Technological Innovation of Muna Teak and Its Contribution Toward the Improvement of the Social Economy in Muna District

Desmiwati*, M. Zanzibar, Jonny H Panjaitan, Naning Yuniarti, Yulianti, Ratna U Damayanti

Forest Tree Seed Technology Research and Development Center
Jl. Pakuan Ciheleut PO BOX 105 Bogor

E-mail: desmiwati.wong@gmail.com

ABSTRACT. Muna Teak is known for its good quality wood and beautiful fiber. At present, remaining teak forests in Muna Regency are very limited due to the high level of degradation. This circumstance can drive the extinction of the genetic resources of Muna Teak. Therefore the efforts for reforestation of Muna Teak is needed continuously. The acceleration of reforesting Muna with teak requires innovation and new breakthrough, one of them is by increasing genetic diversity and producing superior clones by mutation techniques. What and how the innovations carried out and their impact on the community of teak farming farmers in Muna Regency are the questions and objectives of this research. This is qualitative research and the results are analyzed descriptively. Data collection carried out were interviews with questionnaires, depth interviews, field observations and literature studies. The results show that the use of technological innovation on Muna Teak by conducting breeding mutations, vegetative mass propagation, tissue culture and applying intensive silviculture techniques were able to accelerate harvest time, produce the highest quality wood and raise the selling prices. At the beginning of the planting period farmers can practice the intercropping system until the third year so that it can improve their socio-economic conditions.

1. Introduction

Teak (Tectona grandis L.f.) is a tropical timber tree that is widespread in Southeast Asia. In addition to Indonesia, teak plants can also be found in countries such as India, Myanmar, and Thailand. Teak wood is used for many purposes, but the most frequently used is for wood working especially for furniture. Furniture from teak wood is more expensive than other wood, so teak has become known as fancy wood for furniture making all the time [1]. One of the most famous teak producing regions in Indonesia is the Muna Regency, Southeast Sulawesi. Teak plants are iconic plants for Muna Regency and symbolically represented by the presence of “Tugu Jati” or “Monument of Teak” near the port in the capital of Muna, Raha. This indicates that teak is an important part of the history of Muna Regency. Even the spread of teak plants throughout the Muna regency makes this island once known as Teak Island [2].
The state forest area in Muna Regency, Southeast Sulawesi Province is 235,759 Ha, which is divided into 39,685 ha of permanent production forest, 11,693 ha of limited production forest, 46,363 Ha of protected forest, 82,009 Ha of nature tourism forest and 56,009 Ha of convertible production forest [2]. Teak was introduced to Muna by the Dutch, so the people called it *wuna kulidawa* which means “a tree brought from Java”, and grown in Muna to supply teak for European markets [3]. Teak can thrive and be suitable in the Muna area because it is supported by the type of soil where pH soil and climate are suitable. Optimal growth and good quality are the hallmarks of Muna Teak. Muna Teak has a dark color, beautiful fiber texture and generally has straight trunks [4].

However, the golden period passed quickly, the destruction of the Muna Teak forest occurred in a relatively short time so that the condition now became critical. Forest damage occurs due to socio-economic, cultural and political processes. There are three interrelated factors led to the destruction of teak forests in Muna, namely changes in government regimes, shifts in policies towards forest exploitation and cultural communities in forest use [3]. Another study stated that the damage to teak forests in Muna was caused by external and internal factors. External factors include unemployment, agricultural land deficit, low agricultural sector income, food scarcity, fuel wood deficit, deficit in green food consumption, theft of teak wood and rampant of Timber Forest Product Processing Industry (IPHHK). Meanwhile the internal factors are lower quality and lack of human resources, division of tasks and management authority is less clear, and the target of Regional Income (PAD) from the forestry sector is relatively high [5].

The high level of damage can drive the extinction of the genetic resources of Muna Teak, so the efforts of Muna Teak reforestation must be continued. The acceleration of reforesting Muna with teak requires innovation and new breakthroughs, one of that is by increasing genetic diversity and producing superior clones through mutation techniques. In this regard, the research was carried out with the aim of knowing what and how innovations were carried out to accelerate the process of multiplication of Muna teak and how it affected the community of teak cultivators in Muna Regency.

