XV WORLD FORESTRY CONGRESS
Building a Green, Healthy and Resilient Future with Forests
2–6 May 2022 | Coex, Seoul, Republic of Korea

Impact of capacity building in leveraging community skill and livehood: lesson learn from Social Forestry in Indonesia

Dona Octavia[1], Gerson N. Njurumana[2], Irma Yeny[1], Yelin Adalina[1] and Sri Suharti[1]

[1]Forest Research and Development Center, Jl. Gunung Batu No. 5, Bogor 16118, West Java, Indonesia, donasyifa@gmail.com
[2]Environment & Forestry Research and Development Institute of Kupang, East Nusa Tenggara, Indonesia

Abstract

Indonesia encounters several challenges in forest management due to the high communities' demand for forest resources, including the need for agricultural land within state-owned forest areas. Community Based Forest Management (CBFM) is a strategy that emphasizes on the importance of community's involvement in forest conservation. CBFM planning has an important role in the implementation of effective and sustainable forest management through a participatory approach involving all parties in Planning, Organizing, Actuating, and Controlling. This paper aims to provide information on impact of capacity building in leveraging community skill and livehood in three schemes of Social Forestry (SF) in Indonesia, namely Paru Village Forest (VF)–West Sumatra, Cempaka Forestry Partnership (FP)–Lampung, and Tuar Tana Community Forestry (CF)–East Nusa Tenggara, in collaboration between Forestry and Environment Research, Development and Innovation Agency with the Asian Forest Cooperation Organization (AFoCO). The research was conducted through structured interviews, FGDs and field observations by an analysis unit while the informations obtained were analyzed through descriptively qualitative and quantitative methods. The results showed that the provided assistances and capacity building in three SF schemes have increased the active participation of group members in the preparation of technical plans and implementation of economic value species planting and processing of non-timber forest products (NTFPs). Other benefits are the reduced land boundary conflicts, an increase in the frequency of routine group meetings, an increase in the number of members who are able to process NTFPs into semi-finished or finished goods. This condition shows that the provided assistance is able to increase the capacity of farmers so as to change the perceptions and attitudes of group members and encourage them to actively participate in forest management in three SF area.

Keywords: Participatory planning, Capacity building, Community Forestry, Village Forest, Forestry Partnership

Introduction, scope and main objectives

Indonesia's tropical forest management is faced with challenges, due to the high communities' demand for forest resources, including the need for land in state-owned forest areas. Proper management in optimizing the use of forest resources with limited land availability is necessary to meet the increasing needs of society and the state for forests along with the increase in population. Along with policy changes in forest management, the rate of deforestation continues to decline up to 0.49 million hectares in 2017-2018 (KLHK 2019a; KLHK 2019b), as forest management policies are increasingly promoted in the Social Forestry scheme.

Social Forestry as a community-based sustainable forest management system is regulated in the Minister of Environment and Forestry Regulation No. 83 year 2016, No. 39 year 2017 and No. 9 year 2021. There are 5 social

forestry schemes, namely Community Forestry (CF), Village Forest VF), Community Forest Plantation (CFP), Forestry Partnership (FP), and Customary Forest. At the implementation level, it requires good planning to support the implementation of sustainable community-based forest management (CBFM). Planning and evaluation procedures have an important role in forest management because they will be the important instruments in carrying out forest management. Therefore, the forest management program in Social Forestry scheme areas should refer to the 10-year Business plan and the Annual Work Plan which have Forest Utilization Permit that have been prepared first well, and ratified in accordance with the guidelines of the regulation of Directorate General No. 16 year 2016. CBFM planning has an important role in the implementation of effective and sustainable forest management through a participatory approach involving all parties in Planning, Organizing, Actuating, and Controlling.

The Indonesian government gave new opportunities for social forestry areas to become food estate development areas based on the Minister of Environment and Forestry Regulation No. 24 of 2020. The regulation is in synergy with regulation of Minister of Environment and Forestry No. 8 year 2021 concerning forest management and preparation of forest management plans, as well as forest utilization in protection forests and production forests, which encourage increased productivity of forest land through the implementation of agroforestry practices and Forestry Multi-business. The realization of the achievement of the Social Forestry program until August 2021 is around 4.7 million hectares from the target of 12.7 million hectares up to 2024 (Supriyanto 2021).

