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Development of Curcuma Caesia (Black Turmeric) Cultivation as a Leading Local Traditional Medicine Plant

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ABSTRACT

Development of Curcuma Caesia (Black Turmeric) Cultivation as a Local Superior Traditional Medicinal Plant which was carried out in Kekuyang Village, Ketol District, Central Aceh Regency. Our motivation for carrying out this activity, based on the search results, found a lack of understanding of community literacy regarding traditional medicinal plants that can be used as income, namely black turmeric, the minimum amount of fertilizer available, the number of farmers, the number of pesticides and the number of seeds also affect the productivity of black turmeric, in addition to land use which can be used as a location for the biodiversity of medicinal plants has not yet been found. It is hoped that the purpose of this service can provide community understanding regarding the mapping of the biodiversity of local superior traditional medicinal plants, provide public understanding of the benefits and efficacy of black turmeric as a traditional medicinal plant, then form conservation groups, carry out conservation by cultivating rare medicinal plants throughout the region so that the area has a branding as a center for the conservation of medicinal plant biodiversity and makes the conservation center a center for medicinal plant education with a conservation group as the main tutor as well as a center for the medicinal plant business. The implementation method is by way of roadmap mapping, carrying out the stages of activities starting from identifying needs, briefly describing the target audience, planning forms of intervention, establishing partnerships with parties outside the village, mapping success, and measuring and implementing the program. The results of the activity show that the great potential that Kekuyang Village has to expand black turmeric production is supported by the condition of the fertile area, the participation of farmers, and also the support of residents and village apparatus in this program which is very responsive and supported by Reje (village head) to advance the area by introducing all over the world and also accepting all forms of investment in potential agriculture.

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INTRODUCTION

This Black Turmeric / Turmeric plant is very rare, but it contains many properties. Black turmeric is one of the Zingiberaceae plant groups, which has the Latin name Curcuma Caesia. The shape of black turmeric is the same as regular turmeric but the rhizomes are dark black when they are ripe. Black turmeric comes from

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India, where it is used as a traditional medicinal plant. But unfortunately, this plant is rarely found. In Indonesia, the cultivation of black turmeric plants is very small, even though this plant is highly sought after, especially in the pharmaceutical industry. The content of this plant is very diverse, such as containing curcumin, desmetoxicumin, and bisdesmetolsicurcumin. Black turmeric also contains essential oils which are a combination of sesquiterpene ketones, turmerone, tumeon 60%, zingiberen 25%, feladren, sabinen, borneol, and sineil. Other ingredients such as low fat, low carbohydrates, protein, starch, vitamin C and minerals. This content is very good for health, especially during the healing period.

Other names for this black turmeric include cadvar in Turkey, black turmeric in England, black hardy, black Curcuma, and many other names in every country. The stem of the black turmeric plant is no different from other turmeric plants, namely, it has a pseudo stem which is a collection of many leaf strands where the leaves can be peeled off. The stem is between 33-55 cm long. The leaves of the black turmeric plant are oval and elongated with a reddish color on the edges. The color of the leaves is mostly bright green while on the reverse it has a pale green color. Leaf stalks have a long ivory-white color. The flower color of the turmeric plant is white with a purple flower tongue that sticks out. Turmeric flowers are not easy to find because they rarely flower. A turmeric rhizome is a place where there is a food supply in it. This turmeric rhizome has different sizes from one depending on several determining factors forming the rhizome. Black turmeric is quite popular as a traditional herbal medicine, especially in its home country, India. In India, black turmeric is used as a remedy for coughs and colds, pneumonia, fever, and asthma. In addition, turmeric is also used as a migraine reliever by pounding it and attaching it to the forehead and can overcome snake bites, and deadly insects such as centipedes and scorpions. In Indonesia alone, the popularity the benefits of black turmeric are also quite well known. Black turmeric is usually used as a herbal medicine to treat stomach pain, increase appetite, increase stamina and overcome coughs. It is also used as a blood purifier. Black turmeric is also used as a remedy for rashes, ringworm, and scabies. Black turmeric can also help with itchy skin. This is because the content in black turmeric is capable of being anti-inflammatory so in addition to overcoming itchy skin, turmeric can also be used as an anti-inflammatory on itchy skin. In some types of drugs that treat rashes, it is not uncommon to contain turmeric extract, this is because turmeric has been proven to be able to cure rashes. Sufferers of ulcer disease should not hesitate to consume turmeric. This is because turmeric can suppress stomach acid so that ulcers will not happen to you. Those are the benefits of black turmeric that you can fully get by consuming black turmeric.

