



Project ITTO PD 646/12 Rev. 3 (F)

Initiating The Conservation of Cempaka Tree Species (*Elmerrilia* spp.) Through Plantation Development With Local Community Participation in North Sulawesi

Research and Development Centre for Environment and Forestry of Manado
Research Development and Innovation Agency
The Ministry of Environment and Forestry of Indonesia



Background Information

- ITTO Project PD 646/12 Rev.3 (F) entitled “Initiating the conservation of cempaka tree species (*Elmerrillia* sp.) through plantation development with the local community participation in North Sulawesi” had been implemented by Research and Development Centre for Environment and Forestry Research of Manado, Research Development and Innovation Agency (FORDA), The Ministry of Environment and Forestry of Indonesia.
- Cempaka is one of the most precious wood species of the communities in North Sulawesi. Cempaka is widely used in industry of Minahasa Wooden Houses, or in the local name it is called “Wale Kai / Wale Rakek / Wale Loji” (Press com). Cempaka is also a cultural symbol of the Minahasa people.





The supply of cempaka wood from natural and community forests **are declining**

Many industries use **substituted wood** or other species to replace cempaka wood

The unbalance between supply and demand for cempaka wood both in quantity and quality causes **unsustainable** use of cempaka resources

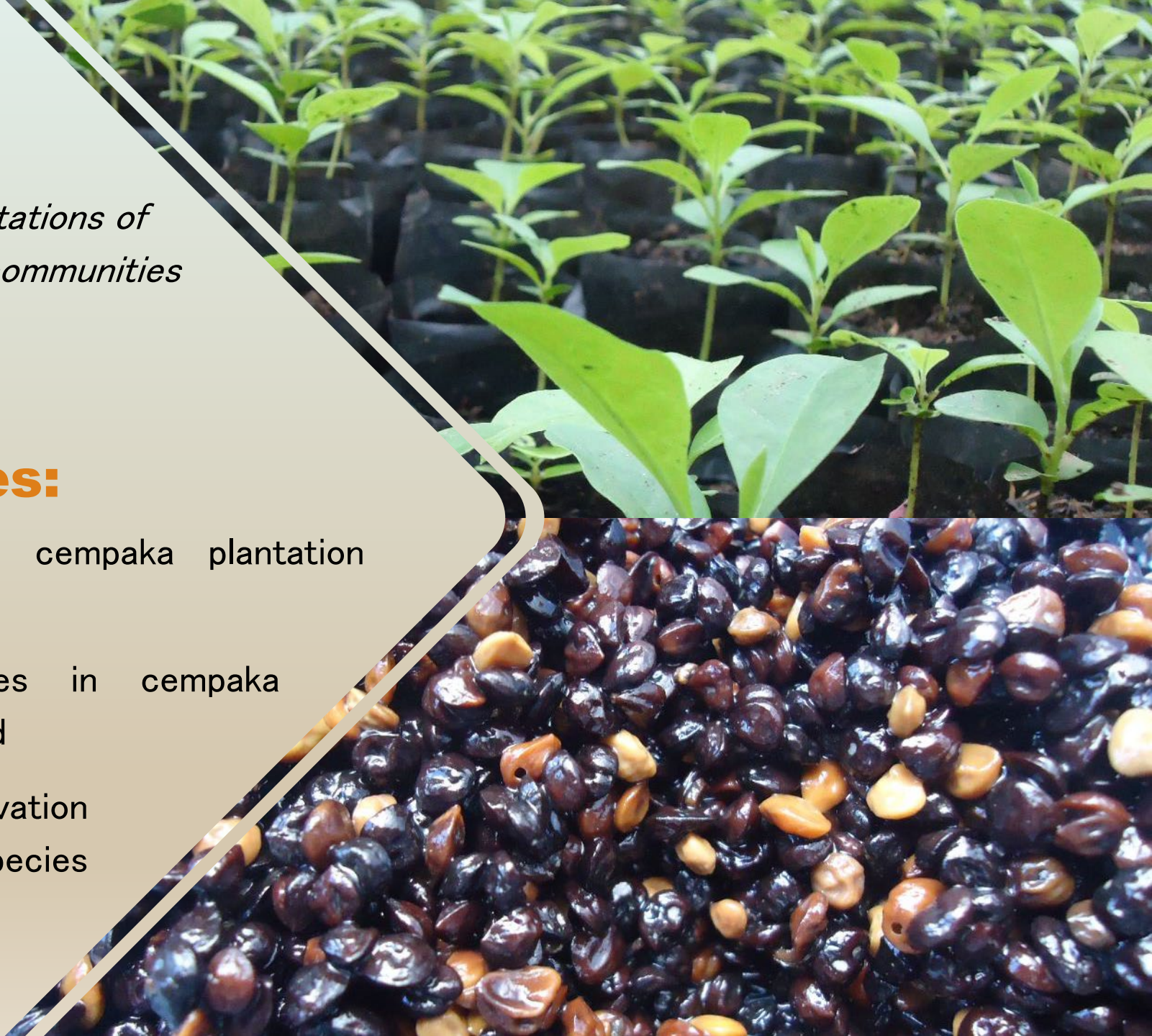


General Objective:

