THE STATE
OF THE WORLD's
FOREST GENETIC RESOURCES

COUNTRY REPORT

INDONESIA

This country report is prepared as a contribution to the FAO publication, The Report on the State of the World's Forest Genetic Resources. The content and the structure are in accordance with the recommendations and guidelines given by FAO in the document Guidelines for Preparation of Country Reports for the State of the World's Forest Genetic Resources (2010). These guidelines set out recommendations for the objective, scope and structure of the country reports. Countries were requested to consider the current state of knowledge of forest genetic diversity, including:

- Between and within species diversity
- List of priority species; their roles and values and importance
- List of threatened/endangered species
- Threats, opportunities and challenges for the conservation, use and development of forest genetic resources

These reports were submitted to FAO as official government documents. The report is presented on www. fao.org/documents as supportive and contextual information to be used in conjunction with other documentation on world forest genetic resources.

COUNTRY REPORT

FOR THE STATE OF THE WORLD'S FOREST GENETIC RESOURCES

INDONESIA

2011

LIST OF CONTENT

LIST OF TABLES

LIST OF FIGURES

ACRONYM

ACIAR	: The Australian Centre for International Agricultural Research
ASEAN	: The Association of Southeast Asian Nations
ASEAN-WEN	:The ASEAN Wildlife Enforcement Network
AFORGEN	: Asia Pacific Forest Genetic Resources Programme
APAFRI	: Asia Pacific Association of Forestry Research Institutions
APC	:The Alliance for Climate Protection
BAPI	: Biodiversity Action Plan for Indonesia
BAPPEDA	: Regional Development Planning Agency
BAPPENAS	: National Development Planning Agency
BBPBPTH	: Office of Biotechnology Research and Forest Plantation Improvement
BPS	: Indonesia Central Bureau of Statistics
CITES	: Convention on International Trade in Endangered Species of Wild Flora and fauna
CSIRO	: Commonwealth Scientific and Industrial Research Organisation
CSO	: Clonal Seed Orchards
DFID	: Department for International Development
Dishut	: Provincial Forest Services
DNS	: Debt-for-Nature Swaps
E8	: Eight countries with large populations of wildelephants
EAAFP	: East Asian-Australian Flyway Partnership
EU	: Europion Union
FAO	: Food and Agriculture Organization of the United Nations
FGR	: Forest Genetic Resources
FORDA	: Forestry Research and Development Agency
FRA	: Global Forest Resources Assessments led by FAO
GRASP	: The Great Apes Survival Partnership by UNEP
GIZ	: The German implementing agencies for international cooperation
Ha	: Hectare
HPH	: Concession Forest (by Management Right)
HR	: Community Forest
HTI	: Estate Industrial Plantation Forest
HTR	: People Plantation Forest
IBSAP	: Indonesian Biodiversity Strategy and Action Plan
INBAR	: International Network for Bamboo and Ratta n
IPB	: Bogor Agricultural University
ITTO	: International Tropical Timber Organization
IUCN	: International Union for the Conservation of Nature
IUFRO	: The International Union of Forest Research Organizations
JICA	:Japan International Cooperation Agency

LIPI	: Indonesian Institute of Sciences
MAB	: Man and Biosphere
MALINDO	: General Border Committee Malaysia-Indonesia
MDGs	: Millennium Development Goals
MoF	: Ministry of Forestry
NTFP	: Non-Timber Forest Product
OIE	: The World Organisation for Animal Health
PHKA	: The Directorate General of Forest Protection and Natural resources Conservation
PP	: Government Regulation
REDD	: Reduction Emission From Deforestation and Forest Degradation
RSPO	: Roundtable on Sustainable Palm Oil
SEAMEO-BIOTROP	: the Southeast Asian Regional Centre for Tropical Biology
SFM	: Sustainable Forest Management
SoER	: The State of Environment Report
SSO	: Seedling Seed Orchards
UNDP	: United Nations Development Programme
UNEP	: United Nations Environment Programme
UNESCO	: United Nations Educational, Scientific, and Cultural Organization
UNCBD	: United Nation Convention on Biological Diversity
UNFCC	: United Nation Framework Convention on Climate Change
UPOV	: The International Union for the Protection of New Varieties of Plants
WHC	: World Heritage Convention
WTO	: World Trade Organization