With topographical conditions like this, it is very suitable for black turmeric cultivation where turmeric plants can grow well in areas that have full or moderate light intensity so that these plants live very well in open places or little shade. The best growth is achieved in areas that have rainfall of 1000-4000 mm/year. When planted in areas with rainfall < 1000 mm/year, the irrigation system must be sufficient and well managed. This plant can be cultivated throughout the year. The best growth is in the early rainy season planting. The optimum air temperature for this plant is between 19-30 oC. Turmeric grows well in the lowlands (from <240 m asl) to the highlands (> 2000 m asl). Optimum production + 12 tons/ha is achieved at an altitude of 45 m above sea level. To these problems, in Kekuyang Village there is still a lack of public understanding of traditional medicinal plants that can be used as a promising income. Lack of understanding of the monoculture system / intercropping so that the cultivation of this plant is minimal.

LITERATURE REVIEW

a. Definition of Cultivation

Plant cultivation is one or several techniques in the business of breeding or developing a type of plant in certain ways.

According to Sunjian

According to Sunjian, cultivation is agricultural development carried out by the community individually or in groups to achieve results that meet basic human needs.

According to Chairun Hanum

According to Chairun Hanum, cultivation is a process in which food and other agro-industrial products are made using plant resources and horticultural crops, food crops, and plants produced as objects of cultivation.

Based on PP RI No. 18 of 2010

According to PP RI No. 18 of 2010, cultivation is the development and use of vegetable natural resources by humans using capital, technology, or other resources to produce products in the form of goods to meet human needs.

b. Definition of Curcuma Caesea (Black Turmeric)

Turmeric is a medicinal plant in the form of a shrub and is annual (perennial) and is spread in the tropics. Turmeric plants thrive and are wild around forests or former gardens. It is thought to have originated from Binar at an altitude of 1,300-1,600 m above sea level, some say that turmeric comes from India. The word Curcuma comes from the Arabic Kurkum and Greek Karkom (Anonymous, 2010).

Turmeric is spread almost throughout Indonesia and is known by the names of their respective regions: turmeric (Aceh), hunik (Batak), koneng (Sunda), turmeric (Java), Konye (Madura), cahang (Dayak), huni (Bima), awahulu (Gorontola), kandefaifu (Irian) (Permatasari, 2011).

Benefits of Black Turmeric for Health

There are various health benefits of black turmeric, including:

1. Counteract free radicals

Black turmeric contains antioxidants that are quite high. Antioxidants are important compounds needed to protect body cells from damage caused by exposure to free radicals, such as cigarette smoke, pollution, and vehicle exhaust. By consuming foods that contain antioxidants, you can be better protected from heart and liver disease.

2. Relieve pain

Black turmeric extract is believed to act as an analgesic. When processed in the right way, black turmeric is useful for relieving pain from toothaches and sprains and can reduce fever.

3. Reducing the risk of infection

As with yellow and white turmeric, black turmeric also has antibacterial and antifungal properties. This makes black turmeric can be used to inhibit the growth of bacteria, such as Staphylococcus aureus and Candida albicans fungi, which can cause infections in the body.

4.Helps prevent inflammation

Consumption of black turmeric is believed to be able to help the body prevent inflammation or inflammation. However, you still need to balance it with a healthy diet, because a poor diet can also trigger inflammation.

5. Reducing the risk of getting cancer

Cancer can occur when cells in the body experience abnormal growth, which is caused by genetic changes or mutations in cells. A study shows that black turmeric extract has antimutagenic compounds that can prevent cancer from occurring in the body.

c. Conservation

Conservation is defined as an effort to manage natural resources wisely based on the principle of preservation. Natural resources are biological elements consisting of vegetable natural resources (plants) and animal natural resources (stwa) with non-biological elements around them which as a whole form an ecosystem. (KEHATI, Meru Betiri National Flora and Fauna Inventory Inventory Course material, Malang, 2000: 8)

According to the Big Indonesian Dictionary. Conservation of Biological Natural Resources is the management of natural resources (biological) by using them wisely and ensuring the continuity of supply while maintaining and increasing the quality of the value of their diversity. (Department of National Education, Big Indonesian Dictionary, Third Edition, Balai Pustaka, print 3, Jakarta 2005: 589)

This understanding is also stated in the Law of the Republic of Indonesia concerning the Conservation of Living Natural Resources and their Ecosystems Article 1 Number 5 of 1990.