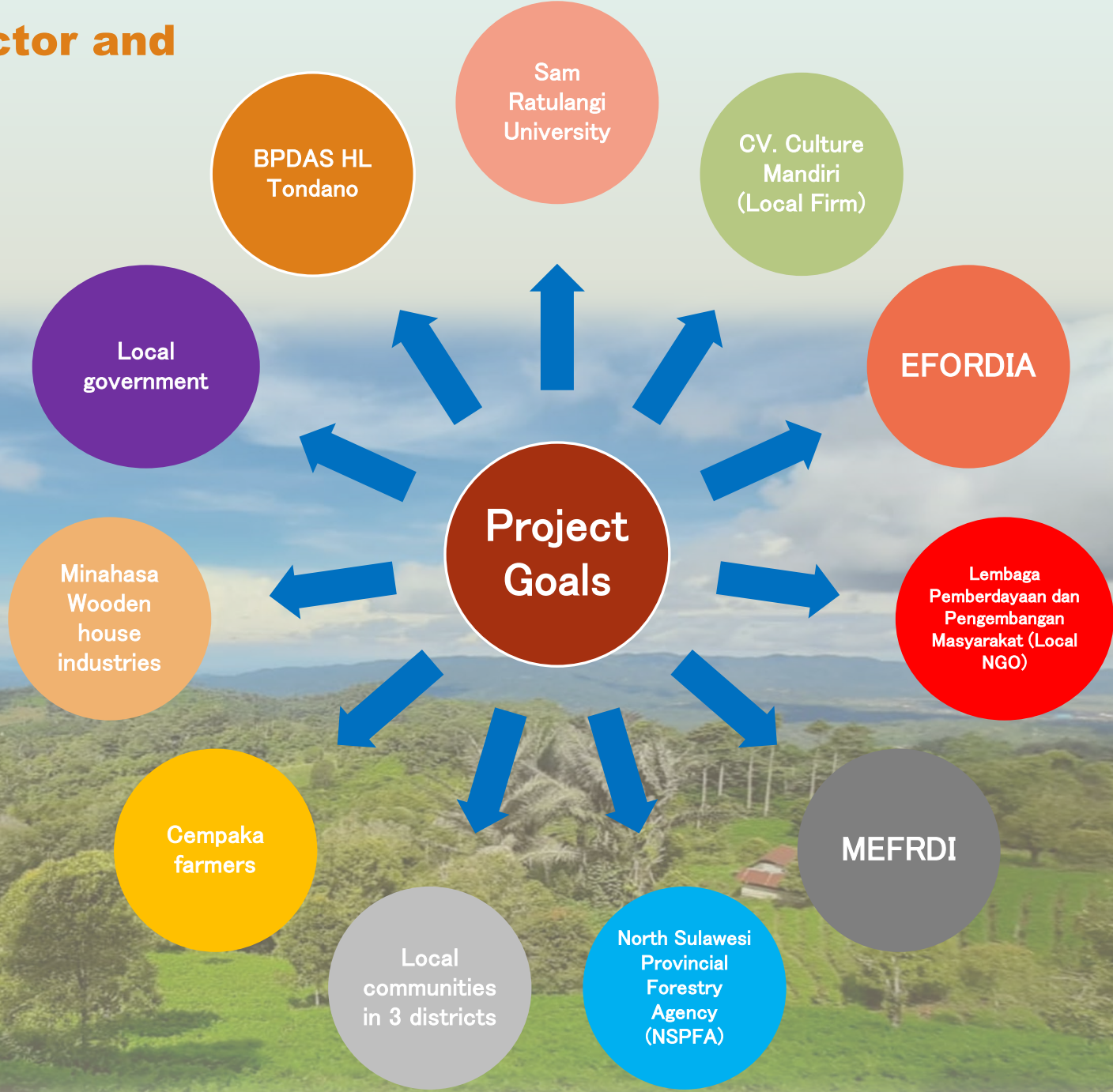
To develop the conservation and plantations of cempaka with the involvement of local communities in North Sulawesi

Specific Objectives:

- Capacity of local communities in cempaka plantation development enhanced
- Participation of local communities in cempaka plantation development increased; and
- Government policy on the conservation and utilization of cempaka species reviewed and strengthened.