To overcome the situation, Asian Forest Cooperation Organization (AFoCO) in collaboration with Forest Research and Development Center- Forestry and Environment Research, Development and Innovation Agency (FOERDIA) facilitated the participatory planning of community based-forest management (CBFM) and several training through technology transfer to increase farmer's capacity in forest management; post-harvest product processing; and various alternative livelihood development in Paru Vilage Forest which is located in Sijunjung Protected Forest Management Unit (PFMU), Cempaka FP which is located in Batutegi PFMU-Lampung, and Tuar Tana CF which is located in Sikka FMU-East Nusa Tenggara since 2016 until 2020. This paper aims to provide information on impact of capacity building in leveraging community skill and livehood in three schemes of Social Forestry (SF) in Indonesia, especially in Paru VF–West Sumatra, Cempaka FP–Lampung, and Tuar Tana CF–East Nusa Tenggara.

Methodology/approach

Time and Location

The research was conducted in three pilot site of Social Forestry areas, located in Paru Village, Sijunjung District, Sijunjung Regency, West Sumatra Province; Sumber Bandung Village, Pagelaran Utara District, Pringsewu Regency, Lampung Province; and Hikong Village, Talibura District, Sikka Regency, East Nusa Tenggara Province in March - May 2020 (Figure 1).

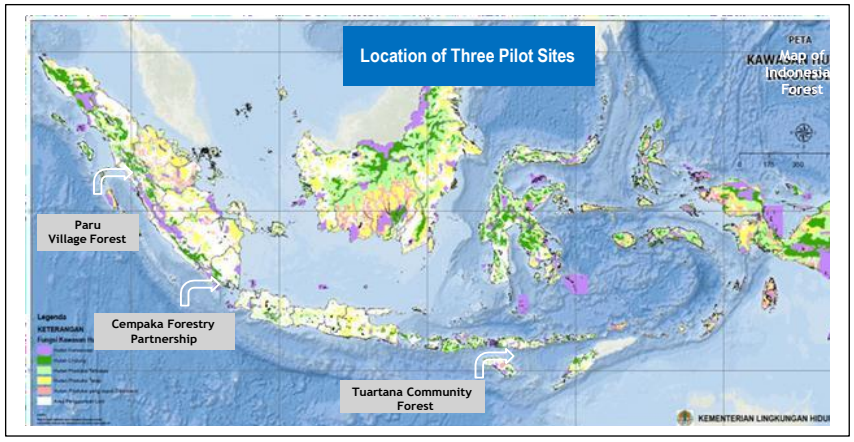


Fig. 1: Three pilot site in Indonesia under three Social Forestry schemes

Materials

Questionnaire, writing instruments, voice recorder and camera.

Methods

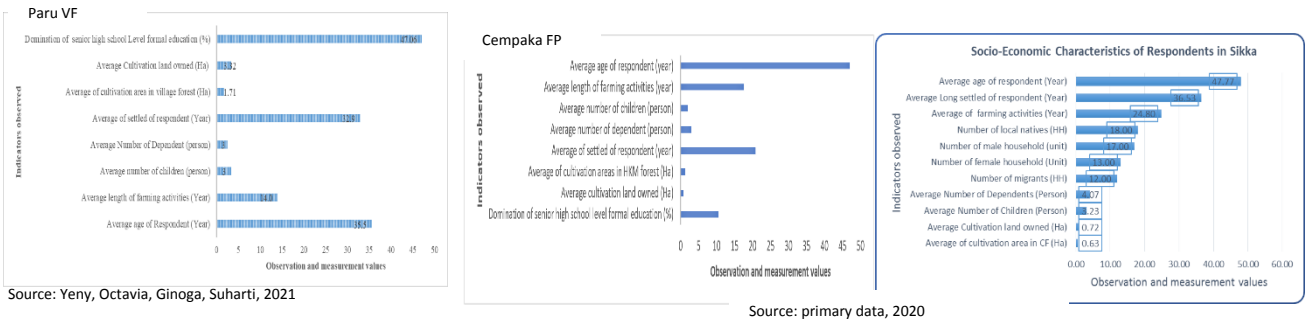
Data collection. This study used a survey method with semi-structured interview technique. The data collection was carried out by interviewing 30-35 respondents in each location by interviewing respondents directly and using the questionnaire as well. The respondents were determined by purposive sampling i.e farmers who have received training and facilitation from AFoCO.

