulawesi Island in the second half of the 19th century, but then turned into a shrimp pond area in the 1980s [6]. Problems then arose after the government designated the land as state forest area so that the government forbade any activities without a permit in the area.

SF is one of the programs provided by the Ministry of Environment and Forestry of Indonesia (MoEF-Indonesia) to provide opportunities for local communities to participate in forest management to improve their welfare while maintaining a balance between environmental and socio-cultural dynamics. The SF program provides communities with options for managing forests, namely Village Forests, Community Forests, Community Plantation Forests, Customary Forests, and Partnership Forests. It is mentioned in MoEF-Indonesia Regulation Number P.83/MenLHK/Setjen/Kum.1/10/2016 that replaced by MoEF-Indonesia Regulation Number 9 of 2021 concerning Social Forestry Management. The development of SF in Indonesia has been started since 2014 with a target of 12.7 million hectares [7]. In 2018 the MoEF-Indonesia then revised this target to 4.38 million hectares and reported that until 2019 the implementation of SF in Indonesia had only reached 31.88% of the initial target with 6,403 determination permits and 818,457 business permits [8].

Due to the uniqueness of the wetland area, the Government of Indonesia applies special rules in the implementation of SF in the Peat Ecosystem Area. Under MoEF-Indonesia Regulation No. P.37/MenLHK/Setjen/Kum.1/7/2019 concerning Social Forestry in Peat Ecosystems, the government only allows the use of areas, environmental services, live plants for food needs utility, and the collection of Non-Timber Forest Products/NTFPs. This restriction can hinder the implementation of SF in Kayan Sembakung Delta because not all-natural resource utilization activities can be carried out freely, including land clearing for new ponds. In addition, they also have to deal with conflicts that occur related to the illegal status of their activities carried out in state forest areas.

The challenges of implementing SF is more complicated than the process in obtaining the SF permit. There are numbers of aspect interfere this situation and mostly related to the local condition. This study aims to identify the problems faced in SF implementation in Kayan Sembakung Delta and the suggested solutions to overcome these problems.

2. Study Site and Methods
   2.1. Research Site
   This research was conducted from October – December 2019 in Liagu Village in Sekatak District - Bulungan Regency; Salimbatu Village in Tanjung Palas Tengah District - Bulungan Regency, Sengkong Village in Sesayap Hilir District - Tana Tidung Regency, Atap Village in Sembakung District - Nunukan Regency and Tepian Village in Sembakung District - Nunukan Regency, which are located in North Kalimantan Province, Indonesia, as shown in Figure 1.
2.2. Data Collection
Data collection in this study was carried out through meetings in the form of Focus Group Discussions (FGDs), in-depth interviews, field observations, and secondary data search (reports, publications, and others). FGDs were carried out in each village by collecting 15-20 people representing groupings related to social forestry in 5 villages to find out the development of SF activities, problems that occur in the field and the involvement of other parties in the implementation of SF in Kayan Sembakung Delta. In-depth interviews were conducted with several key informants e.g. Forestry Service of North Kalimantan Province, Regional Development Planning, Research and Development Agency of North Kalimantan Province, Forest Management Unit (FMU) of 5 SF in Kayan Sembakung Delta, Working Group for the Acceleration of Social Forestry in North Kalimantan (Pokja PPS Kalimantan Utara), management institution of 5 SF in Kayan Sembakung Delta, Aquaculture Pond Farmer Organizations in North Kalimantan (Himpunan Kerukunan Tani Tambak Kalimantan Utara), NGOs, head leader of 5 village (Salimbatu, Liagu, Sengkong, Atap dan Tepian) and Social Forestry Business Group in 5 SF permit. In-depth interviews were conducted to find out the role and support of each institution for the implementation of social forestry in Kayan Sembakung Delta.

2.3. Data Analysis
The data and information obtained were analyzed descriptively, stakeholder analysis and Strengths, Weakness, Opportunities, dan Threats (SWOT) analysis. Descriptive analysis was chosen because it is considered to be able to describe systematically and accurately, facts and characteristics of a particular population or field [9]. Stakeholder analysis is a very important instrument for understanding the social and institutional context of a program activity [10]. Meanwhile, SWOT analysis is a method of systematically identifying various factors to formulate strategies to be achieved from an activity [11].