SECTION I

EXECUTIVE SUMMARY

Indonesia, with its 17,500 islands stretching 5,000 kilometers along the equator, is one of a few countries with the richest biodiversity on earth. Major sources of the megadiversity derive from its forests spanning two bio-geographic realms-the Indo-Malaya and Australia. It also harbors the world largest peatlands and mangrove forests. Forest resources are central life supports to the country environment and socio-economy. Indonesia ranks 4th top of the world population at 237,641,326 in 2010 consensus, about 60% of which is concentrated in Java Island alone.

Forest genetic resources in Indonesia are defined in various forms form of wildlife, plants, and microorganism. Forest areas, forest biological resources and their ecosystems are managed under the Ministry of Forestry. MoF 2010 statistics shows the forest area at 135,907,237.32 ha covering about 72% of the country land area. About 60.2% of the forests are allocated as Production Forest, 23.2% as Protection Forest, and 16.6% as Protected Areas. Data in this report is based mainly on FRA2010 and National Report AFORGEN 2009 on Plant Genetic resources.

Government Regulation No PP. 7/1999 has listed 294 species as protected species. As of 2010, there are 659 species listed as protected, including 584 fauna species and 75 flora species. Among them, MoF has focused on 132 priority species under seven groups of endangered flora and fauna to increase their population by 3%. For plant genetic conservation species priority are listed based on IUCN red list catagories, with the total of 60 plant species. International trade of animals and plants listed in IUCN Appendices is under control of CITES Management Authority and ASEAN-WEN networking.

There are several driving forces and threats to the biodiversity and FGR in Indonesiasuch as: habitat loss, forest degradation, forest fragmentation and forest conversion to monoculture, climate changes, exotic species, environmental degradation.

Forest genetic resources in situ are well preserved within existing conservation area system. However, many identified important ecosystems are not represented in the conservation areas network in Indonesia. Some vital habitats outside protected areas include fresh swamp forests, peat swamp forests, mangrove forests and lowland rainforests.

Ex-situ conservation is dominated by botanical gardens/arboretums for plants and zoos and theme parks for animals. Breeding and nursery are conducted mainly for commercial use. Researches and development programs are still limited particularly at genetic level.

All forest areas are state owned and managed under the ministry of Forestry. Use of forest resources is regulated under various licenses, such as selective harvest in permanent production forest, industrial forest, agroforestry, community forestry.

Major uses are timber products as well as plywood, pulp and papers. Non-Timber Forest Products such as rattans and bamboos rank second to timber in importance.

The timber product from natural forests, particularly from permit on harvest plan area, increased drastically from 2.8 to 6.6 and 14.5 million m^3 in 2008, 2009 and 2010 respectively. The area of industrial forest increased twice from 4.50 million Ha in 2000 to 8.98 million Ha in 2010. MoF statistics showed amount of timber products from natural forests, plantation forests, and others as 34,092,484.44 m^3 in 2006 to 42,114,770.44 m^3 in 2010. It is noted that about 60.5% of which was produced from Riau Province, in Sumatra Island .

FORDA and LIPI are two main organizations leading in FGR research and development. Long-time confrontation and arguments on local/ traditional use, tenure and access of local people to FGR are gaining better recognition by recent forestry regulations. Forest land tenure issues or customary rights have become growing challenges in Indonesia.

Major challenges for the conservation and management of FGR in Indonesia include: lack of valid data base, lack of specific regulations related to conservation and management of forest resources, discrepancies of related policies and regulations, lack of funds, facilities and qualified human resources. Awareness of the importance of conservation and management of FGR is relatively low and mobilization of alternative funding is still difficult.