Data Analysis. The data obtained from the interviews were then tabulated and analyzed descriptively. Data analysis were conducted by comparing the conditions before and after AFoCO facilitation. Furthermore, the results of the data analysis were presented descriptively using tables and graphs.

Results

Demografi and socio economic characteristic of respondents

The characteristics of the farmers who manage Paru VF, Cempaka FP and Tuartana CF are presented in Figure 2. Respondents in Paru Village Forest were dominated by indigenous Minang people who live there with an average stay period between 9 months to 32 years. Their main livelihood is farming (70.59%), and secondary livelihoods are breeders (48.28%). Based on the demographic characteristics, the respondents are of productive age (36 year) and have a relatively high level of education (dominated by the senior high school level). Base on socio economic characteristic respondents had an average cultivated land of 1.71 ha per household and private-owned land of 3.32 ha per household.



Source: Yeny, Octavia, Ginoga, Suharti, 2021

Source: primary data, 2020

Fig. 2: Demographic and socio-economic characteristics of respondents

Meanwhile, most of the respondents in Cempaka FP are natives who were not Lampung ethnic who live in Sumber Bandung Village with a period of stay between 3 to 50 years. Respondents are heads of households with the main livelihood as farmers (100%) and secondary livelihoods as laborers (42.11%). In Tuartana CF, the respondents interviewed were the CF farmers group and a small portion were village officials or village leaders. The age of respondents varies, ranging from 30-77 years, with an average of 47.77 years. As many as 50% of respondents are under and above the average of age.

Community's capacity building and strengthening farmer groups in managing forest

The capacity building for community in the Paru VF, Cempaka FP and Tuar Tana CF was carried out in the form of technology transfer through training and workshops, based on their forest resources and needs. Various technology transfers have been conducted in the three pilot site among others “Propagation Techniques, Establishing Nurseries and Organic Fertilizers; Application of Global Positioning System (GPS) for mapping forest area (attended by Forest Management Unit and Forestry Services official); and Participatory mapping (attended by the member of forest community).

The other training in Paru VF were attended by the community who are members of the Village Forest Management Institution in Paru Village Forest, in developing their forest-based agribusiness among others “Bee Cultivation and Honey Processing; Rattan Processing; Agarwood Cultivation and Inoculation; Cultivation and Processing of dragon blood (*Daemonorops draco*); Production of Biogas to Support the Development of Livelihoods Based on Green Investment; and Mushroom Cultivation and Processing. To support the era of Forestry 4.0, a Digital Marketing Technology Transfer Workshop was also held to expand the marketing reach of various forest products produced from the Nagari Paru Forest. In addition, to support the development of ecotourism, the Nagari Paru Forest community also has the opportunity to participate in the Nagari Forest Ecotourism Development Workshop.

The capacity building for community of Cempaka FP was carried out in various technology transfers for developing their forest-based agribusiness among others “Coffee Cultivation and Processing; Rubber harvesting and Processing; Institutional Strengthening; and Agroforestry Pest and Disease Control. In addition, to further develop forest-based agribusiness in community managed areas, technology transfers for Packaging and Safety of Forest Food Products are also carried out; Processing of NTFPs (coffee) and the use of Machines for Coffee Processing; as well as Workshop on Digital Marketing Technology Transfer (Digital Marketing) to support Forestry 4.0.

Meanwhile, capacity building for supporting the development of forest-based agribusiness and green investment in Tuar Tana CF conducted through several technology transfers (Figure 3), including “Candlenut Oil Processing and Packaging; Making candles from Honeycomb Honeycombs; Improvement of Agroforestry Yield and Post-Harvest Processing of Areca Nuts; and Processing of NTFPs Agroforestry Products, including processing cashew fruit into shredded and cashew syrup, processing pineapple into chips and pineapple jam, and processing deer velvet into velvet powder which has medicinal properties. The processed NTFPs that have been developed by group members at the three pilot sites have been able to meet the subsistence needs of the community and provide added value to the selling value of these commodities.