Involved consultants, contractor and professionals in project implementation



OUTPUT INDICATORS

Output 1: Capacity of local communities in cempaka plantation development enhanced

1. Sources of quality cempaka seeds identified in 3 districts
2. Experiments on techniques for seed collection, storage and germination completed in year 1
3. 3 small-scale nurseries established in year 2
4. Silviculture techniques for cempaka reviewed in year 1
5. 18 Ha of demo cempaka plantation established in year 2 in 3 districts
6. Technical manuals for seed collection, storage, germination and planting developed in year 3

Output 2: Participation of local communities in cempaka plantation development increased

1. Dialogue with 20 villages on cempaka conservation completed in year 2
2. 45 community leaders trained on cempaka nursery and plantation development techniques in years 2 and 3
3. Incentive for local communities to grow cempaka collaboratively identified and introduced in years 2 and 3
4. A sound cempaka conservation extension program developed and implemented since year 2

Output 3: Government policy on the conservation and utilization of cempaka species reviewed and strengthened

1. Survey on cempaka growing stock in North Sulawesi completed in year 2
2. Sustainable AAC identified in year 2
3. Study on cempaka wood utilization conducted in year 3
4. SOP for monitoring of forest operations and timber legality developed and needed equipment and facilities procured in year 3
5. A stakeholder forum (SHF) established in year 2 and operational
6. One provincial workshop on cempaka conservation and development organized in year 2

Output 1: Capacity of local communities in cempaka plantation development enhanced

Activity 1.1. To identify sources of quality cempaka seed at six sites

- The activity was implemented in two provinces, North Sulawesi, and South Sulawesi, known as the ecological, natural distribution areas of cempaka species
- Six sources of cempaka quality seed in two province are: Tolomuten (Minahasa District, Yayasan Masarang (Tomohon), Raruman (South Minahasa, Lesung (Southeast Minahasa), Tondok (Toraja) and Lempe (Toraja)



Activity 1.2. To conduct experiments on appropriate techniques for cempaka seed collection, storage, and germination

- Flowering and fruiting seasons of cempaka Wasian observed at six seed sources located in North and South Sulawesi provinces occurred twice a year from February to April and August to January, the harvesting of fruits is best undertaken in March to April and September to October.
- To obtain highest rate of seed germination, recommended seed storage treatments are: i) to keep seed in sealed plastic bags, to store seed at room temperature for only around three weeks.
- A technical manual for seed collection, storage and germination of cempaka wasian has been developed and is now available with BP2LHK Manado



Activity 1.3. To establish three small-scale nurseries at village level to be managed by local communities

- Three small-scale nurseries were established at 3 sites, each with a size of 0.1 Hectares and production capacity of 8,400 seedlings, located at Kembes village of Minahasa district, Rumoong Atas village of South Minahasa district and Talawaan Atas village of North Minahasa districts.
- A technical manual for cempaka nursery development has been developed, covering : seed collection and preparation, seed sorting and testing, seed packaging, seed sowing, weaning or moving young seedlings from sowing beds to polybags and nurturing of young seedlings.



Activity 1.4. To review available information on cempaka silviculture techniques

- The cempaka species widely known in North Sulawesi is that one having scientific name as *Elmerrillia Ovalis* (miq) Dandy; this name has been recently revised to *Magnolia tsiampacca* (L) Figlar & Noot.
- Cempaka species can grow on sites from low altitude up to 1,000 meters above sea level, from flat to heavily sloping lands, with annual rainfall of 1,400–2,600 mm.
- Local communities have been planting cempaka at different spacing: 3 x 3 meters or 2 x 2 meters in monoculture and 5 x 5 meters in agro-forestry system.
- Available data indicated an average height growth of 1.19 meters and diameter growth of 3.45 centimeters per annum that at 11 years of age trees may reach 43 meters of height and 38 centimeters of diameter

Activity 1.5. To establish 18 Ha of plantation demonstration for purpose of long-term research and training of local communities

- The surveys on suitability and availability of lands for cempaka demplots conducted in three districts : 8.5 Ha at Tombuluan village of Minahasa district; 3.5 Ha at Rumoong Atas Dua of South Minahasa district; and 6.0 Ha at Talawaan Atas Village of North Minahasa district.
- At age 4 – 5 months, it was found that combination of cempaka and corn plants yielded highest survival rate with the extent of height and diameter averaging 54.93 centimeters and 4.4 millimetres