Figure 1. Map of study location in Mahakam Ulu District, East Kalimantan Province, Indonesia.
3. Results

3.1. History and existence of aquaculture ponds in the Sembakung Kayan Delta

For more than 5th decades, hundreds of thousands of local people have depended on the business and results of fisheries in the Kayan Sembakung Delta. The opening of an aquaculture pond in the Kayan Sembakung Delta was first carried out around 1974 on the coast of Tarakan Island by cultivating milkfish. After that, from 1985 to 1990, the cultivation of milkfish and shrimp was also carried out by local people in Tanah Kuning, Bulungan Regency. Since 1990 the opening of ponds has spread to almost the entire Sembakung Kayan Delta region with a mechanical system.

By categorizing less than 50% land cover as non-active ponds, out of 149,958 hectares of ponds in the Kayan Sembakung Delta, only around 85,748.42 hectares of ponds are active [3]. Of the total area of the existing ponds, almost 50% or 40,280.47 hectares are in the production forest areas status, and 162.43 hectares are in the convertible production forest areas status (see Table 1).

Table 1. Fishery cultivation area of Kayan Sembakung Delta based on forest area status.

| Fishery Cultivation Area | Forest Area Status (hectare) | Total (hectare) |
|--------------------------|-----------------------------|-----------------|
|                          | Other Land Uses (APL) | Production Forest (HP) | Convertible Production Forest (HPK) | Water Body |                      |
| Active pond              | 44,827.90                | 40,280.47          | 162.43                 | 323.85     | 85,594.66           |
| Non-active pond          | 34,193.92                | 30,363.77          | 21.82                  | 241.65     | 64,821.16           |
| Total                    | 79,021.83                | 70,644.24          | 184.26                 | 565.50     | 150,415.82          |

![Figure 2. Map of Delta Kayan Sembakung, North Kalimantan Province based on forest area status.](image-url)
3.2. Implementation Social Forestry in the Kayan Sembakung Delta

The implementation of SF in North Kalimantan Province has entered its 3rd year since it started in 2016. Until 2019 in North Kalimantan Province, MoEF-Indonesia has issued 29 PS permits consisting of 18 Village Forest permits, 7 Community Forest permits, 2 Community Plantation Forest permits, and 2 Forestry Partnership permits with a total permit area of 42,273 hectares [12].

Of the 29 existing permits, 5 SF permits in the Kayan Sembakung Delta were selected to represent this research. The five SF permits include Village Forest in Liagu Village, Village Forest in Salimbatu Village, and Village Forest in Tepian Village, as well as Community Forest for Sengkong Village and Atap Village. Of the 5 SF permits, 4 were supported by local NGOs namely Pioneer Bulungan and Perkumpulan Lintas Hijau Nunukan while 1 permit was facilitated by FMU Tana Tidung (see Table 2).

**Table 2. Schematic, location, history, and establishment of social forestry programs in the Kayan Sembakung Delta.**

| Characteristics of SF | Liagu Village Forest | Salimbatu Village Forest | Sengkong Village Forest | Atap Village Forest | Tepian Village Forest |
|-----------------------|----------------------|--------------------------|-------------------------|---------------------|----------------------|
| Schematic             | village forest       | village forest           | community forest         | community forest    | village forest        |
| Location              | Kayan watershed      | Kayan watershed          | Sesayap watershed       | Sembakung watershed| Sembakung watershed  |
| Management area       | FMU of Taranan       | FMU of Taranan           | FMU of Tana Tidung      | FMU of Nunukan      | FMU of Nunukan       |
| Management history    | facilitated by an NGO called Pionir Bulungan in 2018 | facilitated by an NGO called Pionir Bulungan in 2018 | facilitated by FMU of Tana Tidung in 2018 | facilitated by an NGO called Perkumpulan Lintas Hijau (PLH) Nunukan in 2017 | facilitated by an NGO called Perkumpulan Lintas Hijau (PLH) Nunukan in 2017 |
| Permit from MoEF-Indonesia | SK.6513/MenLhk-PSKL/PKPS/PSL.0/10/2018 | SK.6564/MenLhk-PSKL/PKPS/PSL.0/10/2018 | SK.7824/MenLhk-PSKL/PKPS/PSL.0/10/2018 | SK.5030/MenLhk-PSKL/PKPS/PSL.0/9/2017 | SK.6683/MenLhk-PSKL/PKPS/PSL.0/12/2017 |
| Name of social forestry permit | village forest of Liagu | village forest of Salimbatu | community forest of Pemuda Tani Forest Farmer Group | community forest of Seribu Temunung Forest Farmer Group | village forest of Tepian |