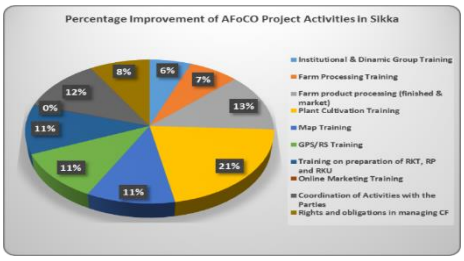
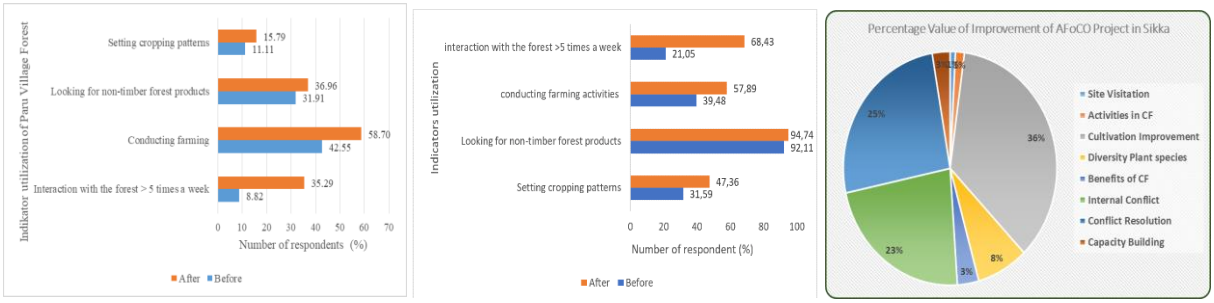


Fig. 3: Percentage of value changes in skill and knowledge of the farmers

Source: primary data, 2020

Forest utilization and management

This research found that social behavior in the forest utilization and improvement considerably increased after facilitation was provided in three pilot sites (Figure 4).



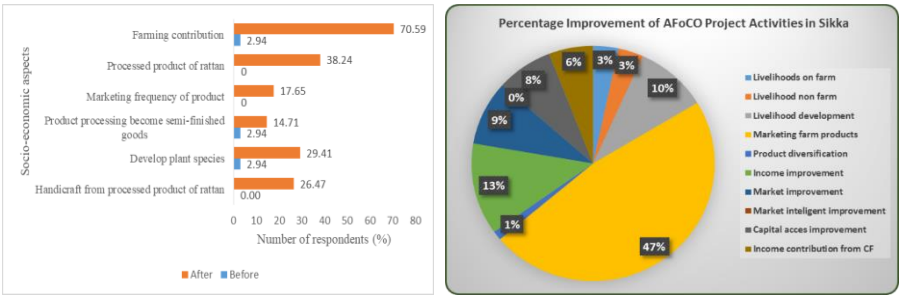
Source: Yeny, Octavia, Ginoga, Suharti, 2021

Source: primary data, 2020

Fig. 4: Utilization and improvement in managing forest at three pilot sites

Livelihood Development

Livelihood development is one of the main program of the AFoCO facilitation and mentoring which aim to increase farmers' income, by introducing alternative source of livelihood, and increasing access to market agricultural products. The provided facilitation for the community has shown positive results in several economic aspects (Figure 5).



Source: Yeny, Octavia, Ginoga, Suharti, 2021

Fig. 5: The impact of facilitation on several economic aspects of the farmers

There is an increase in the number of respondents (67.65%) who stated that farming in Paru Village Forest has contributed to total family income. The increase in processed products of rattan was recognized by 38.24% of respondents, meanwhile the increase in marketing frequency was recognized by 17.65% of respondents. Furthermore, respondents claimed an increase by 11.77%, 26.47% and 26.47 % in product processing into semi-finished and finished goods, an increase in the number of developed plant species, and especially an increase in rattan handicrafts, respectively.

Discussion

Demografi and socio economic characteristic of respondents

The capacity of the community plays an important role to be able to manage natural resources (Gray *et al.* 2001). Based on the demographic characteristics in Paru VF, the respondents are of productive age 15-16 year (Nurhasikin 2013) and have a relatively high level of education, hence it is easier to adopt and apply the introduced knowledge and technology and strongly support the optimization of the management of Paru Village Forest. Based on the socio-cultural characteristics, they know plant cultivation well because they have relatively long farming experience (around 14 years) (Yeny *et al*. 2021). Socio-economic factors including education, family size, agricultural land ownership, and biophysical factors such as the distance from the respondent's settlement to the forest will

determine the community's participation in forest management more than the economic incentives provided by a program (Shrestha and Shrestha 2017). Junaedi and Maryani (2013) revealed that the socio-economic factors of the community around the forest and biophysical factors are closely related to the existence of the forest. The people in Paru Village considers the forest as a source of livelihood and income (LPHN 2015). It showed that Paru Village Forest has an important role that influences the social and economic behavior of the community (Suharti *et al.* 2017).