Conservation benefits are realized by:

i. The preservation of natural conditions and the environment means that conservation efforts are carried out by maintaining that conservation area are not damaged.
ii. The avoidance of disasters due to changes in nature, which means disturbances to flora and fauna and their ecosystems in particular and natural resources in general cause changes in the form of damage or a decrease in the quantity and quality of these natural resources.
iii. Avoiding living things from extinction means that if disturbances that cause a decrease in the number and quality of living things are left without any control measures, these living things will lead to extinction or even extinction.
iv. Being able to achieve environmental balance both micro and macro means that in an ecosystem there is a close relationship between living things and their environment.

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v. Being able to contribute to science means that conservation efforts as a means of preserving and preserving flora and fauna are a support for cultivation, a means for studying extinct and not yet extinct flora and fauna in terms of their nature, potential, and use.
vi. Being able to contribute to tourism means that its characteristics and objects are ideal areas such as recreation or nature tourism. (KEHATI, Meru Betiri National Flora and Fauna Inventory Inventory Course material, Malang, 2000: 8)

d. Biodiversity

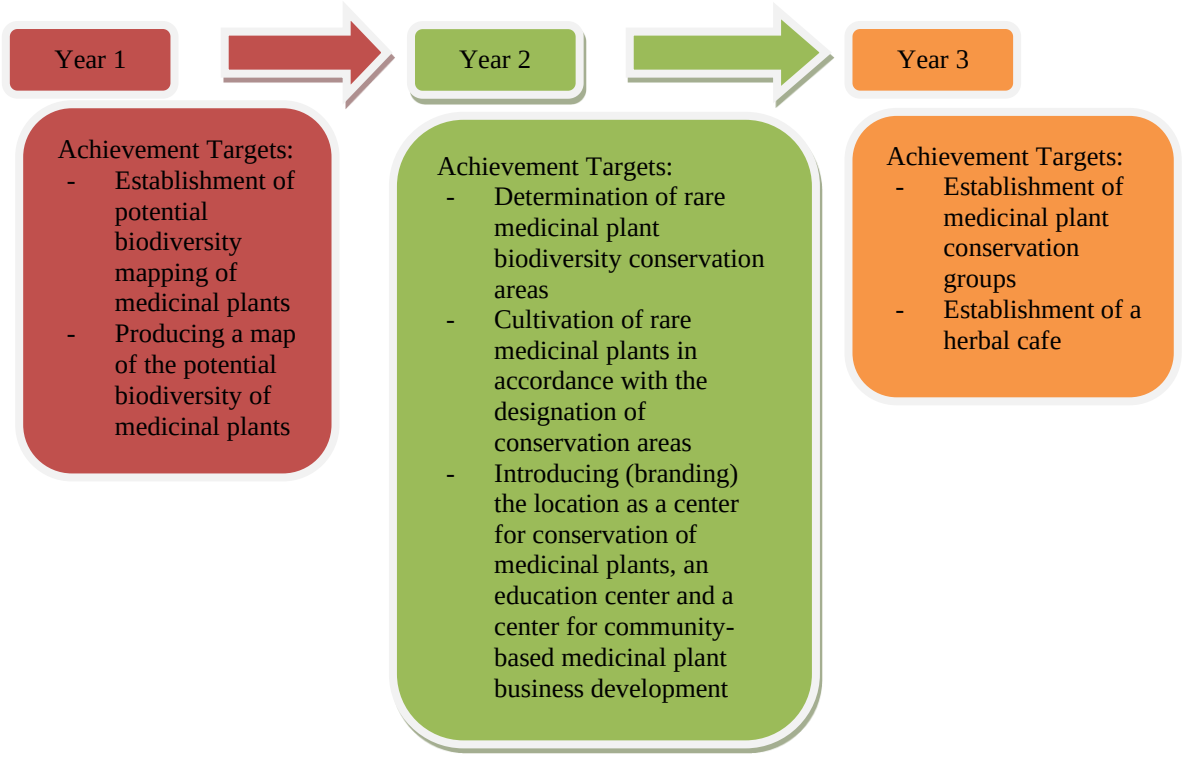
Biodiversity (biological diversity or biodiversity) is all living things on earth (plants, animals, and microorganisms) including the genetic diversity they contain and the diversity of ecosystems they form (DITR 2007). Biodiversity itself consists of three levels (Purvis and Hector 2000), namely:

1. Species diversity, namely the diversity of all species of living things on earth, including bacteria and protists as well as species from the multicellular kingdom (plants, fungi, multicellular or multicellular animals).
2. Genetic diversity, namely genetic variation within one species, both among geographically separated populations, as well as among individuals within one population.
3. Diversity of ecosystems, namely different biological communities and their respective associations with the physical environment (ecosystem).
4. Biodiversity is the basis for the emergence of a variety of ecosystem services, both in the form of goods/products and in the form of environmental services that are indispensable for the livelihoods of living things, especially humans.

