Enhancing capacity and empowering local communities live inside Thirty Hills National Park, Riau through meliponiculture

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Abstract. Thirty Hills National Park (THNP) located in Riau province has a local community, namely Talang Mamak tribes, who live inside its territory. To increase their livelihood and reduce their dependency on forest resources, THNP conducts an empowerment activity as an alternative for living through meliponiculture. Meliponiculture is a practice of beekeeping using stingless bees. The objective of this study is to evaluate the effectivity of meliponiculture as an empowerment activity program. This study was conducted at five communities of Talang Mamak tribes during 2019, namely Tualang, Bangayauan, Nunusan, Air Bomban, and Sadan. Provide to assist and initiate their enthusiasm in this program. Honey production and their capability in maintaining the stingless bees are respond variables that are assessed to determine the effectivity of the program. Results reveal that honey production at five communities are highly increase (avg. 63.12%) in the second semester except in Sadan that is slightly decline (9.89%) even though Sadan have the highest honey production in the first semester as 5 kgs. Furthermore, Air Bomban produces 16.3 kg in the second semester and have the highest honey production in the second semester or increase 91.06% compare to first semester. In addition, there is only in Bengayauan that only have six colonies that have not produced honey yet from total fifteen colonies. Meanwhile, sixty colonies of stingless bees that are placed at the other four communities are already active in producing honey and show that the communities are able to maintain those colonies. The consistency and marketing are needed to guarantee the effectivity of this empowerment program in the following years.

1. Introduction
Historically, Bukit Tiga Puluh National Park (THNP) located in Riau and Jambi province was not only formed by combining two protected forests, namely Singkati Batang Hari in Jambi province and Haposipin in Riau province, but also some restricted production forest areas. Those area are legally stated and appointed as THNP territory based on the Ministry of Forestry regulation No. 539/Kpts-II/1995 and No. 6407/ Kpts-II/2002 and have 144,223 ha [1]. Since it is located in low land tropical area, it has high number of flora and fauna diversity [2–4]. Moreover, one unique that is different with other national park is the existence of indigenous people inside its territory. At least, there are two groups of indigenous people who live inside THNP’s territory, namely Talang Mamak and Anak Dalam (Anak Rimba) [1,5].
In the last 10 years, the life of Talang Mamak tribes was in a difficult situation. Non timber forest products, such as damar, rattan kelukup, and dragon blood that are usually collected and gathered by the tribes were lacking and insufficient to meet their daily requirements [6]. Another problem was the price of those products that were continually decline. Lately, this problem became a huge concern of THNP since it could trigger those people to steal wood and sell it to other people outside THNP territory [1,4,7]. In other words, it leads to massive deforestation and increases social conflicts in the future [8]. In order to solve those problems, THNP have delivered many empowerment programs, such as introduction of other commodities and simple agricultural techniques. One of empowerment programs that is recently held by THNP is meliponiculture.

Meliponiculture is one practice of beekeeping using stingless bees. Indonesia has 33 stingless bees species in which 24 of them are distributed at Sumatera island [9,10]. One of species that is mostly used by many meliponiculturist is *H. itama* that is commonly found in urban and forest area [11]. In fact, main product of this species is propolis other than honey [12]. Yet, complicated techniques that involved chemical processes make this product difficult to obtain. Thus, most people only collect the honey instead of its propolis. Even so, honey produced by stingless bees is rich of fenolic and antioxidants contents although it has high water content [12–16]. The most important is that beekeeping type is much easier to be practice compared to apiculture that need sophisticated tools and equipments. These facts become the main reasons for THNP to select this activity as one of the empowerment programs.

In Thailand, particularly provinces of Chanthaburi and Trat, popularity of stingless bees has raised more than two decades ago and were used not only for honey producer but also as supplementary pollinators for increasing fruits production in rambutan (*Nephelium lappaceum*) and durian (*Durio zibethinus*) [17]. In addition, it has been long time that stingless bees’ honey is widely sold in marketplaces in a higher price than honey gathered from managed honey bees, such as *Apis mellifera* [18,19]. Meanwhile, Indonesia has already started meliponiculture in oil palm plantation as PT Agro Indomas’ corporate social responsibility program in Central Kalimantan since 2019 [19]. The simplicity in managing and engaging with existing livelihoods is another reason for many communities to practice meliponiculture.