Currently, Indonesia is in the legislation process for a Genetic Resources Bill, the law that directly regulates utilization, management, and conservation of genetic resources, including forest genetic resources. The Bill will possibly be passed by the House early in 2013. In 2012, MoF is drafting a strategic planning for forest genetic resources conservation, as a national guideline for FGR management.

SECTION II

INTRODUCTION TO THE COUNTRY AND FOREST SECTOR

A. Country profile

1. The Republic of Indonesia lies between 5.5°North to 11°South Altitude and 95° to 141° East Latutute. It is the world largest archipelago consisting of about 17,500 islands (some 1,000 small islands uninhabited) stretching 5,000 kilometres along the Equator between Asia and Australia. It is located in the highly seismic Pacific Ring of Fire which experiences 90 percent of the world's earthquakes.

2. Its neighbor to the north is Malaysia, to the east is Papua New Guinea, and to the southeast is Timor-Leste. There are seven major islands/ groups of islands, namely: Sumatra, Kalimantan, Java-Bali, Nusa Tenggara, Sulawesi, Maluku and Papua. More than 80% of Indonesia's territory is covered with water; the land area is about 181,157 hectare. Total population reported in 2010 consensus is 237,641,326, ranking 4th top at 3.41% of the world population, and increasing 15.21% from 206,264,595 in 2000 consensus (Indonesian Statistics Bureau, 2011). About 60% of population is concentrated in Java Island alone.

Figure 1. Map of Indonesia

3. Indonesia is a key player in global biodiversity, counting as one of the 17 countries with the richest biodiversity, or what is also known as megadiversity. Indonesia spans two major bio-geographic realms- the Indo-Malaya and Australasia. Indonesia's tropical forests are the third largest in the world – and they are central to the country economy, environment and society. It harbors roughly 10% of all flowering plants, 12% of the world's mammals, 16% of its reptiles and amphibians and 17% of all bird species, and more than a quarter of all marine and freshwater species. Each year many new species are discovered in Indonesia. Up to 3,305 known species of amphibians, birds, mammals, and reptiles and at least 29,375 species of vascular plants are endemic to the islands, estimated at 40% of APEC's biodiversity. Indonesia is also one of the world largest peatlands and mangrove forests, important ecosystems for environment.

B. Forest Sector

4. Forest area in 2010 is reported by Ministry of Forestry at 135,907,237.32 Ha, covers about 72% of the country's land area. Based on forest management system, protected areas and Protection Forests share 16.55% (22,498,373.61 Ha) and 23.2% (31,551,088.02 Ha) of the total forest area. Most of the forest area, 60.23%, is contributed for Production Forests.

5. Data from FRA 2010 show decline in forest cover from 99,409,000 Ha in 2000 to 94,432,000 Ha in 2010.

6. Table 1. shows loss of primary forests and naturally generated forests within the last twenty years. Although annual forest establishment by reforestation and afforestation were increasing but the areas of planted forests are still declining. Data on agroforestry area is still limited.

Table 1. Forest characteristics and areas (FRA 2010)

Main forest Characteristics	**Area (Ha)**		
	2000	**2005**	**2010**
Primary Forests	49,270,000	47,750,000	47,236,000
Naturally regenerated forests	46,467,000	46,408,000	43,647,000
Planted forests	3,672,000	3,699,000	3,549,000
	Annual forest establishment (hectares/year)		
Reforestation	33,029.4	153,941. 4	n.a.
Afforestation	85,883.20	250,420.6	n.a.

7. All forest land is owned by government. Some people grow forest in their own land, called as community forest. Data from FRA2010 on forest ownership are shown in Table 2.