Based on demographic characteristics in Cempaka FP, respondents are in the productive age as much as 73.69% and have a relatively low level of education. The low level of public education is caused by limited funds, facilities and infrastructure. The data shows that most of the respondents have the potential to work optimally in various businesses to meet the economic needs of their households. Mantra (2000) classifies the age class that is classified as productive age above 15 years to 55 years. The results showed that the demographic, socio-economic, and socio-cultural characteristics of the respondents strongly support the optimization of forest management in the Cempaka FP under Batutegi FMU. Demographically, respondents who have productive age are able to carry out maximum productive activities. Unfortunately, they have a low level of education. This causes a very high level of community dependence on forest resources.

In Tuar Tana CF, the weak technical capacity of the community still become a constrain to the intensification of farmland management in order to increase farmland production. This is faced by the majority of farmers (53.33%) who still be at elementary school education level and limited technical capacity. An indication of this limitation can be seen from the capacity of businesses carried out outside the farming sector. Amounting 40% of farmers who have a side business, generally engaged in the service sector, namely as a handyman, making 'nyiru', weaving, trading, and involved as Family Skill Education (PKK) activators at the village level. There are no other side jobs that are oriented towards wider networks, such as the marketing network for agricultural products. Amounting 50% of respondents are below and above the average age. The age factor is one of the important inputs that determine the dynamics of CF management. As in Cempaka FP, the level of community dependence in Tuar Tana CF is also very high on forest resources. This is also due to the low level of welfare. The socio-economic conditions of NTFP farmers on surrounding forest are not prosperous yet, and highly depend on the sustainability of NTFP production (Njurumana and Octavia 2020).

Community's capacity building and strengthening farmer groups in managing CF

Community capacity building have generated value changes in skill and knowledge of the farmers. It has implication to generate income and marketing of NTFPs better as well. Therefore, communities will have great opportunities in forest management to achieve their socio-economic and environmental goals (Meijaard *et al.* 2021). There are some potential NTFPs commodities in Paru Village Forest, among others bee honey, dragon blood, and other rattan. Besides that, one of the other NTFPs frequently found in Paru Village Forest and utilized by the local community is kapencong fruit (*Scaphium macropodum*). This species is a medicinal plant for curing several diseases, including sore throat, intestinal infections, diarrhea, fever, cough, asthma and anti-inflammatory (Dewi *et al*. 2018). The people in Paru Village had used various species of NTFPs from generation to generation as a source of food, medicine, dyes, handicrafts, resins, buildings, traditional rituals, and other necessities (Nugroho and Octavia 2020).

Capacity building of community by various training in Paru Village Forest positively impacts to an increase in the species number of crops planted, selecting plant species and properly arranging cropping patterns, proportions, and composition of plant species. Their income sources and livelihood not only originated from agricultural sector but also comes from outside the agricultural sector. There was an increasing number of respondents who make handicrafts from rattan and pandanus, develop oyster mushroom and honey bee cultivation, process tree's resin, and become traders of agricultural products. Amounted 88.24% of respondents stated that there has been an increase in their ability to manage the Paru Village Forest (Yeny *et al.* 2021). Likewise, the GIS training and participatory mapping conducted have improved the skills of farmers in mapping their respective lands, so that the boundaries of arable land are clear and avoid boundary conflicts. It is expected that the increased capacity of both FMU officials and farmers, especially in geographic information system (GIS), can resolve land boundary conflicts.

The strengthening of farmers' institutions becomes a key factor that determines sustainable forest management and increases the value of its benefits to the community (Njurumana *et al*. 2020).