In general, the site conditions of the 5 SF permits granted by the MoEF-Indonesia in the Kayan Sembakung Delta are a mixture of muddy soil, peat swamp, and mangrove. The SF areas can be accessed by water transportation except for Community Forestry in Atap Village. The natural resource potential of the Liagu Village Forest, Salimbatu Village Forest, Community Forest in Sengkong Village, and Tepian Village Forest are almost similar, but the Community Forest in Atap Village is slightly different. This potential difference causes the Social Forestry Business Group in the Atap Village to have a plan to develop natural honey, while the other 4 SF permits plan to do silvofishery (see Table 3).
Table 3. Characteristics of social forestry area in the Kayan Sembakung Delta.

| Characteristic of area | Liagu | Salimbatu | Sengkong | Atap | Tepian |
|------------------------|-------|-----------|----------|------|--------|
| Large Access           | ±5.502 hectare | ±4.710 hectare | ±772 hectare | ±145 hectare | ±100 hectare |
|                        | waterway     | waterway   | waterway and road | waterway | waterway |
| Site condition         | muddy soil, peat swamps and mangroves | muddy soil and mangroves | muddy soil, peat swamps and mangroves | muddy soil and peat swamps | muddy soil and peat swamps |
| Flora                  | • *Rhizophora* spp. | • *Rhizophora* spp. | • *Rhizophora* spp. | • *Shorea balangeran* | • *Shorea balangeran* |
|                        | • *Avicenia alba* | • *Avicenia* spp. | • *Avicenia alba* | • *Anisoptera manginata* | • *Nipa fruticans* |
|                        | • *Sonneratia caseolaris* | • *Sonneratia caseolaris* | • *Sonneratia caseolaris* | • *Camphosperma spp* | • *Calophyllum inophyllum* |
|                        | • *Sonneratia alba* | • *Sonneratia alba* | • *Sonneratia alba* | • *Shorea balangeran* | • *Oncosperma tigillariun* |
|                        | • *Xylocarpus granatum* | • *Nypa fruticans* | • *Nypa fruticans* | • *Nypa fruticans* | • *Nypa fruticans* |
| Fauna                  | • *Nasalis larvatus* | • *Nasalis larvatus* | • *Enhydra spp.* | • *Cervus unicolor* | • *Cervus unicolor* |
|                        | • *Varanus salvator* | • *Cervus unicolor* | • *Varanus salvator* | • *Neofelis nebulosa* | • *Crocodylus porosus* |
|                        | • *Sus barbatus* | • *Mycterista leucocephala* | • *Sus barbatus* | • *Sus barbatus* | • *Manis javanica* |
|                        | • *Nasalis larvatus* | • *Nasalis larvatus* | • *Nasalis larvatus* | • *Sus barbatus* | • *Sus barbatus* |
|                        | • *Varanus salvator* | • *Cervus unicolor* | • *Cervus unicolor* | • *Crocodylus porosus* | • *Crocodylus porosus* |
|                        | • *Sus barbatus* | • *Mycterista leucocephala* | • *Sus barbatus* | • *Manis javanica* | • *Manis javanica* |
| Business potential     | • silvoforestry | • Environmental services | • agroforestry | • natural honey cultivation | • silvoforestry |
|                        | • NTFP | • Silvofishery | • honey cultivation | • cultivation | • silvoforestry |
|                        |      | • NTFP | • sustainable production forest management |      |      |