METHOD OF IMPLEMENTATION

The method for implementing this Student Organization Capacity Development Program, namely:

1. Activity Roadmap



2. Activity Stages
   a. Identify community needs
      - Socialization and provision of understanding of traditional medicinal plants and the biodiversity of traditional medicinal plants
      - Assistance and guidance on planting biodiversity of traditional medicinal plants
   b. A brief description of the target audience
      - The topographical location of the land is highland with an altitude of 900 meters above sea level
      - The average maximum air temperature for Central Aceh District is 26 ℃. Meanwhile, the altitude of Central Aceh Regency ranges from 850-1,700 mpdl.

- Most of the villagers are farmers.

c. Intervention plan

The program will provide an intervention focus on training and assistance in community organizing in the form of farmer groups, development of tools and supporting tools, development of open literacy, technological input, and development of the best models for replication of program implementation according to the context, characteristics and local wisdom of each target village of the program.

d. Partnership with parties outside the village

Partners are individuals or institutions that are considered to have the potential to collaborate with villages and participation in partnerships in the form of funds, equipment, expertise, systems, and forms of participation that support community empowerment efforts. Prospective partners can come from individuals, SKPD, State Ministry, NGOs, Foundations, State Owned Enterprises, Private Owned Enterprises, Cooperatives, and other forms by the laws and regulations in Indonesia;

e. Success indicators and measurement methods

The expected success indicator of the Ormawa PPK program is more than 80%. If the percentage obtained exceeds 80%, it can be said that PPK Ormawa activities can develop the capacity of Student Organizations. Conversely, if the percentage obtained does not reach 80%, it means that the Ormawa PPK activities have not been able to develop the capacity of Student Organizations. The results of the percentage of respondents' answers can then be compared with indicators of the success of Ormawa PPK which are used to determine the success rate of Ormawa PPK.

The basis for determining the sample of respondents according to Arikunto (2006), namely, if less than 100, it is better to take all of them until the research is a population study. If the number of subjects is large, it can be taken between 10-15% or 20-55% or more. Primary data was collected through data collection techniques with respondents based on the success of the Ormawa PPK activities. Respondents for this primary data questionnaire were taken from a population sample of the Kekuyang village community. Determining the number of samples is calculated using Total Population x 20% = 429 people x 20% = 85.8 people (rounded up to 85).

The research analysis uses a scale that contains five levels of answers which is an ordinal type scale. The results of the community questionnaire answers are then analyzed based on frequency (amount) or proportion (percentage) with the formula:

The interpretation of the percentage results obtained from the formula refers to the table developed by Arikunto (2006). as shown in the following table.

Table of Value Interpretation %

f. Implement programs

The several stages of implementing the activities to be carried out include:

a) The planning stage was carried out and debriefing the 2022 Student Organization Capacity Building Program (PPK Ormawa) team consisting of 10 people who then prepared proposals which were then submitted, this program was carried out from July to November 2022.
b) The preparatory stage was carried out for one week to make a cooperation agreement with the residents of Kekuyang Village, preparation of an activity schedule, and implementation of activities in Kekuyang Village.
c) Implementation stage
   i. Introduction and Introduction to the program.
   The introduction includes an introduction to the program being implemented to create a public understanding of the objectives and benefits of the 2022 Student Organization Capacity Building Program (PPK Ormawa).
   ii. Socialization
   The socialization was carried out by forming an implementing team for the student capacity-building program consisting of 25 local farmers. The socialization stage aims to provide a theoretical understanding of the target community so that the community is ready to implement the program.
   iii. application stage
   This stage includes technical guidance assistance including:
   - Seedlings, Seed Requirements, Seed Preparation, Seed Seeding Techniques and Seed Transfer
   - Processing of planting media, land preparation, land clearing, formation of beds, fertilization (before planting)