Forest utilization and management

In Paru VF, the increase in the frequency of interaction to the forest > 5 times a week was 26.47%, the increase in farming activities was 16.14%, non-timber livelihoods were 5.04%, and cropping patterns were 4.68%. The capacity enhancement of the community in managing forest is a part of empowerment in achieving economic goals and sustainability of biodiversity (Yeny *et al*. 2021). The improvement is also found in Cempaka FP and Tuar Tana CF. After obtaining facilitation, respondents paid more attention to land management by choosing plant species and arranging cropping patterns, proportions, and composition of plant species properly.

Agroforestry based tree planting was established in the three pilot sites for a total 34 hectares, covering an area of 8 hectares in Paru Village Forest and generate a good growth (Octavia and Rachmat 2020) and expanding to nine hectares in 2020 (Octavia *et al.* 2020), 15 hectares in Cempaka FP, and 10 hectares in Tuar Tana CF.

The results in Fig. 4 showed that the use of forests through the CF program increased after the facilitation. All respondents considered that cultivated CF land as a source of livelihood. The objectives of forest management include conserving forest resources and increasing the welfare of people living around the forest (Adalina *et al.* 2015).

Livelihood Development

There are increasing value in several aspect on measured assessment, among others main sources of livelihood in agriculture, main sources of livelihood outside agriculture, alternative livelihood development, marketing of agricultural and farming products, processing of business results into semi-finished or finished goods, changes in income before and after the AFoCO project, an increase in the frequency and volume of marketing of products after processing, increased access to market information and capital/funding sources, and contribution/proportion of income from activities within the CF area to the total family's income.

The introduction of knowledge through various trainings has a positive impact on increasing the number of plant species planted. Before the assistance was carried out, the CF cultivated land was dominated by fruit trees, but after the assistance, the variety of forest plant species increased which directly increased biodiversity and canopy cover. The positive impact of facilitation on forest farmer groups in forest management can be seen from the increased active participation of group members in technical planning activities and planting implementation. This condition shows that the provided assistance is able to increase the capacity of farmers so as to change the perceptions and attitudes of group members and encourage them to actively participate in forest management in three SF area.

Conclusions/ wider implications of findings

In general, the provided assistances and capacity building in three SF schemes have increased the active participation of group members in the preparation of technical plans and implementation of economic value species planting and processing of non-timber forest products (NTFPs). Other benefits are the reduced land boundary conflicts, an increase in the frequency of routine group meetings, an increase in the number of members who are able to process NTFPs into semi-finished or finished goods. It generated the perceived impacts, among others developed capacity of forest communities in delineating boundaries using GPS, livelihood and agroforestry techniques; developed capacity of more forest personnel in facilitating participatory CBFM planning and use of database management system; decreased conflicts over boundaries due to accuracy of GIS data; Increased economically inspiring livelihoods from forest resources products processing mainly NTFPs and their selling value

and community's income; change in values and perception over forest resource management; improved CFM planning process into a more Social Forestry (SF) group-led one; stronger partnership between and among various stakeholders; increase in land cover and potential of NTFP from multipurpose tree species in agroforestry models; an improved biophysical condition (increasing land cover) and Socio-economic changes (increasing income).

The capacity enhancement of the community in managing forest is a part of empowerment in achieving economic goals and sustainability of biodiversity. For sustaining the impact of facilitation, the improved skills and the readiness of the community can be facilitated to become a model that can be scaled up. Further continuity of assistance, follow up and evaluation by ocal government and Forest Management Unit at the site level are strongly needed.

Acknowledgements

The authors would like to express sincere gratitude to The Asian Forest Cooperation Organization (AFoCO) for providing funding for the study under Regional Project Component 3, "Facilitating the Participatory Planning of Community Based Forest Management using Geographic Information System and Remote Sensing Technologies in Forest Resource Management in the Philippine, Indonesia and Thailand." Furthermore, we would like to express sincere gratitude to acknowledge all parties who support this study.

References

Adalina Y, Nurrochmat DR, Darusman D, Sundawati L. 2015. Kondisi sosial ekonomi masyarakat di sekitar Taman Nasional Gunung Halimun Salak. Jurnal Penelitian Hutan dan Konservasi Alam 12 (2): 105-118.

Biedenweg K. 2012. A framework for evaluating forest conservation implications of community-based capacity building: Experiences from the Northern Bolivian Amazon. *Conserv. Soc.* 10(3): 256-269.

Gray GJ, Enzer MJ, Kusel J. 2001. Understanding community-based forest ecosystem management: An editorial synthesis. *J. Sustain. For*. 2(3):1-23.