Output 2: Participation of local communities in cempaka plantation development increased

Activity 2.1. To conduct intensive dialogues on long-term benefits of cempaka plantation with 20 villages in 3 districts

- The dialogue involved 21 villages in total which located in 3 districts: Minahasa, North Minahasa and South Minahasa with 319 participants.
- Interest in growing cempaka trees was found stronger after the dialogues than before the dialogues due mainly to the perceived growing demand for cempaka wood and its promising economic consequences.
- Most of the participants, in the order of 80 to 90%, expressed interest in growing cempaka tree after completion of the dialogue
- The participants that were not interested in growing tree had cited different reasons for their position. Most common reasons were: did not acquire needed skill for growing cempaka tress, legality of harvested timber was uncertain, cempaka seed needed for planting were hard to obtain, owned-land had already occupied with other plants and weak capacity to interest.



Activity 2.2. To train local communities on cempaka nursery development techniques at the small-scale nurseries

- 52 participants were involved the training, comprising 35% females and 65% males.
- The training session participants were provided the knowledge and skills on small-scale nursery development including techniques for seeding, construction of a simple small nursery, nurturing of sown seed and seedlings, nursery costing analysis and success stories of cempaka growers.
- A technical manual has been produced by the project for distribution for farmer groups free of charge.



Activity 2.3. To train local communities on cempaka planting techniques

- The training conducted twice. The first training session was held at Tombulu village in Minahasa district with 30 participants from Minahasa and North Minahasa districts. The second training session was held at Rumoong atas village in South Minahasa district with 15 participants.
- Both training session were able to increase level of knowledge and skills of the participants
- A technical manual on cempaka planting techniques has been produced and distributed to the participants and other stakeholders

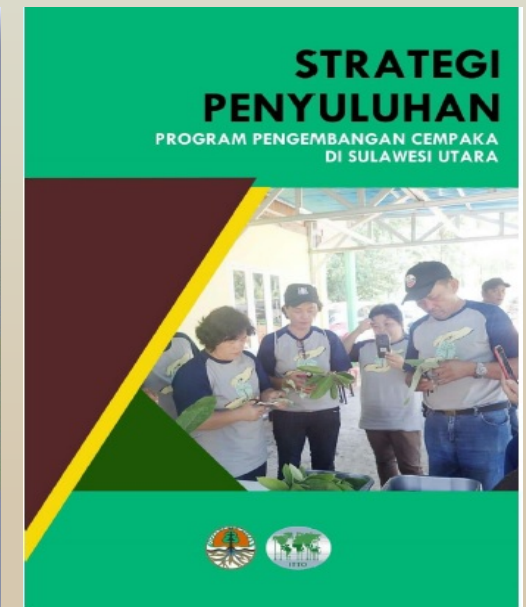
Activity 2.4 : To collaboratively identify and introduce appropriate incentives for local communities to plant cempaka tree

- Major problems to cempaka plantation development facing local communities: weak technical capacity of farmers, lack of capital investment due to the relatively long harvesting period, uncertain timely availability of seed in terms of quantity and quality, questionable legality of harvested cempaka wood and weak operational management of formers' institution.
- The feasible incentives to apply
 - ✓ Construction of nurseries at strategic points taking distribution of potential growers into account
 - ✓ Continued coaching by professionals on different task of planting
 - ✓ Persisting production and distribution of outreaching materials indifferent forms relevant to cempaka plantation development for purposes of continued refreshing and reminding of local communities of cempaka conservation and development
 - ✓ Wide dissemination of information on policies governing cempaka resources management confirming the right of growers to harvest trees and sell the wood they were planted
 - ✓ Organization of scheduled training session widely announced before date of the training to allow farmers prepared for attending, free of charge.
 - ✓ Provision of information and coaching on financing aspect of growing cempaka including development of cempaka business plan, free of charge.