2. Methodology

2.1 Time and Location of Research

The research activity was carried out in October 2018. Field research was conducted in the area of Lambiku Village, Napabalano District, Muna Regency, Southeast Sulawesi Province.
2.2 Data Collection Technique

The data used consist of primary data and secondary data. Primary data were collected through interviews and questionnaire results by respondents who are cultivators of the Muna Teak planting demonstration plot and stakeholders involved in this program such as cooperative management, field foremen, company owner, and Head of KPH (Forest Stewardship Unit of State Forest Company). The interview question was intended to determine the extent of efforts, policies, institutions that had been carried out by various parties to support the planting of Muna Teak back in Muna Regency. Meanwhile the questionnaire questions for sharecroppers included questions about the preferences and social, economic and institutional aspects of sharecroppers on the activities of the Muna Teak demonstration plot. The total number of cultivating farmers involved is 9 (nine) individuals, however only 6 (six) met during the study.

2.3 Data Analysis

This study uses descriptive qualitative methods, with the following stages: preparation; data collection; data analysis and making studies. Data analysis used are growth evaluation analysis and descriptive analysis.

3. Result and Discussions

3.1 Description of Location

The location of the Muna teak demonstration plot resulting from mutation breeding is located in Lambiku Village, Napabalano District, Muna Regency, Southeast Sulawesi Province. This location is included in the Forest Management Units (KPH) Region VI of Muna Island. The area of Lambiku is 2,096 ha. The north is bordered with Kambungo Village, Lasalepa Subdistrict, on east bordered with Labonge Village, Lasalepa Subdistrict, south bordered with the Buton Strait and on the west bordered with Pentiro Village, Lasalepa District. The distance from the village to the sub-district is 9
km and to the regency capital is 20-25 km. The location of the village is also crossed by district roads so that access and transportation to Lambiku Village is easily accessible. Access to the planting demonstration plot should be about ± 2 km in. The access road condition is quite good but public transportation has not been passed, only motorcycle taxis are available.

The population of Lambiku is 2,928 people consisting of Muna ethnic (43.7%), Buginese (0.78%) and followed by lesser number of Javanese, Tolaki, Buton, West Nusa Tenggara, Bajo, and others. The majority of the population's religion is Islam (99.8%). The number of working age population (12-56 years) is 1,035 people (35.3% of the total population), which consists of 693 men (66.9%) and 342 women (33.04%). Livelihoods of the people of Lambiku are quite varied, most dominant in dryland agriculture/forestry with superior products are cashew nuts and sweet corn. The other livelihoods include carpenters, masons, fishermen, farmers, mechanics, motorcycle taxi drivers, and civil servants [6].

3.2 Characteristic of Respondents

The total land area of the teak planting plots of Muna resulting from mutation breeding in Lambiku Village, Napabalano Subdistrict, Muna Regency is 8.25 ha, which is cultivated by 9 (nine) farmers. Respondents who were successfully met were 6 (six) people (66.6%) out of a total of 9 (nine) people who were supposed to be respondents. Most of the respondents made dryland farmers/planters as the main occupation (66.6%) and the entire land management was dominated by men and women who were no longer in productive ages, although in all fields the cultivation of land is also operated by women (housewives).

The education level of the respondents varied both from those who did not attend school until graduating from high school. The number of family dependents is between 1-3 people (66.6%) because the age is sufficiently advanced and their children already have their own household. There are respondents who made plant as a basic livelihood (66.6%), but there are also those who made farming as an additional work (33.3%), as their main livelihood were retired civil servants and drivers. The profile of respondents was illustrated in Table 1.