Junaedi E, Maryani R. 2013. Pengaruh dinamika spasial sosial ekonomi pada suatu lanskap Daerah Aliran Sungai (DAS) terhadap keberadaan lanskap hutan (studi kasus pada DAS Citanduy Hulu dan DAS Ciseel, Jawa Barat). *Jurnal Penelitian Sosial Ekonomi Kehutanan*. 10 (2):122-139.

[KLHK] Kementerian Lingkungan Hidup dan Kehutanan. 2019a. *Deforestasi Indonesia 2017-2018*. Direktorat Inventarisasi dan Sumber Daya Hutan. Direktorat Jenderal Planologi Kehutanan dan Tata Lingkungan. Kementerian Lingkungan Hidup dan Kehutanan. Jakarta.

[KLHK] 2019b. *Statistik Kehutanan Indonesia*. Direktorat Inventarisasi dan Sumber Daya Hutan. Direktorat Jenderal Planologi Kehutanan dan Tata Lingkungan. Kementerian Lingkungan Hidup dan Kehutanan. Jakarta.

[LPHN] Lembaga Pengelola Hutan Nagari Paru. 2015. Rencana kerja hutan nagari (RKHN). Sijunjung, Sumatera Barat.

Mantra, I.B. (2000). Demografi umum. Pustaka Pelajar. Yogyakarta.

Meijaard E, Santika T, Wilson KA, Budiharta S, Kusworo A, Law EA, Struebig MJ. 2021. Toward improved impact evaluation of community forest management in Indonesia. *Conserv. Sci. Pract,* 3(1):1-14.

Njurumana GN, Ginoga KL, Octavia D. 2020. Sustaining farmers livelihoods through community forestry in Sikka, East Nusa Tenggara, Indonesia. Biodiversitas. 21(8):3786-3796. Available at DOI: 10.13057/biodiv/d210846. [accessed 30.10.21].

Njurumana GN, Octavia D. 2020. Conservation of NTFPs Species Through Agroforestry for Community Livelihoods in Sikka, East Nusa Tenggara. Journal of Sylva Indonesiana (JSI).3(1):1 – 16. Available at: DOI: 10.32734/jsi.v3i01.1984. [accessed 30.10.21].

Nugroho NP, Octavia D. 2020. Inventarisasi jenis tanaman penghasil hasil hutan bukan kayu di Hutan Nagari Paru, Sijunjung, Sumatera Barat. *J. Penelit. Hutan dan Konserv. Alam*, 17(1): 21-3.

Nurhasikin. 2013. Penduduk usia produktif dan ketenagakerjaan BKKN Kepri. Available at: http://kepri.bkkbn.go.id/Lists/Artikel/DispForm.aspx?I D=144 [accessed 15.10.21].

Octavia D, Rachmat HH. 2020. Promoting agroforestry model in increasing land cover to sustain community livelihood in Paru Village Forest. *IOP Conf. Ser.: Earth and Environ. Sci*. 449 012011

Octavia D, Ginoga KL, Yeny I. 2020. Pengelolaan Hutan Secara Partisipatif Menuju KPH Hijau Untuk Mendukung Tujuan Pembangunan Berkelanjutan. Deepublish. Yogyakarta.

Shrestha S, Shrestha U. 2017. Beyond money: Does REDD+ payment enhance household's participation in forest governance and management in Nepal's community forests. *J. For. Policy Econ*, 80:63-70.

Suharti S, Murniati, Octavia D. 2017. Paru Village Forest: Some opportunities and challenges. *Proceeding Iufro Inafor Joint International Conference*. Yogyakarta.

Supriyanto B. 2021. Kemandirian pangan dan masyarakat. Keynote speech paper in Webinar: Gerakan Kemandirian Pangan. Departemen Konservasi Sumberdaya Hutan dan Ekowisata-IPB.

Yeny I, Octavia D, Ginoga KL, Suharti S. 2021. The impact of community capacity building on forest management at Paru Village Forest, Sijunjung Regency, West Sumatera. *International Conference on Indonesia Forestry Researches 2021 Stream 4 : Managing Forest and Natural Resources Meeting Sustainable and Friendy Use. IOP Conf. Ser.: Earth and Environ.* (on process).