Activity 2.5 : To collaboratively develop of an extension program on cempaka resource conservation

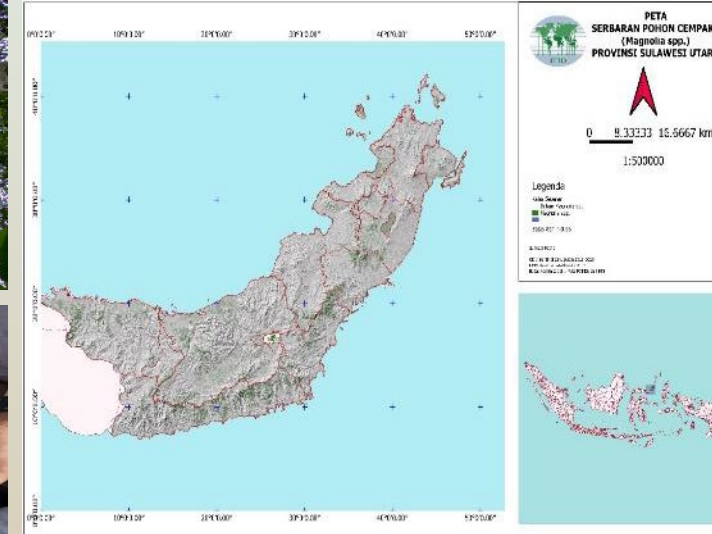
- Constrains to implementing forestry extension program identified were :
 - ✓ In sufficient number of extension materials not available
 - ✓ Documented extension materials not available
 - ✓ Weak capacity of local community in cempaka plantation development for technical, institutional and financial resources
 - ✓ Lack of capacity to perform timber legality assurance system (SLVK)
 - ✓ Lack of information on government policies on cempaka utilization
 - ✓ Illegal charges on transporting of wood products
- A document on cempaka extension program called “Buku Penyuluhan Pengembangan Cempaka di Sulawesi Utara” has been produced and distributed to all extension officers and staff
- A document on “Strategy for the Extension of Cempaka Development Program in North Sulawesi” has also been developed and ready for distribution



Output 3: Government policy on the conservation and utilization of cempaka species reviewed and strengthened

Activity 3.1 : To conduct survey on growing stock and distribution of cempaka species

- The purpose of this activity was the availability of distribution and growing stock of cempaka species in North Sulawesi using remote sensing technologies
- Cempaka distribution is attained by building models based on identified points of cempaka plants, spatial data and satellite imagery of Sentinel 2B with resolution image 10 x 10 meters
- Cempaka species distribution in North Sulawesi are scattered in mountainous areas. From 12 regencies in North Sulawesi, it is predicted that cempaka species are mainly discovered in the region of South Bolaang Mongondow
- Distribution cempaka in North Sulawesi reached around 175.000 Ha and the prediction of potential volume of cempaka species reached 1.2 million meters³.
- The distribution of cempaka wood are scattered in small spots and raises high bias in mapping the distribution of cempaka if only based on Sentinel 2B imagery. It is recommended to improve the accuracy using Unmanned Aerial Vehicle /Drone



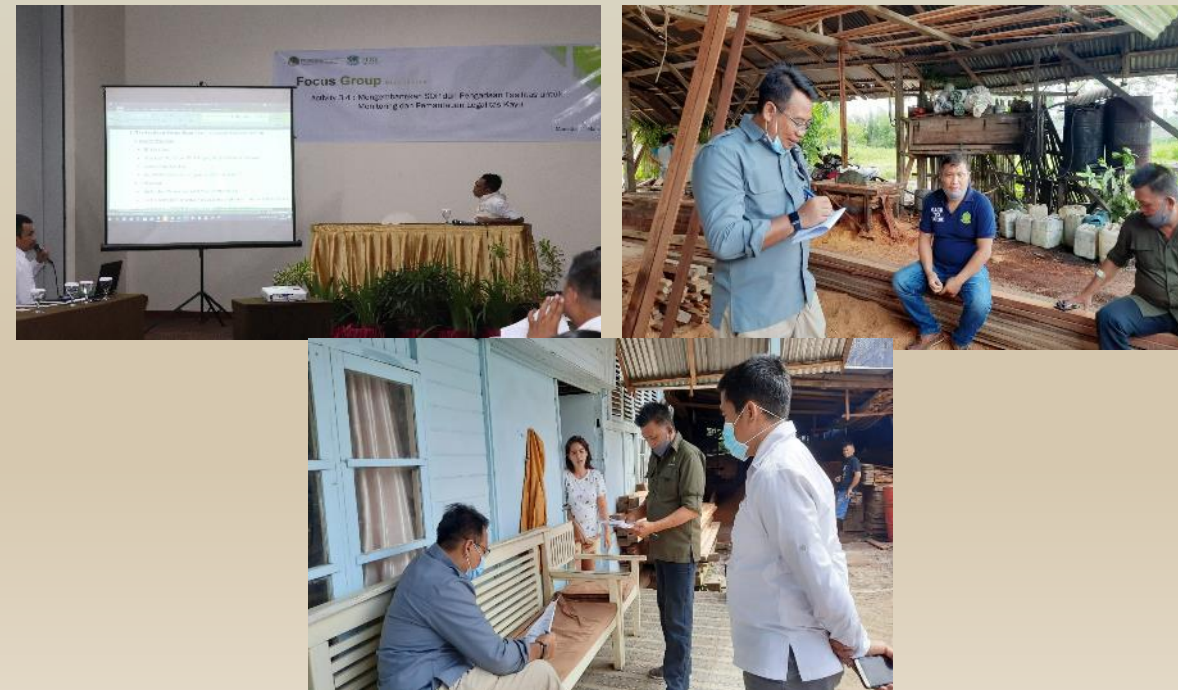
Activity 3.2 : To conduct a study on economics of cempaka wood utilization for woloan-house production