| No | Description                  | Total | %   |
|----|------------------------------|-------|-----|
| 1. | Sex                          |       |     |
|    | a. Male                      | 6     | 100 |
|    | b. Female                    | 0     | 0   |
| 2. | Age                          |       |     |
|    | a. < 50                      | 0     | 0   |
|    | b. 50-70                     | 5     | 83.3|
|    | c. > 70                      | 1     | 0   |
| 3. | Number of family dependents  |       |     |
|    | a. 1-3 people                | 4     | 66.6|
|    | b. 4-6 people                | 1     | 16.6|
|    | c. > 6 people                | 1     | 16.6|
| 4. | Level of education           |       |     |
|    | a. None                      | 1     | 16.6|
|    | b. Basic elementary          | 2     | 33.3|
|    | c. Junior high school        | 2     | 33.3|
|    | d. Senior high school        | 1     | 16.6|
| 5. | Main profession              |       |     |
a. Farmer  
  b. Non farmer (retired civil servant, driver, etc) 

6. Second profession 
   a. Cultivator 
   b. Merchant 
   c. Non agriculture (Qur’an teacher, entrepreneurs) 
   d. None 

Source: Primary data (2018) 

3.3 Muna Teak Technology Innovations 

Technological innovation carried out on Muna Teak is the production of Muna Teak seedlings from prospective superior clones resulting from mutation breeding through macro/micro propagation. Seedling production is carried out in tissue culture laboratories and BP2TPTH nurseries. The Muna Teak irradiation activity was carried out at the Isotope and Radiation Application Center, the National Nuclear Energy Agency (PAIR BATAN). Clone propagation is done by tissue culture techniques and multiplication of clones with shoot cuttings.

Illumination of gamma ray irradiation was carried out on teak plant seeds originating from Muna with several levels of irradiation. The results from the irradiation of seed are several prospective clones of jati muna. Some prospective Muna teak clones were propagated in tissue culture media at BP2TPTH in 2017 (Table 2). Several prospective clones were continuously propagated using MS (Murashige and Skog) media with modified nitrogen concentrations from MS media.

Propagation of muna teak is done by cutting the explants section. Each explant of Muna teak can be cut into 4 segments within 1 month so that 30 explants in one month can be cut at least 4 segments to produce 120 explants. Propagation using tissue culture is proven to be able to multiply plant genetic material in the near future.

Table 2. Propagation through Muna teak tissue culture in the Laboratory

| No | Prospective clones | Number of explants | No | Prospective clones | Number of explants |
|----|--------------------|--------------------|----|--------------------|--------------------|
| 1  | 0 gy               | 273                | 21 | 80 gy 20          | 21                |
| 2  | 0 gy 8             | 385                | 22 | 100 gy 25         | 14                |
| 3  | 10 gy 10           | 30                 | 23 | 100 gy 2          | 14                |
| 4  | 10 gy 6            | 294                | 24 | 110 gy 20         | 700               |
| 5  | 10 gy 2            | 161                | 25 | 110 gy 18         | 7                 |
| 6  | 10 gy 4            | 154                | 26 | 110 gy 7          | 14                |
| 7  | 10 gy 15           | 364                | 27 | 120 gy            | 7                 |
| 8  | 10 u 5             | 252                | 28 | 130 gy 5          | 126               |
| 9  | 30 gy              | 245                | 29 | 130 gy 13         | 42                |
| 10 | 30 gy 25           | 336                | 30 | 140 gy 1          | 35                |
| 11 | 50 gy 18           | 210                | 31 | 140 gy 5          | 7                 |
| 12 | 50 gy 7            | 238                | 32 | 140 gy 13         | 70                |
| 13 | 50 gy 25           | 252                | 33 | 140 gy 3          | 7                 |
| 14 | 60 gy              | 168                | 34 | 150 gy            | 154               |
| 15 | 70 gy 1            | 4543               | 35 | 150 gy 4          | 133               |
| 16 | 70 gy 6            | 301                | 36 | 160 gy 5          | 28                |
After the explants of Muna teak are multiplied and the amount is sufficient, the explants are ready to be moved out (acclimatization). In the acclimatization process, several considerations are needed, including the provision of environmental conditions for teak plantlets to survive in this process. Acclimatization of Muna teak has not yet achieved maximum survival, this is because the ability to adapt plantlets to conditions outside the culture is not optimal [7][8]. At present, the survival of Muna teak plantlets is 44%. Deaths that occur due to the process of opening the acclimatization plastic lid. Planlet experiences dryness when a plastic lid is opened. Fungal and bacterial attacks are reduced when the acclimatization stage is changed. Changed stages are plantlets not washed in running water to remove the remaining media attached to the diplanlet, but cut into parts of the plantlets that touch the media. After cutting, the plantlets are immersed in a fungicide and bactericidal solution.