3.3. Problems in implementing Social Forestry in the Kayan Sembakung Delta

In general, the problems faced by the 5 SF permits in Kayan Sembakung Delta are almost the same, such as institutional, facilitating, management plan, funding, human resources, the potential for natural resource development, groups of social forestry business, and support from other parties. The most dominating problem is the lack capacity of human resources in the 5 SF management institutions in Delta Kayan Sembakung. Therefore, the SF management boards are unable to prepare Memorandum of Association/Articles of Association (AD/ART), General Work Plans, Annual Work Plans, and Business Plans (see Table 4).
Table 4. Problems in implementing Social Forestry in the Kayan Sebakung Delta.

| Aspect                          | Common Problems Found in the Research Site                                                                                                                                                                                                 |
|--------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Institutional                  | • no Memorandum of Association/ Articles of Association yet  
• no secretariat yet  
• institutional structure is only built on rules not on needs  
• institutional personnel are only filled by people who do not have the capacity of human resources  |
| Forestry assistants/forestry extension | • each social forestry institution only has 1 forestry assistants/ forestry extension  
• forestry assistants/forestry extension are not permanent and have limited time (unscheduled) due to lack of funds  
• there is no coordination between forestry assistants and forestry extension causing different perceptions, |
| Work plan                      | • the General Work Plans and Annual Work Plans cannot be understood because only prepared by certain people and are not based on natural resource potential  
• the first year’s General Work Plans and Annual Work Plan was not implemented due to limited human resources and funds |
| Finansial                       | • because at the beginning of the year the activities of the Social Forestry Business Group had not yet started, the social forestry institution did not have funding  
• support from MoEF-Indonesia is only provided in the form of noncash  
• very minimal information on financial assistance from the Public Service Institution |
| Human resources                | • in social forestry institutions only involve old people  
• weak in leadership skills, archiving, preparation of work plans etc. |
| Natural resources              | • the potential of natural resources in the social forestry location has not been maximally utilized  
• no synchronization of business plans and natural resources potential  
• ownership of active and inactive aquaculture ponds has not been identified,  
• the location of social forestry is not in one stretch so that it requires large monitoring and management costs |
| Social forestry business group | • no business plan available and no business icon  
• so far still using traditional technology in the development of natural resources business |
| Involvement of other parties   | • the involvement of parties outside the village (provincial/district/city governments, companies, NGOS) is still limited  
• there is no synchronization of social forestry activities with village activities |

3.4. Efforts to support Social Forestry in the Kayan Sembakung Delta
To overcome the main problem in the SF implementation strengthening the capacity of human resources is crucial. This can be done by providing assistance in various aspects such as institutional improvement, re-arrangement of work plans, search for financing sources, and network enhancement.
Table 5. Efforts to support Social Forestry in the Kayan Sembakung Delta