- Existing business in traditional wooden house of the people of North Sulawesi is considered as family inheritance located in the regency of North Minahasa, South Minahasa, Minahasa, and Tomohon City as the biggest producers of cempaka wood in North Sulawesi.
- Supply chain of raw material chosen by traditional house craftsmen is cheap and simple supply chain with small transaction cost as well as quick delivery of these raw materials.
- The selling or marketing pattern of these traditional houses of the people in North Sulawesi is controlled by consumer driven, therefore, producers are willing to supply the products as many as demanded in the markets



Activity 3.3 : To determine sustainable level of AAC for cempaka species

- Per capita consumption of cempaka wood was 0.17 m³ in 2020; largest use was for house construction, followed by interior appliances such cupboard and dining sets.
- Largest total consumption of wood occurred in Manado city (12,000 – 12,575 m³/year), followed by Minahasa District (6,000 – 8,000 m³/year) and others districts at less than 6,000 m³/year.
- The predictive model developed under activity 3.1 estimated a total growing stock of cempaka at around 1.2 million m³; assuming a maturity age of 20 years sustainable level of AAC would be around 60,000 m³.

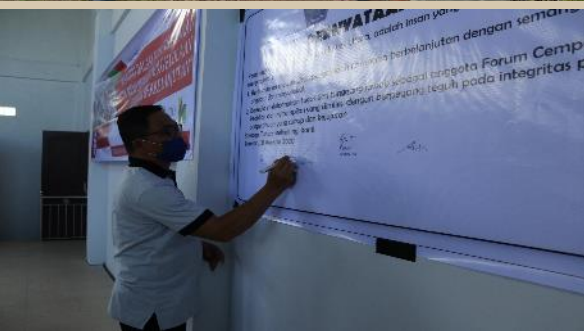


Activity 3.4 : To determine sustainable level of AAC for cempaka species

- Majority of Cempaka wood revolving in the community do not possess legitimate documents because of the existing obstacles such as insufficient understanding of current regulation, limited number of individuals involved in monitoring the wood dissemination, technology that simplifies officers in monitoring illegal logging.
- SOP is organized in accordance with regulation including document requirements needed for cempaka from both private and state forests
- Necessary equipment in monitoring actions are operational vehicles, navigating instruments (GPS, compass, maps), communication devices, wood identification application AIKO, observation post, computer/laptop to compose reports

Activity 3.5 : To pilot test application of SOP (developed under Act 3.4) equipment and facilities in one forest district

- Evaluation findings of SOP in the fields indicated that Pemen LHK p.48/Menlhk/Setjen/Kum. 1/8/2017 can be applied well even though several challenges are still experienced especially for farmers/public.
- Challenges experienced are limited possession of legal documents of lands, uninventorised, plants which are cultivated and grown naturally even within the local's lands. The absence of these documents complicated the land verification process.
- Recommendation from activity 3.5 is to improve verification and monitoring systems of cempaka wood origin from community forests with more accurate online verification system which base on database
- The utilization of SIGAP application is an alternative which can be used. SIGAP (Aksi Inspiratif Warga Untuk Perubahan) is an approach developed by YAYASAN KONSERVASI ALAM NUSANTARA (YKAN) to support village communities to empower their ability and to implement insipring actions to alter their lifestyle to be better within sustainable natural resources.