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- Planting Techniques, Determination of Plant Patterns, Making Planting Holes, How to Plant, Planting Period
- Plant Maintenance, Stitching, Weeding, Pembubunan, Fertilization, Irrigation and Watering, Timing of Pesticide Spraying, Mulching

g. Forms of local government support

To anticipate various issues that exist, it is hoped that the local government will provide communication channels so that the community can express their opinions. This line of communication includes public meetings, interviews, consultations, and written submissions. Another form of stimulating community involvement is through participatory planning to prepare development agendas, participatory monitoring, evaluation and supervision, and consultation mechanisms to resolve sectoral issues.

h. Forms of target group development

The form of coaching in the PPK Ormawa program can be done by forming farmer and community working groups to fulfill and resolve a problem and Student Organizations can bridge activities including public meetings, interviews, and consultations and involve themselves in assisting the community in preparing development agendas, monitoring, evaluating and participatory monitoring and consultation mechanisms to resolve sectoral issues.

i. Monitoring and evaluation

- Review of the program implementation process carried out by each program implementing member and farmer group according to plan.
- Review the documentation of procedures or work activities to ascertain whether the work procedures are easily understood by program implementing members.
- Comparing the process with the expected results by examining work procedures and activity reports in the field.
- Record findings/nonconformances, namely if other nonconformances are found that require improvement.

j. Workshop

The workshop on the results of the Ormawa PPK program will be disseminated by presenting local regional stakeholders including gechik (reje wali), ministries/agencies and local governments, media groups, community groups such as farmer groups, as well as groups of non-governmental organizations and community organizations.

k. Audience

The results of this program activity will be held by hearings with the local government by holding public meetings, interviews, and consultations and involving themselves in assisting the community in preparing participatory development, monitoring, evaluation, and supervision agendas and consultation mechanisms as an exploration of sustainable potential.

l. Data processing and reporting

Data processing and reporting will be carried out jointly by dividing tasks among each member of the student organization and accompanied by a companion lecturer as a director.

m. Description of activities after the report is completed

Activities after the reporting are complete will be carried out by conducting periodic monitoring (2 times a week or once a week), this monitoring will involve as many as 5 students and accompanied by local people who are entrusted with maintaining and monitoring the development of plants during the planting process until after harvest.

n. target data update

Updating target data for 2 (two) months after the implementation of the program which will be filled in by students and accompanying lecturers.

RESULTS AND DISCUSSION

Potency

The results of the implementation during the activity, the development of black turmeric seedlings showed good development potential for growth in the Kekuyang Village location, Ketol District, but several seeds experienced rot due to excess water during the initial planting yesterday. It takes time and patience to grow these black turmeric seeds because good potential development can be seen in 3 to 4 months. The second phase of the visit was only 1 month away, so not all of the new shoots appeared in the development of the seedlings.

The enthusiasm of the farmers is very large, they are happy with activities like this and hope that they will be carried out on an ongoing basis. Moreover, the arrival of these students helped them to increase their literacy in understanding black turmeric plants, and how to market them.

Target initial conditions,

At first, the farmers did not know of the black turmeric plant, most of the farmers in Kekuyang Village planted coffee, nutmeg, candlenut, areca nut, red ginger, red chilies, green chilies, and cayenne pepper in collaboration with the toke or collectors of their crops. only after the socialization of the Ormawa PPK activities did they know about this black turmeric plant. With enthusiasm, the farmers in Kekuyang Village want to work together to plant black turmeric with careful planning starting from the planting process, availability of seeds, tools, and fertilizers as well as marketing that has been planned in collaboration with local stakeholders from both the related Office, Community Organizations and Apparatus Local government.

Activity Process

The implementation of the Ormawa PPK program is planned in two stages.
Phase I will be held on July 25, 2022. At this stage the activities carried out are:

- preparing agricultural equipment materials,
- clearing the site/cropland,
- drying the black turmeric seeds and soaking them in onion water to provide nutrition to the seeds for half a day,
- mix the soil with manure,
- insert soil media into small polybags and
- arranged in a place that has been provided for the nursery.