Table 2. Forest ownership and area (FRA 2010)

Forest Ownership	Area (Ha)		
	1990	2000	2005
Public	103,058,000	90,224,000	89,449,000
Private	15,487,000	9,185,000	8,408,000
total	118,545,000	99,409,000	97,857,000

8. Traditionally, many Indonesian people have depended on forest for their subsistence and customary activities. Non-Timber Forest Products are widely used for living needs, as sources of food, medicine, and materials. Forestry also generates employment and business opportunities. MoF statistics (2010) shows 41,781 people working in industrial forests excluding in Java, Nusa Tenggara and South Sumatra.

C. Trends in Forest Conservation, management and production

9. Terrestrial Protected areas gradually increase both in numbers and areas from 466 units of 21,216,775,27 Ha in 2000 to 495 units of 22,498,373.61 Ha in 2010. Conservation forest management scheme is developing towards self-sustained management units. (Renstra Menhut 2010-2014)

10. To reduce pressure from natural forest exploitation, MoF has increased permits for Industrial Plantation Forest (HTI) from 4.5 million ha in 2000 to 8.97 million ha in 2010. Agroforestry scheme of community plantation forest (HTR) has been developed. In 2010, the area of 101,012 Ha out of the community forestry reserved area of 634,917 Ha are permitted.

11. Species diversity conservation in production forests are often ignored due to the lack of FGR conservation knowledge and awareness. Land preparation practices for forest plantation or agroforestry in ex-logged off conversion forest areas are often done by clear cut that clean up all other species that still survive. The recent 1.6 million Ha Mega-Food Estate programme in Papua is also one of the debut for forest conversion and destruction of existing and unexplored invaluable FGR.

12. Aside from expansion of coal mining areas, Indonesia's high level of greenhouse gas emissions is being driven by deforestation, forest fires and degradation of land, especially peat swamps in Sumatra and Central Kalimantan. During the past ten years, loss and degradation of forest habitats are less attributed by illegal logging. Rapid and vast conversion of forest areas for agricultural use, in particular for oil palm plantations as well as pulp and paper industry are the major driving forces.

13. Indonesia voluntarily reduces greenhouse gas emissions by 26% or 41% with international supportsby 2020. A two-year moratorium on new licenses to exploit natural primary forest and all peat lands is issued in May 2010. There are 40 REDD Plus pilot or demonstration projects across Indonesia being

implemented for ecosystem restoration concessions for carbon sequestration and emission reduction. Massive campaign programme to plant one billion trees nation-wide annually is lauched for greening Indonesia.

14. Forest land tenure issues or customary rights have become growing challenges in the gradually shifting of forest management paradigms from the State Based to Communiity Based, from timber-oriented to forest resources and ecosystem services and from repressive to incentive. Forest tenure reform will help state-communities conflict resolution and ensure proper land right (and also tree right) which is the basic tools for benefit sharing in REDD.

D. Process of SOW-FGR Country Report Preparation

15. MoF as Indonesian focal point of SOW-FGR Country Report preparation for FAO, has organized consultation meetings with related institutions/ organizations (including resource persons from FAO representative) to discuss the important of SOW-FGR and process (Guideline for the preparation of country report), difficulties and constraints, as well as identify options and ways to move forward. Nomination of SOW-FGR Country Report preparation Team and Advisory board is proposed. Establishment of SOW-FGR Country Report Preparation Team by MoF Secretariat General is done in October 2011(see appendix).

16. Preliminary desk study and secondary data collection related to FGR (regulation/ policy, report and other reference documents) were carried out. Series of meetings/ focus group discussion to review and analyze available data and informationwere conducted.

17. During the Formulation of Country Report, the scope, structure and content of the report (based on FAO Guideline as possible) were outlined and drafted. Results are reviewed in a verification workshop/ stakeholders consultationin December 19, 2011. The Report is then finalized, with inputs and recommendations accommodated, to be officially endorsed and submitted to FAO by the end of January 2012.