Activity 3.6 : To establish and operate a cempaka stakeholder forum (SHF) at provincial level

- The survey results of the need to establish this forum are more than 90% expect this forum.
- Estimated benefits from this forum are information exchange, knowledge and skills between stakeholders, cempaka preservation, assisting and synergizing in production and marketing, acquiring knowledge, crafting, assistance and companion, increasing cultivation efforts, cempaka seeds and woods marketing, development program of preservation and cultivation of Cempaka is well controlled and can achieve great purposes, fulfilled the demand of cempaka and controlled supply and demand.
- North Sulawesi Cempaka Forum is founded based on the Decree of the Head of Forestry Office number: 522/22SK/DKD/2020 date 7th August 2020 with members from regional and central government, NGO, cempaka farmers, industries, and forestry extension officer
- The plans of operational forum have been organized for 3 years (2020–2023) with annual objectives such as: improving the existences of cempaka forum, encouraging the interests in cempaka cultivation, and exploring partnerships

Activity 3.7 : To organize one provincial workshop on cempaka resource conservation and utilization

- The workshop was organized by Research and Development Centre for Environment and Forestry of Manado and implemented virtually. Dr. Subarudi from EFORDIA as keynote speech
- Estimated outcomes from this undertakings is to create stakeholder’s awareness that preservation of cempaka is at stake, interests from different parties to cempaka conservation and development, the presence of advices and suggestions from stakeholders in order to perfect the documents of ISMP CSRD, and lastly the accessible documents of ISMP – CSRD as guidelines in the development of Cempaka in North Sulawesi.
- The contents of ISMP CSRD documents are :
 - ✓ Background and purpose of document organization
 - ✓ The history of Cempaka plant utilizations in North Sulawesi including the origin, production center, and utilities.
 - ✓ Cempaka Cultivation techniques.
 - ✓ The concepts of cempaka plants production and conservation
 - ✓ Integrated Strategic Management Plan for Cempaka Resource Conservation
 - ✓ Mid-term Program and Action Plans



Quotation From selected beneficiaries

“The planting pattern of cempaka using the agroforestry system provides benefits, including added economic value and ecologically supports the growth of cempaka plants that require shade”

–local farmers–

“Wasian is a local wood that is closely related to the life of the Minahasa people, so it needs to be preserved for the next generations”

–local community–

“Through the introduction of cempaka species, training on small scale nursery and planting techniques that are part of the ITTO PD 646/12 project can increase the knowledge of the communities”

–local community–

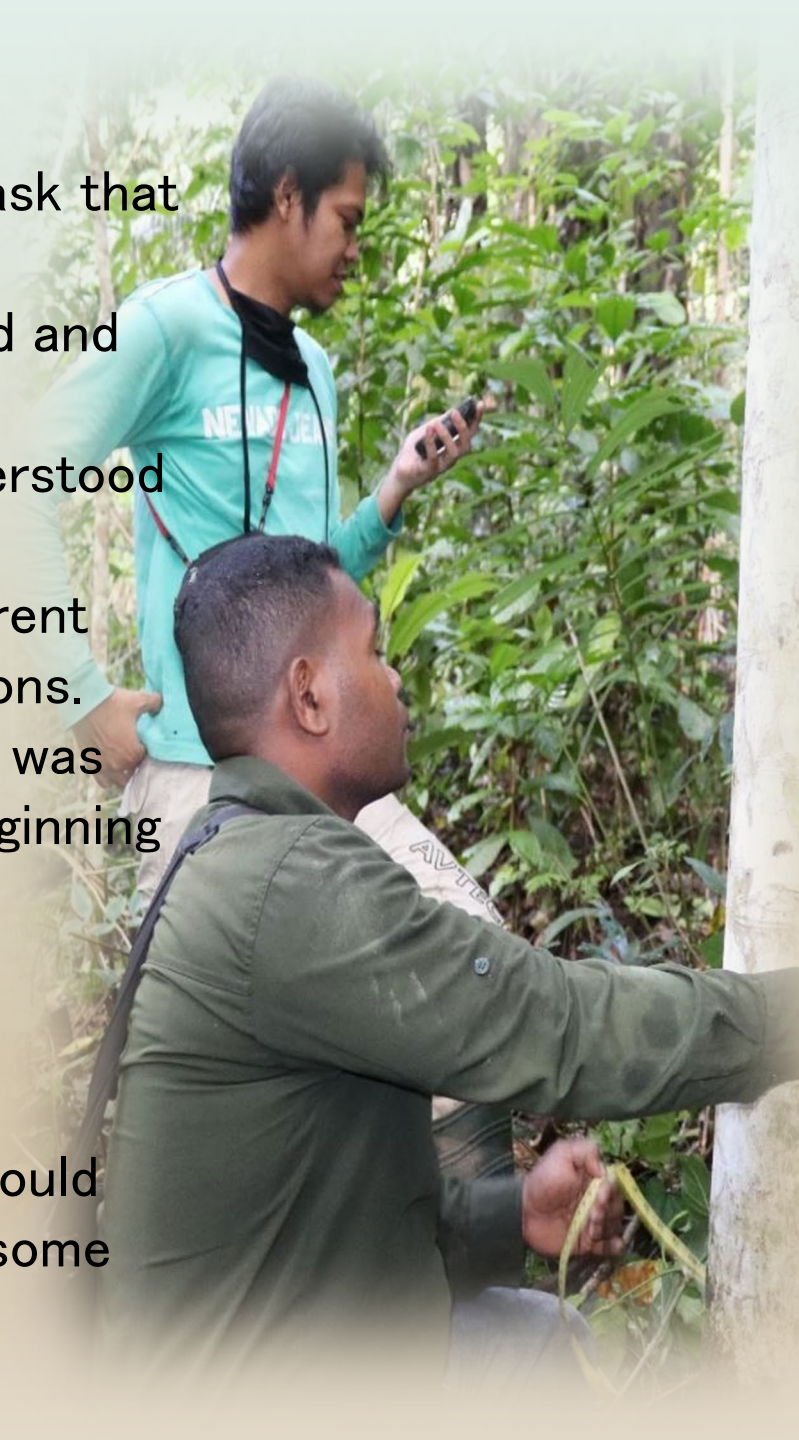
“The provincial cempaka SHF is a powerful means for coordination and communication among all stakeholders that its continued operations should be ensured through allocation of sufficient operational resources”