| Aspect                              | Efforts that can be made                                                                                                                                 |
|-------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------|
| **Institutional**                   | • drafting Memorandum of Association/ Articles of Association with the help of forestry assistants or forestry extension                                 |
|                                     | • building a secretariat and its accessories with the help of village governance                                                                         |
|                                     | • rebuilding the institutional structure based on the needs and potential of human resources                                                               |
|                                     | • fill institutional personnel in accordance with their human resource capacity                                                                            |
| **Forestry assistants/forestry**    | • the mentoring process also can be assisted by NGOs                                                                                                       |
| extension                           | • limited funds for forestry assistants/forestry extension can be support from village fund allocations or external parties,                                |
|                                     | • the Working Group for the Acceleration of Social Forestry in North Kalimantan Province can support forestry assistants and forestry extension to coordinate and complement each other |
|                                     | • recompile the General Work Plan and Annual Work Plan based on the potential of natural resources by involving all institutional personnel                  |
|                                     | • the implementation of Social Forestry is carried out according to the revised of General Work Plan and Annual Work Plan                                    |
| **Work plan**                       | • conduct a review related to the General Work Plan and Annual Work Plan that have been prepared                                                          |
|                                     | • carry out the revised General Work Plan and Annual Work Plan with the support of many parties                                                           |
| **Financial**                       | • because at the beginning of the year the activities of the Social Forestry Business Group had not yet started, the social forestry institution did not have funding |
|                                     | • apply for support from MoEF-Indonesia only for the most important goods needs bantuan dari pihak luar                                                  |
|                                     | • forestry assistant and forestry extension should help provide information on financial support from the Public Service Institution for social forestry managers |
| **Human resources**                 | • involving the younger generation in the implementation of social forestry                                                                           |
|                                     | • it is necessary to increase institutional and personnel capacity in the form of training of leadership, archives, preparation of work plans, finance and others |
| **Natural resources**               | • explore the potential of natural resources in social forestry sites and discuss their development with the help of other parties                          |
|                                     | • develop a business plan based on the potential of natural resources                                                                                   |
|                                     | • compiling a list of potential natural resources at the site                                                                                            |
|                                     | • identifying ownership and presence of active and inactive aquaculture pond as the basis for the social forestry implementation                          |
|                                     | • reviewing the existence of aquaculture ponds in accordance with applicable regulations and collaborating with many parties in the activities of protecting and securing social forestry sites |
| **Social forestry**                 | • develop a business plan based on the potential of natural resources and sustainable natural resource management practices                              |
| business group                      | • develop appropriate technology for the utilization of natural resources                                                                               |
| **Involvement of**                  | • involving parties outside the village (provincial/district/city governments, companies, NGOs) with an interest in social forestry activities             |
| other parties                       | • with the help of forestry assistants and forestry extension to synchronize social forestry activities with village activities                           |
4. Discussion

To address poverty, the Government of Indonesia has targeted some provinces with the highest percentage of poor people as priority provinces for SF implementation. These provinces include Papua, West Papua, East Nusa Tenggara, Maluku, Gorontalo, Aceh, Bengkulu, West Nusa Tenggara, Central Sulawesi [8]. During 2014 – 2019 the implementation of SF in Indonesia experienced a significant increase from 449,104 hectares to 642,554 hectares but facing many problems in some places. The implementation of SF in South Sulawesi has many problems such as historical problems, political-economic influence in the land administration process, and lack of involvement of institutions outside the licensing process [13]. The realization of SF is not happening as quickly as expected due to various challenges such as community understanding that needs to be improved, the readiness of group forest farmers in land use planning, and the difficulty of licensing process. Therefore, the implementation of SF requires simplification of procedures and permits, strengthening of institutions and partnerships, regional assistance, and development of monitoring and evaluation systems. In addition, the government needs to verify the location and recipients of permits and limit the number of members who receive SF permits to ensure that the people who receive SF permits are those who need them [8].

SF of 5 villages in Kayan Sembakung Delta already implemented and obtained SF permits from MoEF-Indonesia since 2017/2018. However, until 2019 the SF implementation in Kayan Sembakung Delta did not show good performance. The SF implementation in those locations faces many problems such as institutional, facilitating, management plan, funding, human resources, the potential for natural resource development, groups of social forestry business, and support from other parties. These conditions indicate that the SF implementation in Kayan Sembakung Delta can be stated still at an early stage because it has just had a business permit called Social Forestry Business Group (KUPS) and has identified business potential [14]. It is still far from the government's final expectations in implementing the SF, namely poverty alleviation, community empowerment, and improvement of forest conditions [15].

Lack of human resource capacity in SF management institution in Kayan Sembakung Delta shows the importance of assistance in the SF implementation. Moreover, in the SF implementation rules, the SF management institution has the same responsibilities as other permit holders such as the timber corporation in preparing the General Working Plan (RKU) and Annual Working Plan (RKT). Related to that, MoEF-Indonesia relies on FMUs in assisting the SF implementation at the site level [16]. FMUs usually assign the task of assisting the implementation of SF to forestry extension who working in their area. Weak institutional capacity of FMUs at the site level and high costs of forest enforcement are problematic situations encountered in carrying out their duties [17].