Phase II will be held on September 5, 2022. At this stage the activities carried out are:

- prepare the required agricultural equipment materials,
- re-cleaning the location/cropland,
- checking seedlings that have the potential to grow,
- separate seeds contaminated with pests
- adding manure to potential seedlings

Program Sustainability

Seeing the potential of the area in Kekuyang Village, Ketol District, Central Aceh Regency which has a topographical location of the land is a highland with an altitude of 900. Mdpl Village area 44,000 HA With topographical conditions like this it is very suitable for black turmeric cultivation where turmeric plants can grow well in areas that have light intensity full or medium, so this plant is very good living in open places or a little shade. The Kekuyang area has a rainfall of 1000-4000 mm/year. When planted in areas with rainfall < 1000 mm/year, the irrigation system must be sufficient and well managed. This plant can be cultivated throughout the year. The best growth is in the early rainy season planting. The optimum air temperature for this plant is between 19-30 oC. Turmeric grows well in the lowlands (from <240 m asl) to the highlands (> 2000 m asl). Optimum production + 12 tons/ha is achieved at an altitude of 45 m above sea level. with the support of these conditions to grow black turmeric is very large and has the potential to be produced every year. Therefore, the continuation of the PPK Ormawa program can help Kekuyang Village farmers to improve their economy and wide-open welfare. Future planning can be carried out by establishing a biodiversity conservation area for rare medicinal plants, cultivating rare medicinal plants by the designation of a conservation area, and introducing (branding) the location as a center for medicinal plant conservation, education center, and center for community-based medicinal plant business development, forming conservation groups medicinal plants, the establishment of herbal medicine cafes.

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Achievement of Goals and Indicators

The implementation of PPK Ormawa activities is going well and smoothly by the achievement of the goals and indicators that have been set. Achievement data can be seen in the following figure and table:

Picture of Achievement of Goals and Indicators

Table of Achievement of Goals and Indicators Defined

No.	Achievement Indicator	Change Data		
		Before	After	%
1	Mapping the potential of medicinal plant biodiversity	There aren't any yet	Already available	40%
2	Biodiversity potential map	There aren't any yet	Already available	40%
3	A rare medicinal plant biodiversity conservation area	There aren't any yet	Already available	20%
4	Cultivation of medicinal plants by the designation of conservation areas	There aren't any yet	Belum Ada	0%
5	The branding of the activity location as a center for medicinal plant conservation, an education center, and a community-based medicinal plant business development center	There aren't any yet	There aren't any yet	0%
6	Formation of medicinal plant conservation groups (20-25 people)	There aren't any yet	There aren't any yet	0%
7	Establishment of a herbal cafe	There aren't any yet	There aren't any yet	0%

Lecturer Recommendations

1. Establish a UPT Business Incubator within the University as a place for students to carry out entrepreneurial, research and community service activities.
2. Regarding biodiversity conservation areas, a collaboration between universities and local governments, and offices related to the legality of forest areas as medicinal plant conservation areas is needed.

CONCLUSION

The potential of the Kekuyang area is very large because the location where we carry out this activity is included a forest area, the soil conditions are fertile and the rainfall is of moderate intensity and the air temperature ranges from 19-30 oC. Turmeric grows well in the lowlands (from <240 m asl) to the highlands (> 2000 m asl). Optimum production + 12 tons/ha is achieved at an altitude of 45 m above sea level. Based on these conditions, the purpose of this activity is to have the potential to develop the cultivation of Curcuma cease (black turmeric) as a local superior traditional medicinal plant with the achievement of indicators which can be explained as follows:

1. Mapping the potential for the biodiversity of medicinal plants that did not exist before is now available with an achievement rate of 40%
2. Biodiversity potential maps that previously did not exist now exist with an achievement rate of 40%

3. Biodiversity conservation areas for rare medicinal plants that did not previously exist now have an achievement level of 20%.

Follow-Up Suggestions

The suggestions and follow-ups that we can describe in the activities of developing Curcuma ceasea (black turmeric) seeds are as follows:

1. It is necessary to assist farmers in cultivating the medicinal plant Curcuma ceasea (black turmeric) to make it easier for farmers to plant the medicinal plant Curcuma ceasea (black turmeric) and increase understanding so that it will produce good and maximum production.
2. Establish partnerships, either individuals or institutions that are considered to have the potential to collaborate with villages and have participated in partnerships in the form of funds, equipment, expertise, systems, and forms of participation that support community empowerment efforts. Prospective partners can come from individuals, SKPD, State Ministry, NGOs, Foundations, State Owned Enterprises, Private Owned Enterprises, Cooperatives, and other forms by the laws and regulations in Indonesia;
3. Expanding the network through the dissemination of information on social media, so that the location of activities will be branded as a center for medicinal plant conservation an education center, and a center for community-based medicinal plant business development.
4. The process of legalizing the status of forest conservation area land management into cultivating land management by farmers requires a long time and is a complicated process, therefore we need support and assistance in this process.
5. Provision of funds or a place to open a herbal cafe.

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