Meliponiculture empowerment program started on 2018 by conducting a discussion to form establish some meliponiculture groups in order to make easier to organize and distribute the grants. There are many steps in conducting this activity, such as trainings and workshop. Since this meliponiculture program has never been conducted and all Talang Mamak tribes have no perception about how to deal with the program. Hence, the evaluation and monitoring are needed to determine the progress, obstacles, and problems in conducting the program. There are two indicators to determine the effectivity of the empowerment programs, namely socio-economic indicators and environmental factors [20]. Thus, the objective of this study is to evaluate the effectivity of meliponiculture as an empowerment activity program within Talang Mamak tribes live inside THNP’s territory.

2. Methods
2.1 Study area
This study is carried out at five communities of Talang Mamak tribes that are located along side of Batang Gangsal River. Each community consists of 50 to more than 200 people and about 20 to 30 people in each community are chosen to be involved in this meliponiculture program. All Talang Mamak’s tribes that are being subjected in this study are located inside the territory of Thirty Hills National Park. Those five communities are Tualang, Bangayauan, Nunusan, Air Bomban, and Sadan. They are chosen by THNP as subject of this meliponiculture program since they are not only located within the restricted but also become main priority area and people need to be empowered [1]. The empowerment programs, observations, and data collections conducted during 2019.

2.2 Procedures
This study is to evaluate a series of empowerment program activities that cover many steps, namely (1) communities decided the types of empowerment programs they need and interest, (2) institutional
formation, (3) trainings and workshops, (4) grants, (5) assistances, and (6) marketing. Trainings, assistances, and grants are given to assist and initiate their enthusiasm. Trainings and workshops are delivered by BP2TSTH’s researchers, meanwhile the rests are implemented by Thirty Hills National Park’s extension agents and forest rangers. In order to determine the effectivity of the programs, evaluations and observations are conducted every six months since there are many physical obstacles, such as communication, transportation, and marketing that lead to difficulty of data collection. In other words, this study is to evaluate the ability and capability of Talang Mamak tribes in accepting the empowerment program through meliponiculture. Socio-economic indicators are selected these consist of ability to maintain the stingless bees’ colonies as skills gained from beekeeping indicator and economic benefit that are valued by the number of honey production and income that could be obtained [20].

2.3 Data collection and indicators

Data are obtained by collecting honey productivity that is harvested during first and second semester in 2019 per each community that have fifteen stingless bee stups. This condition is caused by the limitation factors, such as accessibilities and communications particularly communities that are located far from the last forest ranger posts. Honey collected by communities is also brought and collected by forest rangers when they do patrols to communities. In order to evaluate the communities’ responds on the meliponiculture practices, three respond variables as the indicators are observed, namely (1) honey production, (2) income, (3) condition of stingless bees’ colonies that are given by THNP in the end of 2019.

2.4 Data analysis

Data collected are analyzed by quantitative and qualitative descriptive [20] toward honey production and total income in the first and second semester. Besides, the data of last condition of stingless bees’ colonies given by THNP in the end of 2019 is analyzed to determine and examine the ability and effectiveness of training and assistances.

3. Results and discussions

3.1 Characteristics of Talang Mamak tribes

Talang Mamak tribes is local community live in alongside of Indragiri River (one of four biggest rivers in Riau province). This study, however, take place on communities of Talang Mamak tribes who live alongside Batang Gangsal River from upstream to downstream. Batang Gangsal is one branch of Indragiri River that belongs to THNP’s territory. Talang Mamak is categorized as a Proto Malay that is grouped into Austronesia [21]. Originally, they live in modest house built from simple materials gathered from forest, such as tree bark, bamboo, rumbia leaves, and rattan [21,22]. Moreover, most of them are illiterate.