–SHF members–



Lessons Learned

- a. Identification of cempaka seed stands is a resource consuming task that the stands must be fully protected and sustained.
- b. To be useful, any technical manuals produced must be distributed and user taught on how to make use of the manuals.
- c. Any technical reports should be documented using language understood by users to avoid wasting resource.
- d. Extreme care should be practiced in the labelling of seed of different origins or provenances to avoid confusion in doing follow-up actions.
- e. Using questionnaire sheet to assess result of training or dialogue was found most effective if the sheet were distributed right at the beginning and completion of the session.
- f. Project planners should be aware because of the occurrence of conceptual and practical achievement of a project when defining indicators of achievements.
- g. The feasible incentives for local communities to grow cempaka would undergo a long institutional process that their effect would take some time to materialize.



- h. The sound extension program, developed under the project would not be useful as intended to unless needed resources to operationalize it are made available
- i. To conduct an adequate survey on forest growing stock required substantial inputs that its planning should be done with extreme care
- j. To ensure quality results of an activity, selection of partner(s) or expert(s) to implement should be solely based on competence and expertise
- k. Establishment of a stakeholders forum was accomplished effectively due to the support and involvement of high-rank decision makers and influential stakeholders.
- l. Organizing a workshop or seminar under a semi-virtual fashion proved effective in achieving planned objectives and accommodated wide participation thus worth considering for initiating.



Appreciation

Project Management Unit would like to express our high appreciation and gratitude to :

- a. The International Tropical Timber Organization (ITTO),
- b. The Director of Forest Division
- c. The Directorate General of Research, Development and Innovation Agency,
- d. Members of the Project Steering Committee (PSC)

For their supports and guidance during the development and implementation stages of ITTO project PD 646/12 Rev. 3 (F).

We also express gratitude for active collaboration and cooperation from Project Advisor (Dr. Hiras Sidabutar), The North Sulawesi Provincial Forestry Agency (NSPFA), the national consultants and experts, researcher, and technicians.



Conclusion

- a. All 17 planned project activities had been fully implemented to produce three defined outputs, at least in conceptual sense
- b. Important products from output 1 were : seed stands identified at 6 sites, a technical manual for seed collection, storage and germination produced, three small scale nurseries established, cempaka silvicultural information produced in English and 18 hectares of cempaka demonstration plot established.
- c. The results relating output 2 included: improved understanding on long-term benefits of growing cempaka by local communities; 52 local people trained on nursery development techniques and a technical manual produced; 45 community leaders trained on cempaka planting techniques and a technical manual produced; appropriate incentives for local communities to grow cempaka species collaboratively identified; a sound cempaka extension program developed and distributed,
- d. Under output 3, important findings included: data on cempaka growing stock collected, a study on economic of cempaka wood utilization published, a sustainable AAC of cempaka wood calculated, SOP for monitoring of forest operations developed and pilot tested, a provincial cempaka SHF established and run-tested; and legitimate ISMP for cempaka resource conservation and development produced; all of which are necessary inputs to cempaka policy making
- e. Overall, the project had generated individuals reliable information and different products that have practical significance for cempaka resource conservation and development