Acclimatized seedlings that grow in polybags are then made as genetic material for propagation using shoot cuttings. BP2TPTH has produced ten (10) prospective Muna teak clones that are morphologically different [9]. The ten candidates for this clone are then multiplied using the shoot cut technique. Table 3 shows the muna propagation data using monthly cuttings per month.

| No Prospective clones | Apr | May | June | July | Aug | Sept | Oct | Total | Grows (%) |
|-----------------------|-----|-----|------|------|-----|------|-----|-------|-----------|
| Control               | 37  | 23  | 24   | 35   | 28  | 49   | 46  | 242   | 94.75     |
| G1M1                  | 27  | 40  | 42   | 63   | 75  | 85   | 41  | 373   | 47.59     |
| G2M1                  | 27  | 23  | 34   | 41   | 57  | 76   | 47  | 305   | 70.54     |
| G3M1                  | 33  | 22  | 39   | 50   | 69  | 84   | 81  | 378   | 70.37     |
| G4M1                  | 41  | 54  | 30   | 64   | 58  | 62   | 50  | 359   | 63.11     |
| G5M1                  | 46  | 28  | 27   | 34   | 17  | 54   | 58  | 264   | 92.23     |
| G6M1                  | 37  | 40  | 67   | 82   | 110 | 82   | 55  | 473   | 40.67     |
| G7M1                  | 49  | 52  | 29   | 48   | 50  | 55   | 53  | 336   | 88.34     |
| G8M1                  | 51  | 40  | 36   | 41   | 47  | 56   | 60  | 331   | 82.29     |
| G9M1                  | 37  | 24  | 57   | 73   | 75  | 65   | 72  | 403   | 39.58     |
| G10M1                 | 32  | 9   | 32   | 41   | 30  | 55   | 43  | 242   | 32.16     |
| Total                 |     |     |      |      |     |      |     | 3.706 |           |

Source: Primary data (2018)

Making a clone collection nursery for the multiplication of Muna teak through shoot cuttings was carried out at the Nagrak BP2TPTH Research Station. The size of the nursery made for the prospective motherplants of the Muna teak clone is 1.2 m x 6 m with 75 cm high, covered by plastic to sustain the humidity. The number of motherplants planted in one nursery is 180. After 4 weeks
intensive treatment, such as treatment of fertilizer and weeding for the mother plants, buds began to grow and used for shoot cuttings. The application of fertilizer is carried out using liquid fertilizer obtained by dissolving NPK as much as 2g/liter to obtain new shoots from the mother plant as a source of cutting materials.

Propagation of prospective Muna teak clones through shoot cuttings is done with the intensity of cutting on average 1 time in one month, cutting is done 2-3 weeks after fertilization. The number of cuttings from motherplant (30 motherplants of each prospective clone) in the prospective Muna teak clones was higher than control (Jati inti clone 0). Although the cuttings produced from prospective clones of Muna Teak were higher, the growth ability of control teak was higher than the prospective Muna teak clones numbers G1M1, G6M1, G9M1 and G10M1. The process of making shoot cuttings of Muna teak is starting from the selection of shoots to maintenance of cuttings in the nursery followed by acclimatization outside the nursery. The stages of making shoot cutting of Muna teak are making clone collections and maintaining clone collections that have been carried out for the past 2 years and will be established as an operational standard procedure for making Muna teak shoot cuttings, making clone collections and maintenance stages of clone collections.

3.4 Evaluation of Planting Demonstration Plots on Muna

The Muna teak demonstration plot in the Muna Regency community plantation area (HTR), Southeast Sulawesi Province has been planted in February 2018. Maintenance activities have been carried out in the Muna teak plots by weeding every 4 months and providing NPK fertilizer in November 2018, with the dosage of 10 g/tree. The growth evaluation of the Muna teak demonstration plot (survival rate, height and diameter) is carried out in August 2018.