Furthermore, Talang Mamak tribes live communally alongside the river, which the oldest and most ancient community stay at the upper stream side [19]. Most of them have a livelihood as farmers with dominantly practiced collecting non forest timber products (NTFPs), such as damar, rattan kelukup, dragon blood, honey hunter, and rubber. They also exhibit simple agriculture practices, such as planting seasoned rice, cassava, and sweet potato. In a certain time, all those NTFPs are brought to market by streaming them into Batang Gangsal River to downstream side where market is located. They also buy some important stuffs to bring back to their community in market. In other words, Talang Mamak tribe is a type of community that is highly dependent on nature resources available in forest.

The programs of local community empowerment funded and held by THNP have been conducted for many years [1]. In order to make the program run smoothly, THNP held a PRA (Participatory Rural Appraisal) to collect and make data regarded to community needs. PRA is a method used to encourage community participating and enable them to involve and take part in identifying and appraising conditions as soon as possible [24]. In other words, the empowerment programs should accommodate community’s needs, hopes, and THNP interests. Active roles and commitment of Talang Mamak tribes
are needed to make those programs succeed since the programs are delivered and supported themselves to fulfill their own needs. For communities, economy and livelihood are the most major issues need to be addressed, mean while THNP expects their territory keep safe from deforestation and destruction to maintain their forest conserve. There are many commodities that have been introduced and practiced by THNP to Talang Mamak tribes, such as rattan kelukup, rattan jernang (dragon blood), and palm. Nonetheless, THNP and Talang Mamak tribes are not satisfied yet to those empowerment programs and decide to have a new program named meliponiculture.

Talang Mamak empowerment program through meliponiculture involved many activities that are fully funded by THNP. After the intuitional at each community (dusun) (Community Forest Group) is formed (Table 1), THNP manage a series of trainings and workshops that involved trainers from Balai Litbang Teknologi Serat Tanaman Hutan (BP2TSTH). To assure the continuity of the program, the assistances, monitoring, and evaluation activities are conducted by THNP. Moreover, THNP also gives their assistances in marketing and promotion aspects by purchasing all collected honey, since, they still have limitations in dealing with marketing and promotion activities.

3.2 Honey production, incomes, and bees’ colonies condition
The easiest way to determine the succeed of the meliponiculture empowerment program is to look up its honey production that always relates to income. Results show that in general, five communities of Talang Mamak tribes located in THNP’s territory are able to produce honey after training and workshop conducted in end of 2018. In average, there is an increase of honey production as 63.12% in the second semester. In specific, there are Bengayauan, Tualang, Air Bomban, and Nunusan communities that perform an 60%-90% enhancement in the second semester and Air Bomban is the highest community that have highest number of honey production by having 90% of enhancement in second semester compare to first semester (Table 1). Meanwhile, it is only one community, namely Sadan, that exhibit a slightly decline as 9.8% compare to the first semester. Yet as it turns out, Sadan community show better performance in the first semester compare to other four communities by producing the highest number of honey production which produce up to 5000 grams honey. This production is almost five times compare to an average value of other communities.

In a similar results tendency to honey production, the income collected by those all communities by practicing meliponiculture increases. In order to help to promote and advertise the honey, THNP gives their assistances in order to get the local enthusiasm in dealing with meliponiculture since promotions and marketing become limited factor for Talang Mamak tribes. Moreover, THNP have standardize all honey price and packaging into 200 grams plastic bottles with Rp 50.000,- for the price of each bottle. Since the income depends on the number of honey produced, it can be assumed that the number of income trends are similar to honey production. In Bengayauan, they only make income as USD 14.28 during the first semester and increase up to USD 96.42 in the second semester or increase 85.18%. Similarly, Air Bomban collected income as USD 34.28 during first semester and increase to 91.06% in the second semester that result USD 383.57 (Table 1). In contrast, Sadan shows slight decline in their income as 1% in the second semester. Nevertheless, it could be assumed that all Talang Mamak produce more than USD 66.67 in the second semester. These results show that Talang Mamak community has capability in practicing meliponiculture and able to implement all lessons delivered in trainings and workshops. Even, most of community forest group stated that this commodity could earn income faster than other commodities that have been trained like rattan that need seven years [24–26] to harvest and get the income. In other words, meliponiculture is well accepted by the community since it is easier to handle, have a good price, and earned income faster than other commodities.