18. FAO and APAFRI have supported Indonesian delegates to participate in SOW-FGR related international meetings in Rome (April 4-6, 2011), Kuala Lumpur (March 7-9, 2011), and Beijing (November 7-11, 2011). Although MoF was advised to seek financial support for SOW-FGR Process from FAO Representatives Office, but until October no such supports were granted. MoF has bared all the expenses of preparation SOW-FGR Country report through the Ministerial annual budget 2011.

SECTION III

CHAPTER 1
THE CURRENT STATE OF FOREST GENETIC RESOURCES

A. FGR at ecosystem level

19. Processes and services that occur within an ecosystem are a product of the activities of the flora and fauna within that ecosystem. Indonesia is not only rich in genetic and species diversity, but it is also rich in ecosystem diversity, which includes natural diversity of the terrestrial landscape as well as water, in which organisms (plants, animals and micro organisms) interact with their physical environment (IBSAP 2003). Forest genetic resources cover any living forms within the forest ecosystem including plants, wildlife, fungi and other microorganism. There are scattered studies, reports, and insufficient data on FGR particularly at genetic level. In this report, FGR at ecosystem diversity and species diversity are reviewed.

20. As a country of archipelago between the distribution lines of Asia and Australia continents, and distribution area of transitional Wallacea, the terrestrial ecosystems of Indonesia have distinctive biodiversity of Asian, Australian region as well as transitional region. The geological history of the formation of each island in Indonesia caused variations that affect the formation of ecosystems and species of plants and animals that live in them, including the formation of endemic species in Indonesia.

21. In the IBSAP (2003), based on the geological history, the diversity of terrestrial ecosystems in Indonesia encompasses a wide range and variety of habitats from lowland rain forests and mangroves to savanna grasslands and shrubs, swamp forestsand limestone hills; from montane forests to alpine meadows and snow-topped mountains and tundra, support a diverse flora and fauna. These categories are based on the vegetation type, which is influenced by the rainfall and temperature (Whittaker 1970). The tropical climate that is relatively stable throughout the year creates the forests in Indonesia as the main terrestrial ecosystem, which has the richest biodiversity.

22. Riswan and Yamada (2006) classify forest ecosystems in Indonesia into two main groups, one group being tropical rain forest (which include dry land forest like lowland rainforest, mountain rain forest and conifer forest and wetland forest) and the other group being monsoonal tropical forest (savanna and grassland).

23. Karsts area is also one of the terrestrial ecosystems found in Java, Kalimantan and Sulawesi Islands. The process of karstification was characterized by underground drainage web and cave system as well as the formation of exokarst on the soil surface. Many unknown species are yet explored.

24. Other terrestrial ecosystems that become a characteristic of the Indonesian Archipelago are small islands, which are insulated, connected land (separated from the main land or main-island (Bengen 2001; MMAF2001). In the Government Regulation No. 27, 2007, a small island is defined as an island

with the size of equal or less than 2,000 km^2 together with its ecosystem. The prominent physical and biological characteristics include limitedness of fresh water supply because the water catchment area is relatively small, vulnerable and fragile from external influence, which happen either naturally or as the result of human activities. In several cases, it has high endemism of flora and fauna.

25. Major forest type categories are lowland evergreen broadleaf rain forest, lower montane forest, upper montane forest, freshwater swamp forest, semi-evergreen moist broadleaf forest, mixed broadleaf/ needleleaf forest, and needleleaf forest.

B. FGR at species level

26. In terms of species diversity, Indonesia is among the top five in the world. Of these species, 55% are endemic plants (Newman 1999 in SoER Indonesia 2007). Research Centre for Biology of the Indonesian Institute of Sciences (LIPI) reported that 31,746 different species of vascular plants have been recordedand described. Many are still poorly known or even unknown to science and their benefits to men are not completely understood yet. Kalimantan (Borneo) is the centre of diversity of the commercially important dipterocarp trees, with 262 of 386 species found on this island. Moreover, 25,000-30,000 species of Spermatophyta and 1,500 species of Pteridophyta were also found. Approximately 5,000 species are categorized as used plants in Indonesia. Around 1,259 species of timber, 1,050 medicinal species, 984 food species, 520 oil/ fat species, 328 animal feed species and 885 others species were also found in Borneo island (Kartawinata, 2004).