The role of forestry assistants is an absolute requirement for the successful implementation of SF. For this reason, mapping the number of facilitators, funding, and capacity building of human resources need to be prioritized [8]. The limited number of forestry extension causes MoEF-Indonesia to allocate special funds for SF assistance activities. This financing is not only given to forestry extension with the status of government officials but also forestry extension who are non-government officers. In accordance Decree of the Head of the Center for Social Forestry and Environmental Partnerships of the Kalimantan Region Number: SK.43/X-3/BPSKL-4/PSL.3/03/2019, the 4 SF permits in the Kayan Sembakung Delta assistance by a forestry extension with the status of a government officer except for SF permit in Sengkong Village assistance by non-forestry extension but government officer The task of FMUs to SF assistance in North Kalimantan Province more clearly through Governor Regulation of North Kalimantan Number 66 of 2018 concerning the Organization and Work Procedure of Regional Technical Implementation Units at the North Kalimantan Provincial Forestry Service and Governor Regulation of North Kalimantan Number 46 of 2018 concerning the Implementation of Social Forestry in North Kalimantan Province.

To accelerate the implementation of SF in North Kalimantan, the Provincial Government of North Kalimantan has issued a Governor Decree of North Kalimantan Number 188.44/K.333/2017 concerning the Working Group for the Acceleration of Social Forestry in North Kalimantan (Pokja PPS Kalimantan Utara) in 2016 – 2021. If Pokja PPS Kalimantan Utara works with neither SF's mentoring activities will
have technical assistance or financing problems. Pokja PPS Kalimantan Utara was chaired by the Governor of North Kalimantan. This institution consists of many institutions, including government, traditional institutions, community leaders, NGOs, and others. The Pokja PPS can help expedite the issuance of SF permits by verifying the proposer and the proposed location [8].

The implementation of SF in the Kayan Sembakung Delta requires the support of many parties, especially from the local government, including the village government. For funding support for the implementation of SF, the SF management institution in Delta Kayan Sembakung can get from the village by including it in the Village Revenue and Expenditure Budget (APBDes). To financing by APBDes, SF activities must include in the Village Medium-Term Development Plan (RPJMDes) and the Village Development Work Plan (RKPDes). For this reason, the forestry assistants/forestry extension can assist the SF management institution in the Village Development Plan Deliberations (Musrenbang Desa) during the preparation of the RPJMDesa and RKPDes. Local government support is very crucial in the SF implementation. District governments have a higher level of interest than companies or NGOs because they can play a role in implementing several development strategies, such as business development, stakeholder involvement, and area management [18]. Moreover, the existence of business and agricultural development is most frequently reported as a driver of change in SF in the literature relative to socio-cultural and demographic factors [19].

The implementation of PS is not the only way of effort legalization of aquaculture ponds in the Kayan Delta Sembakung. Not all pond owners in Kayan Sembakung Delta are willing to join the SF program. They even asked for recognition of ownership from the government through the Land Objects for Agrarian Reform (TORA) program. TORA is an Indonesian government program that certifies land controlled by the state and or community-owned land as long as it meets the requirements to obtain TORA. After knowing that the community's fishpond area was in a state forest area, the local government later revoked letters. These letters include cultivation permits, Land Tenure Statements (SPPT), Transfer of Rights (SPH), fishpond land use permits, and fishery business permits [20]. However, until today, the best option given by MoEF-Indonesia to legalize aquaculture ponds in Kayan Sembakung Delta is through the SF program.

5. Conclusion
The SF program is one way to promote the sylvosfishery in the Kayan Sembakung Delta. In general, the problem faced in the implementation of SF in the Kayan Sembakung Delta is the weak capacity of human resources in the SF management institution. The support of other parties is needed not only in helping to obtain a SF permit from MoEF-Indonesia, but also in optimizing the potential of existing natural resources while maintaining the balance of the wetland ecosystem in the Kayan Sembakung Delta.

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