![Table 1. Honey production and income collected by five communities of Talang Mamak tribes inside THNP.](image)

| Name of Community (location) | Observation time | Honey production (grams) | Income (USD) |
|-----------------------------|------------------|--------------------------|--------------|
|                            |                  |                          |              |

![Figure 1. Schematic diagram.](image)
Besides honey production and income, the other factors that determine the success of the empowerment program is the ability of communities to maintain the stingless bees’ colonies which are granted by THNP. This assumption is based on the previous observations and studies regarding the characteristics of Talang Mamak tribes. Two studies mention that food and resources gathering are the main activities of Talang Mamak tribes to meet their daily requirements [8,23]. In other words, they are not familiar to advance agricultural techniques or only practice simple agricultural techniques. Even more, practicing meliponiculture is new that they never done before. Hence, here we want to determine the way they maintain colonies by observing the number of active colonies to obtain the adaptability respond of Talang Mamak tribes to new program. Since the number of active colonies is one of the main factors that determine the succeed of meliponiculture, we used them as one parameter to determine the success of the empowerment program. The terminology of active colonies is that the colony (especially the workers’ caste) has been able to reach, cover, and build honey pot at the topping box laid on the top of log [12]. Log is a name given by local people in Sumatra for a piece of bark that contains stingless bees.

Table 2. Condition of stingless bees’ colonies granted by THNP in the end 2019.

| Name of Community Forest Group (CFG) | Community (location) | Colonies status          |
|-------------------------------------|-----------------------|--------------------------|
| Jelemu Bengayauan                   | Bengayauan            | 9 actives, 6 inactives   |
| Tualang Sejahtera                   | Tualang               | 15 actives               |
| Kasih Alam                         | Nunusan               | 15 actives               |
| Batu Berduri                        | Sadan                 | 15 actives               |
| Bomban Berduri                      | Air Bomban            | 15 actives               |

Results reveal that Tualang, Nunusan, Sadan, and Bomban Berduri have exhibited a good performance in maintaining the colonies. From fiveteen colonies granted by THNP, all of them have already been active in producing honey. It means that those communities have capability in understanding the techniques given during trainings and workshops to trigger the colonies being active. In the contrary, Bengayauan only have nine active colonies from five teen granted colonies. Inactive colonies are the main problems for most stingless bees that could lead failures in many meliponiculturists in Indonesia. In order to solve the problem in Bengayauan, in the beginning of second semester 2019, more specific trainings were given. There are two techniques that are conducted to solve those inactive colonies. First, after determining the position of brood chamber, logs are cut using chainsaw until reaching top of brood/ egg structure [12]. Second, pollen pots collected from other strong colonies are deposited into the “topping box”. These methods are practiced in order to trigger worker bees to start building new honey pots. Empty space between honey box (topping box) and brood chamber leads the worker bees to fulfill those area before starting build honey pots in topping [12].
In general, all communities have already performed such abilities to maintain the colonies by techniques and methods given by the trainers. Abilities to maintain are one of main aspects that could lead the colonies to survive and active in producing honey. Based on the observations, all communities succeed in maintaining the colony and preventing them from absconding. Absconding is one bee’s behavior in which all colonies run away and leave their origin nest to find other places. This behavior usually happens when the colonies are disturbed and attacked by predators, pests, lack of bee forages, and diseases. In other words, all communities have a good understanding in adapting and practicing new information with all limitations they have. Furthermore, these communities have performed three from eight indicators of succeed of empowerment programs, namely (1) the freedom of mobility and creativity, (2) the ability to buy small and households commodities, and (3) income guarantee in household level [27] since they could earn and use the income for their daily necessities.