27. For fauna diversity, about 12% of mammals (515 species) of the world occur in Indonesia. This placed Indonesia in the second rank after Brazil. About 16% of world reptiles (781 species) and 35 species of primate placed Indonesia in the fourth rank in the world. Furthermore, 17% of the total species of birds (1,592 species) and 270 species of amphibians placed Indonesia in the fifth and sixth rank, respectively in the world (Mittermier et al. 1997 in SoER Indonesia 2007). The latest data of the taxonomic assessment of Indonesia 2007 showed that bird diversity of Indonesia is 1,595 species. From this assessment, the highest bird diversity occurred in Papua with more than 650 species. The bird species richness in Sumatera was placed in the second rank after Papua, with about 600 species. The increase of the species number was also found in amphibians that reached 363 species (243 species are endemic) (LIPI 2008).

C. FGR at Genetic Level

28. Ministry of Forestry c.q FORDA has been conducting genetic conservation for threaten species such as Santalum album, *Eusideroxylon zwagery, Araucaria cunninghamii, Melaleuca cajuputi* subsp. *Cajuputi, Acacia mangium and Eucalyptus* spp. , *Alstonia* spp. , *Intsia* spp., *Tectona grandis,Paraserianthes falcataria, Artocarpus altilis, Dyospyros celebica, Dyera costulata, Shorea*

johorensis, Shorea stenoptera, Swietenia macrophylla, Morus spp.,Instia bijuga, ulin, *Arenga pinata*, Araucaria etc for the purposes of reproduction viability, pest and diseases resistance, adaptation ability from climate change, productivity improvement through tree improvement program.

D. Protected species and priority species

29. Government regulation No. 7/1999 has listed 294 animal and plant species as protected. MoF statistics 2010 shows number of protected species up to 659 species (584 fauna spp and 75 flora spp).

30. Important protected plant species are as follows: *Agathis borneensis, Dalbergia latifolia, Dipterocarpus sublamellatus, Duabanga maluccana, Eusideroxylon zwagery, Gonystylus bancanus, G. Macrophyllus, Gyrinops verstigii, Koompassia malaccensis, Pericopsis mooniana, Pinus merkusii, Pterocarpus indicus, Shorea balanocarpoides, S. Balangeran, S. Faguetiana, S. Gibbosa, S. Macrantha, S. Mecistopteryx, S. Seminis, S. Splendida, S. Stenoptera, Swietenia mahogani, Vatica obovata, V. Teysmanniana, Acacia crassicarpa, Alstonia scholaris, Aquilaria malaccenensis, Araucaria cunninghamii, Castanopsis argentea, Cinnamomum iners, Cinnamomum porrectum, Dyospyros celebica, Dyospyros malabarica, Dyera costulata, Dryobalanops aromatica, Elmirrillia ovalis, Eucalyptus urophylla, Hopea mengarawan, Intsia bijuga, Laphopethalum javanicum, Manilkara kauki, Octomeles moluccana, Palaquium rostratum, Parashorea aptera, Peronema canescens, Podocarpus imbricatus, Santalum album, Shorea atrinervosa, Shorea javanica, Shorea johorensis, Shorea leprosula, Shorea macrophylla, Shorea palembanica, Shorea pinanga, Shorea plathyclados, Shorea singkawang, Sindora inermis, Toona sureni, Vitex cofassus, Zanthoxylum rhetsa,*

31. Conservation Strategy and Action Plan for endangered species that have been endorsed during the past ten years are shown in Table below