The growth evaluation results of Muna teak demonstration plots (life percentage, height and diameter) at 6 months old are presented in Table 4. It shows that candidate clones 6 has the highest initial growth (143.76 cm) and the lowest height is shown by candidate number 2. It is expected that the growth of prospective Muna teak clones at 12 months old would be significantly different among the clones. The diameter of prospective Muna teak clones is ± 2 cm, almost the same as the control clone diameter (clone no 0). The lowest percentage of life parameter is candidate clone number 7 (57.33%), while the highest percentage of life is candidate number 5 (94%) at 6 months after planting.

Table 4. The results of the evaluation of the growth of Muna teak in MTR Muna Regency, Southeast Sulawesi Province after 6 months

| Number clones | High (cm) | Diameter (mm) | Percent of life (%) |
|---------------|-----------|---------------|---------------------|
| Kontrol       | 137.5     | 20.88         | 88.00               |
| G1M1          | 117.91    | 18.68         | 68.67               |
| G2M1          | 88.39     | 17.05         | 80.67               |
| G3M1          | 124.79    | 20.68         | 89.33               |
| G4M1          | 133.27    | 19.85         | 84.67               |
| G5M1          | 124.53    | 19.36         | 94                  |
| G6M1          | 143.76    | 21.44         | 90.00               |
| G7M1          | 103.08    | 17.05         | 57.33               |
| G8M1          | 122.55    | 19.87         | 72.00               |
| G9M1          | 115.31    | 19.85         | 64.67               |
| G10M1         | 120.27    | 20.68         | 76.67               |

Source: Primary data (2018)
3.5 Contribution of the Muna Planting Plant Demonstration Development Program in Improving the Social Economy of Cultivators

a. Social Aspects of Cultivator Farmers

All respondents are Muna ethnic, who live in Lambiku Village, Napabalano Subdistrict, but there are also other sub-district residents who live in the huts on their land. The land for planting Muna teak plots as a result of the mutation breeding is a type of dry land and is an area of Production Forest which becomes Community Plantation Forest (HTR). This region obtained a license for management of Social Forestry in the form of 1,800 ha Community Plantation Forest. The first phase of the land area to be cultivated is 600 ha which is managed by 3 cooperatives namely the Kulidawawuna Cooperative, Mondonoqhoera and Anthocepilius, each managing 200 ha. The land for planting Muna teak plots is also included in the area that gets the permit. The number of tenants in the BP2TPTH demonstration plot area is 6 people interviewed, 4 of them are members of cooperatives, while the other 2 have not become members of any cooperatives.

The area of land cultivated by each farmer has been arranged by the cooperative management. Most of the land was processed jointly by men and women (husband and wife) (83.3%). Cultivated land in the Muna teak area produced by mutation breeding, using agroforestry systems, agricultural crops is commonly used as intercropping plants such as sweet corn and other vegetables (83.3%). Agroforestry is implemented in the hope that there will be additional income from the sale of sweet corn and vegetables while maintaining and caring for the teak seeds. For the care of the Muna teak plant, the cooperative which is the parent of the sharecropping farmers helps by providing corn seeds, controlling weeds (herbicides), fertilizers and providing wages for routine land clearing. As for vegetables (such as kale, eggplant, pumpkin, and tomatoes), the seeds were cultivated by buying seeds on the market.

Figure 2-3. Intercropping with sweet corn and vegetables (eggplant) in the Muna Teak-Southeast Sulawesi planting demonstration plot
Table 5. Profile of cultivated land plots of teak Muna