Based on the parameter of honey production, income, and colonies status above, it could be assumed that this empowerment program gives a significant good effect for Talang Mamak tribes. Delivering a new technology or information and to encourage Talang Mamak tribes to practice something new and never be done in their communities and ancestors is challenging. Transforming a cultural habit from extractive activities, such as gathering and collecting, into farming, such as beekeeping, is complicated and involve many aspects. Nevertheless, all communities of Talang Mamak tribes that are given this empowerment program reveal that they are able to receive and practice new information that are never be thought by their ancestors. Since, there are many local wisdoms and traditions that need to be clarified by their elderly people before all activities that are not exhibited yet by their ancestors. Therefore, in the beginning, there are many incertitude and concern related to the succeed of this empowerment programs. Yet, in the end of 2019, Talang Mamak tribes turned out that they could succeed to complete the empowerment program. According to Adi [28], THNP almost finished this empowerment programs since they have accomplished six from seven steps of local community empowerment program process, namely (1) engagement, (2) assessment, (3) planning, (4) action plan formulation, (5) implementation, and (6) evaluation. Meanwhile, last process that is needed to accomplished is termination. Termination means that local communities can run their business and its organization independently.

In contrast, there are a contradictive phenomenon as the result of this empowerment program. Since Talang Mamak tribes realize that there is a commodity other than they usually collected, most of them try to go to deep forest to gather the honey. As a result, it leads to deforestation. The unique fact is that they only collect the honey since they only gave attention to its honey due to it offer them more direct income. Meanwhile, just few of them that collected the colonies. In order to prevent the deforestation, police rangers of THNP always conduct warnings for Talang Mamak tribes not to collect honey and the colonies that lay at the living trees. Permit is guarantee only when they collect honey and the colonies from scavenged and dead trees. Moreover, they are not allowed to sell the colonies to other people, especially for people from outside THNP’s teritory to minimize the massive exploitation that led to environmental damage.

Based on observations, some challenges that are faced by this empowerment program is less interest and marketing. In the forming of community forest group, THNP facilitated all community member from wide range of age to join so that all participants vary. Nevertheless, it turns out that only couple of people that engaged directly to handle the bees and are mostly dominated by young people. This fact gives one description that the local community empowerment program through meliponiculture has a good prospect since it is engaging more young people than the elders. This finding is different to Putra et al. [29] that conducted a study at Dilem village, Mojokerto reveals that most young people have no interest in conducting apiculture. Next, marketing is the second problem. At least there are two problems in marketing. First, since Talang Mamak lives in deep forest and rarely to go outside from the forest, they have limitations on how to sell the honey unlike the other products, such as damar and rubber, that have been dealt for long time. Second, some facts and nice information put in the label need to be created through digital printing in order to attract costumers’ interests. Nonetheless, this marketing techniques is kindly hard to do since they have limitation in dealing with that such technology. These marketing problems are similar to a study conducted by Nurhikmah et. al (30) that reveal in honey marketing,
inadequate in promoting, labelling, and fragile in marketing chain are major problems for beekeepers in Halmahera. Moreover, empowerment program needs to be more relevant, effective, sustainable, efficient, and contribute positive impact in empowering Talang Mamak. In other words, the poor should become a center of the empowerment program [31,32].

4. Conclusion
The empowerment program conducted by THNP using meliponiculture for Talang Mamak tribes live inside THNP’s territory reveal that honey production at five communities increases (avg. 63.12%) in the second semester except in Sadan that is slightly decline (9.89%). Furthermore, Air Bomban produce 16.3 kg in the second semester and had the highest honey production in the second semester or increase 91.06% compare to first semester. In addition, there was only in Bengayaan that only have six colonies that have not produced honey yet from total fifteen colonies. Meanwhile, sixty colonies of stingless bees that are placed at the other four communities are already active in producing honey and show that the communities are able to maintain those colonies. This result reveals that the empowerment through meliponiculture program is widely accepted and succeed. Nevertheless, the continuity of the program should be run by their own community. In other words, Talang Mamak tribes is advised to manage their own business, particularly in marketing, promotion, product diversification aspects. It is recommended that THNP as the main authority of THNP should keep this momentum and spirit by conducting assistances and accompaniments. For instances, THNP should conduct exhibitions and promotions to people, local government, and central government through social media, exhibitions, promotions, and meliponiculture educational tours.

References
[1] Taman Nasional Bukit Tiga Puluh 2017 Keanekaragaman dan Pesona Bukit Tiga Puluh Rengat
[2] Samsoeedin I and Pramono I B 1996 Studi Kemungkinan Perluasan Areal Taman Nasional Bukit Tiga Puluh di Provinsi Jambi Bogor
[3] S.Antoko B Kwatrina RT and Suryatmojo H 2006 Keragaman Jenis Hayati dan Pengelolaan Kawasan di Resor Granit Taman Nasional Bukit Tigapuluh Riau J Lit. Hut. dan Kons. Al. 3(5) pp 513–32
[4] Kuswanda W and Mukhtar A 2006 Potensi masyarakat dan peranan kelembagaan di zona penyangga taman nasional bukit tiga puluh J Lit. Hut. dan Kons. Al. 3(4) pp 459–75
[5] Sadad A 2018 Pengelolaan ekowisata taman nasional bukit tiga puluh berwawasan lingkungan di kabupaten Indragiri Hulu in Seminar Nasional Pelestarian lingkungan [Internet]. Pekanbaru Universitas Riau pp 1–6
[6] Melyana M Yoz D and Arlita T 2015 Interaksi sosial ekonomi masyarakat terhadap kawasan taman nasional bukit tiga puluh (studi kasus desa Rantau Langsat kecamatan Batang Gansal kabupaten Indragiri Hulu provinsi Riau) JOM Faperta 2(2) pp 1–8
[7] TFCA-Sumatera Taman Nasional Bukit Tiga Puluh Ancaman Utama 2016 [cited 2020 Sep 23] pp 1 Available from: http://tfcasumatera.org/bentang_alam/taman-nasional-bukit-tiga-puluh/
[8] Islamuddin 2014 Pengembangan Budaya Suku talang mamak sebagai nilai-nilai kearifan lokal dalam Bagian Civic Culture J. Pendidik. Ilm. Sos. 23(2) pp 55–67
[9] Sakagami SF Inoue T and Salmah S 1990 Stingless Bees of Central Sumatra in S F Sakagami R Ohgushi & D W Roubik (Eds) Natural History of Social Wasps and Bees in Equatorial Sumatra Sapporo Hokkaido University Press pp 125–137
[10] Michener CD 2007 The Bees of the World 2nd editions Baltimore USA The Johns Hopkins University Press pp 972
[11] Hamid SA Salleh MS 2016 Thevan K and Hashim NA Distribution and morphometrical variations of stingless bees (Apidae: Meliponini) in urban and forest areas of Penang Island Malaysia J. Trop. Resour. Sustain. Sci. 4(1) pp1–5
[12] Pribadi A 2020 Produktivitas panen propolis mentah lebih Trigona itama Cockerell (Hymenoptera: Apidae) menggunakan propolis trap dan manipulasi lingkungan di Riau Maj.
Ilm. Biol. Biosf. A. Sci. J. 37 (2) pp 60–8

[13] Kek SP Chin NL Yusof YA Tan SW and Chua LS 2018 Classification of entomological origin of honey based on its physicochemical and antioxidant properties Int. J. Food Prop. [Internet] 20(3) S2723–38 Available from: https://doi.org/10.1080/10942912.2017.1359185

[14] Priawandiputra W Azizi M Rismayanti Djakaria K Wicakseno A Rafiuddin R 2020 Lebah tanpa sengat (stingless bees) Panduan Budidaya Lebah Tanpa Sengat (Stingless Bees) di Desa Perbatasan Hutan 1st ed Priawandiputra W editor ZSL Indonesia Bogor