| No | Description                                           | Total | %   |
|----|------------------------------------------------------|-------|-----|
| 1. | Cultivated land area (ha)                           |       |     |
|    | a. <0,5                                              | 0     | 0   |
|    | b. 0,5-1                                             | 3     | 50  |
|    | c. 1-1,5                                             | 3     | 50  |
|    | d. >1,5                                              | 0     | 0   |
| 2. | Distance from home to arable land                    |       |     |
|    | a. <500 m                                            | 4     | 66,6|
|    | b. 500-1000 m                                        | 0     | 0   |
|    | c. 1000-2000 m                                       | 1     | 16,6|
|    | d. >2000 m                                           | 1     | 16,6|
| 3. | Who manages arable land                              |       |     |
|    | a. Only male                                          | 1     | 16,6|
|    | b. Only female                                        | 0     | 0   |
|    | c. Male and female                                    | 5     | 83,3|
|    | d. Productive age children                            | 0     | 0   |
| 4. | Types of plants on cultivated land                   |       |     |
|    | a. Teak+fruits                                       | 0     | 0   |
|    | b. Teak+vegetables                                   | 5     | 83,3|
|    | c. Teak+vegetables+fruits                            | 1     | 16,6|
|    | d. Only teak                                         | 0     | 0   |
| 5. | Source of business capital                           |       |     |
|    | a. Personal savings                                   | 2     | 33,3|
|    | b. Loan from neighbors/family/bank                    | 0     | 0   |
|    | c. Government assistance                             | 0     | 0   |
|    | d. Facilitated by employers (cooperatives)            | 4     | 66,6|

Source: Primary data (2018)

The duration of land use permits obtained by cooperatives in Lambiku Village from the government through the Social Forestry Program is for 35 (thirty five) years, but the arable land agreement between the cooperatives and cultivators in the first stage is 10 (ten) years. Kulidawawuna Cooperative consists of 94 people, Mondhonogoera 93 people and Anthocepilus 134 people. The members of the three cooperatives came from the villages of Napalakura, Langkumapo, Lambiku, Kombungo, Wakadia and Umba. As many as 30% of members of cooperatives are women. Two managers in the BP2TPTH demonstration plot area were not members of the cooperative, but their wives were members of the cooperative. Each cultivator gets 0.75-1.5 ha.

All sharecroppers respondents have huts on their land, most of them (66.6%) made the cottage as well as a place to live every day. The process of managing the land begins with land clearing (cutting stumps, collecting and cleaning bushes) until the land is ready for planting. In addition they also built work huts, safety fences and wells. In this activity the cultivating farmers get wages and materials to prepare their respective land from the cooperative. Furthermore, when the land is cleared, fertilizer, planting seeds, herbicides and sweet corn seeds for the plants are given.

Land management is carried out jointly by men and women (83.3%), starting from land clearing, planting and maintenance, both for main plants (teak) and plants in their entirety. The cropping patterns used by sharecroppers are simple intercropping/agroforestry patterns. Agroforestry is basically a system and technology uses land under the stands to increase productivity, protect land and preserve the environment by combining forestry and agricultural crops so that it can increase the
income of sharecroppers and overcome the poverty of communities around the forest [10]. This pattern is done so that income can be obtained to meet daily needs, while maintaining the teak plant. Teak plantations and sweet corn are facilitated by cooperatives, while other intercropping plants are provided by themselves (33.3%).

This agroforestry practice can only be done for 3 (three) years, after which the teak plant is large and the canopy will cover the land below, so it can no longer be cultivated. Cultivators only need to maintain their teak plants until harvest, which is for 10 (ten) years. In accordance with the profit sharing system agreement, the details are as follows: 35% for cooperative investors, namely the Public Development Center for Forest Development Services (P2H Center BLU) Ministry of Environment and Forestry (KLHK), 30% for managers, 28% for cooperatives, 5% for sharecroppers and 2% for Lambiku Village.

Muna Teak was famous from ancient times, the Netherlands had developed it on a large scale at that time. However, the current condition is not as it used to be and it took decades to restore the glory of muna teak if it still uses old and conventional planting patterns. One of Muna's community leaders, La Ode Rifai Pedansa (Mr. Rifai), has made a new breakthrough by using technological advancements and cooperation with various parties, including BP2TPTH to develop Muna Teak as a result of mutation breeding. "With this technology, we no longer need to wait for a long time for harvesting, the harvest period can be shortened by approximately seven to eight years of production" (Desa Lambiku, 16 October 2018). He also hoped that with the harvest time not too long, the people of Muna would again have the desire to plant teak, build forests, not only for the present, but also for the future of posterity, "This is the first step, the most important is sustainability and in the future, we all work together to restore this area to become a teak producer" (Desa Lambiku, 16 October 2018).

b. Economic Aspects of Cultivators

The economic conditions of cultivating farmers in the demonstration plot area are quite alarming, but they feel quite satisfied (83.3%) because they already have a guarantee to cultivate the land for the next ten years. The monthly income for land clearing and intercropping sales is between Rp. 700,000.00 - Rp1,500,000.00.