[15] Pribadi A and Wiratmoko ME Karakteristik 2019 Madu lebah hutan (Apis dorsata fabr.) dari berbagai bioregion di Riau J. Penelit. Has. Hut. 37(3) pp 185–200

[16] Wiratmoko MDE and Pribadi A 2020 Physicochemical characteristics of west Sumatera’s forest honey IOP Conf. Ser. Earth Environ. Sci. 2020 415 (1)

[17] Chuttong B Chanbang Y and Burgett MD 2014 World Bee World Jul pp 41–45

[18] Chidi OH and Odo PE 2017 Meliponiculture for sustainable economy Proc. 4th Delta State Univ. Fac. Sci. Int. Conf. (July) pp 131–137 Available from https://www.researchgate.net/publication/320922565_Meliponiculture_for_Sustainable_Economy

[19] ELTI 2019 Oil palm plantation staff member promotes beekeeping in Indonesia Yale School of the Environment;1 Available from: https://elti.yale.edu/our-stories/oil-palm-plantation-staff-member-promotes-beekeeping-indonesia

[20] Wicander S Vansteelandt N Lewis E Mant R Monitoring 2016 Evaluating adaptation interventions in Niumi National Park Gambia and Sangomar Marine Protected Area Senegal Cambridge Available from: https://www.unep-wcmc.org/

[21] Yoesoef N 1992 Masyarakat terasing dan kebudayaannya di propinsi Riau Pekanbaru Telaga Karya

[22] Faisal G and Wihardyanto D 2014 Studi tata ruang rumah tinggal suku talang mamak J. Tessa. Arsit. 12 (2) pp 97–104

[23] Mauludea H Nurhadianto and Islamuddin 2016 Budaya masyarakat suku talang mamak dalam bagian civic culture Edu. J. Pendidik. 14 (1829–8702) pp 53–68 Available from: http://journal.ikippgriptk.ac.id/index.php/edukasi/article/view/285

[24] Abdullah MY Sulehan J Abu Bakar NR Awang H Liu OP 2012 Participatory rural appraisal (PRA) an analysis of experience in Darmareja Village, Sukabumi District, West Java, Indonesia Akademika 82 (1) pp 15–9

[25] Asra R Diversity and distribution of Rattan Jernang (Arecaceae) in Bukit Duabelas National Park Indonesia Appl. Sci. Technol. 3 (1) pp 1–8

[26] Ari R Ikmat A and Antosa YAS 2016 Pendugaan produksi jernang ( Daemonorops didymophylla Becc.) berdasarkan karakteristik morfometrik rotan Media Konserv. 20 (2)

[27] Lembaga Sertifikasi 2015 Pekerjaan Sosial Pemberdayaan Kementerian Sosial

[28] Adi IR 2003 Pemberdayaan Pengembangan Masyarakat dan Intervensi Komunitas Edisi Revisi Jakarta Lembaga Penerbit Fakultas Ekonomi UI

[29] Putra AAS Wisadirana D and Mocthar H 2016 Strategi pemberdayaan masyarakat melalui pengembangan lebah madu kelompok tani tahura (KTT) (stud kasus di desa Dilem Kecamatan Gondang Mojokerto) Wacana J. Sos. dan Hum. 19(01) pp 36–45

[30] Hikmah N Nurdin AS Irmayanti L and Hanafi MY 2020 Strategi pengembangan usaha lebah madu kelompok tani mau sigaro hutan kemasyarakatan desa Gamsung kabupaten Halmahera Barat. J. Hutan dan Masy. 12(1) 58

[31] Chayati N Sarwono and Mardiyo 2013 The implementation of community empowerment program in reducing the poverty (Case Study of PNPM-Mandiri Urban in Besito Village Gebog Sub-district Kudus Regency Central Java) Wacana 16(3) pp 118–124

[32] Saleh A and Mujahiddin M 2020 Challenges and opportunities for community empowerment practices in indonesia during the covid-19 pandemic through strengthening the role of higher education Budapest Int. Res. Critics. Inst. Humanit. Soc. Sci. 3(2) pp 1105–1113