The family dependents are at most two people (66.6%), namely respondents and their wives, because their children have married and have their own livelihoods. In addition to being a sharecropper, there are also other income earners, namely pension income, drivers and other business activities (making leaf roofs), so they are not too concerned about this. As for the results of planting Muna teak, if they cannot see the harvest result, it will be descended to the heirs (written in the contract). This made them feel quite confident (50%) about the family's future.

| No | Uraian                                      | Jumlah | %   |
|----|--------------------------------------------|--------|-----|
| 1. | Satisfaction with current income           |        |     |
|    | a. Not satisfied                           | 1      | 16.6|
|    | b. Quite satisfied                         | 5      | 83.3|
|    | c. Satisfied                               | 0      | 0   |
| 2. | Current income confidence for the family's future |        |     |
|    | a. Not sure                                | 2      | 33.3|
|    | b. Sure enough                             | 3      | 50  |
|    | c. Confident                               | 1      | 16.6|
| 3. | Status of ownership of the occupied house  |        |     |
a. Belonging to parents 0 0
b. Legacy 0 0
c. Buy/build 6 100
d. Rent 0 0

4. Ownership status of vehicles owned (motorbike / car)
   a. Belonging to parents 0 0
   b. Legacy 0 0
   c. Buy/credit 3 50
      a. None 3 50

5. Amount of income each month
   a. <Rp1.000.000 3 50
   b. Rp1.000.000-Rp1.500.000 2 33.3
   c. Rp1.500.000-Rp2.000.000 1 16.6
   d. >Rp2.000.000 0 0

6. Some family members have savings
   a. Yes 4 66.6
   b. No 2 33.3

7. Saving place
   a. Save by self 0 0
   b. Bank 4 0
   c. Cooperative 0 0
   d. Microfinance institutions 0 0

8. Who accesses savings
   a. Respondent 1 25
   b. Partner 1 25
   c. Children 1 25
   d. Others 1 25

9. Some family members access credit
   a. Yes 1 16.6
   b. No 5 83.3

10. Who accesses credit
    a. Respondent 1 100
    b. Partner 0 0
    c. Children 0 0
    d. Others 0 0

11. Credit needs
    a. Property purchase 0 0
    b. Capital 0 0
    c. Daily needs 0 0
    d. Education fund 1 100

12. Credit service provider
    a. Bank 1 100
    b. Cooperative 0 0
    c. Individual loan 0 0
    d. Pawnshop 0 0

13. Loan amount
    a. <5 juta 0 0
    b. 5-10 juta 0 0
    c. 10-50 juta 0 0
    d. >50 juta 1 100

14. Payment term
15. Credit application process
   a. Easy  1  100
   b. Difficult  0  0
   c. Others

16. Credit guarantee system
   a. None  0  0
   b. Land certificate  0  0
   c. Vehicle documents  0  0
   d. Others (Retirement Letter)  1  16,6

Source: Primary data (2018)

The Lambiku villagers are familiar with the bank's savings and loan system, especially Bank Rakyat Indonesia (BRI), and even one farmer has become an active borrowing customer to date. The purpose of using the loan is for children's education funds, with a large loan amount above 50 million, using Retirement Letter as a collateral. Therefore, for sharecroppers who are members of cooperatives banking practices are common. The three cooperatives in carrying out their business in the field of Muna teak planting were assisted by private companies (Jati Wuna Lestari Inc.), in which they proposed large-scale loans to develop teak businesses. This is not burdening the farmers, even greatly helped by opening new jobs so they could raise level of welfare.

c. Institutional Aspects of Cultivators

By becoming a member of a cooperative both tenants and their wives (66.6% of members of the Cooperative in Mondonoghoera and 33.3% of members of the Kulidawawuna Cooperative) must follow the set of rules. Explanation of the rules, rights and obligations of cultivating farmers are all listed in the signed contract. Each cultivator understands and is ready to follow the agreed conditions. One of the provisions is not to plant coconut and cashew nut trees on arable land.

| No | Uraian | Jumlah | % |
|----|--------|--------|---|
| 1. | The number of activities involved in the community that are followed | | |
| | a. 1 organisation (Cooperative) | 6 | 100 |
| | b. 2-3 organisations | 0 | 0 |
| | c. > 3 organisations | 0 | 0 |
| | d. None | 0 | 0 |
| 2. | Who participated in the activity | | |
| | a. Respondent | 4 | 66,6 |
| | b. Partner (respondents did not join the cooperative) | 2 | 33,3 |
| | c. Respondents and other family members | 0 | 0 |
| 3. | Activity level | | |
| | a. Off | 0 | 0 |
| | b. Fair | 0 | 0 |
| | c. Active | 5 | 83,3 |
| | d. Very active | 1 | 16,6 |
| 4. | Group quality | | |
| | a. Low | 0 | 0 |
Cultivating farmers are not very active in the activities of other organizations/institutions, other than the cooperatives they participate in. Cooperatives that are followed by tenants are cooperatives that receive social forestry permits in the form of Community Plantation Forests (HTR). In accordance with P.83/MENLHK/SETJEN/KUM.1/10/2016 concerning Social Forestry, what is meant by Social Forestry is "Sustainable forest management systems carried out in state forest areas or customary/customary forest areas carried out by local communities or customary law communities as the main actors to improve their welfare, balance the environment and socio-cultural dynamics in the form of Village Forests, Community Forests, Community Plantation Forests, Customary Forests and Forestry Partnerships". So that with the existence of a social forestry program, it is expected that poverty alleviation in rural areas can be realized through community involvement in forest management. The forest area which is currently categorized as critical land can be restored to quality. Community involvement in forest management can also reduce pressure on forests in their area [10].

There are three HTR permit holders cooperatives in Muna. To finance large-scale Muna teak plantations, the three cooperatives are managed by Jati Wuna Lestari Inc. which is directly commanded by Mr. Rifai. Jati Wuna Lestari Inc. cooperates with community plantation forests through a profit sharing scheme with the Public Development Center for Forest Development (BLUP2H Center).

The rules for playing in this collaboration have also been implemented directly in the field, namely the existence of a share for social management of 10% of the funding as proposed by the manager. Cultivating farmers who are also members of cooperatives, plant teak staples and for the first three years they can utilize land between teak and agroforestry plants so that it gives direct benefit to sharecroppers (members of cooperatives).

Jati Wuna Lestari Inc. in addition to being a manager also becomes a companion for cooperatives that have been formed. This assistance is sought to foster the empowerment and self-reliance of farmers/members. Assistance carried out includes how cooperatives run their businesses, interact and connect among members, and create network with outside parties. This assistance is carried out to increase awareness in order to fulfill the needs and solve problems faced by farmer groups.

4. Conclusions

As an effort of genetic conservation and development of Muna Teak, technological innovations have been carried out namely the production of seedlings from 10 (ten) prospective Muna Teak clones resulting from breeding mutations through multiplication of tissue culture and shoot cuttings. The results of propagation through macro cuttings have been planted in field testing demonstration plots with agroforestry patterns and involve farmer groups in Lambiku Village, Napabaleno Subdistrict, Muna Regency covering an area of 8.25 hectares involving 9 (nine) cultivators. The positive impact has begun to be seen with the existence of the Social Forestry program in the Community Plantation Forest and the Muna Teak planting demonstration development program. This improvement includes the socio-economic aspects of the sharecroppers. Those who initially did not have access to land, now have access to land planted with Muna Teak and for the next 3 (three) years can intercrop and when Teak harvests within the next 10 (ten) years, they will also get a share
which is quite satisfying. In addition to the improvement in terms of institutions, improvement of human resource capacity is also felt by the existence of field assistance.

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