Table 3. Conservation Strategy and Action Plan for endangered species

Conservation Strategy and Action Plan for Sumatran Tiger (*Panthera tigris sumatrae*) 2007-2017	P.42/Menhut-II/2007
Conservation Strategy and Action Plan for Sumatra and Borneo Elephant 2007-2017	P.44/Menhut-II/2007
Strategy and Action Plan for the Conservation of Rhinos in Indonesia 2007-2017	P.43/Menhut-II/2007
Strategy and Action Plan for Orangutan Conservation Indonesia 2007-2017	P.53/MenhutIV/2007
Conservation Strategy of Curik / Bali Starling	Decision of the Director General Forest Protection and Nature Conservation No. SK.150/IV/Set-3/2007
Conservation Strategy and Action Plan for Banteng 2010-2020	P. 58/Menhut-II/2011

32. Despite the growing number of conservation areas and efforts to improve habitat management and protection, populations of some endangered species still continue to decline. Growth and shrinkage of the population is largely determined by genetic ability to breed of each species and state of the environment (habitat carrying capacity). Complicated interactions and interconnected impacts from the individual species as well as the environment often make it harder to predict or ensure the species growth rate even in the boundary of a conservation area.

33. Guided Strategies for National Species Conservation 2008-2018 in the Ministerial Decree No P.57/Menhut-II/2008 have directed species conservation efforts to focus on 132 priority species of endangered flora and fauna. The priority species are classified under seven groups, i.e., birds (26 species), mammals (17 species), primates (11 species), reptiles and amphibians (22 species), insects (22 species), marine and freshwater (22 species), and plants (22 species). The overall policies on species conservation and specific policies and strategies for each group of priority species for ten years (2008-2018) will be evaluated and renewed every five years.

34. For plant genetic conservation species priority are listed based on red IUCN red list catagories: extinct, extinct in the wild, critically endangered, endangered, vulnerable, lower risk, data deficient, not evaluated. There are 60 species as shown in Appendix II.

35. In the PHKA Strategic Plan 2010 – 2014, the Directorate General of Forest Protection and Nature Conservation (PHKA) has identified biological diversity conservation as one of key priority policies. Driven by strong determination and supporting commitment from concerned agencies, one of PHKA performance indicators is that by the year 2014, the population of high priority endangered species will be increased 3% of the population in 2008, with regards to each species biological condition and habitat availability.

E. Driving Forces and Threats

36. There are several driving forces and threats to the biodiversity and FGR in Indonesia such as: climate changes, habitat loss due to forest degradation, forest fragmentation and forest conversion to monoculture, exotic species and threat for endemic species, environmental degradation, lack of policy and regulation (gap between policy and implementation).

F. Future needs and Priority

37. Indonesia has develop national strategy on biodiversity and the implementation of this strategy is an urgen needs and priority. The national strategy namely Indonesian Biodiversity Strategy and Action Plan (IBSAP) covers the years 2003-2020. Eight points of policy direction for its implementation were determined (BAPPENAS 2003) as follows:
    1. Enhance the capacity of communities in managing biodiversity.

2. Enhance assessment and development of knowledge and technology in sustainable management of biodiversity.
3. Increase the sustainability of functions and ecosystem balance at the local, regional and national levels.
4. Improve national economy through the development of environmentally and socially sound, biodiversity-based technology.
5. Improve management systems (conservation, rehabilitation, utilization) of biodiversity on a fair and sustainable basis.
6. Develop institutional framework, local and national policy and an effective law enforcement in a synergic management of biodiversity.
7. Encourage deconcentration and decentralization of central government authority on managing biodiversity to local governments and communities on a gradual and selective manner.
8. Develop mechanisms for the resolution of conflicts on natural resources and biodiversity at the local, regional, national and international levels
9. Improve and harmonized policy and regulation.
10. REDD+ Indonesia is one propose solution to conserve FGR.

CHAPTER 2

THE STATE OF *IN SITU* GENETIC CONSERVATION

A. Conservation of FGR within and outside Protected Areas

38. In forestry and agriculture sector, the in situ approach is also used to protect the genetic diversity of plants in the original habitat and in determination of protected species without specifying their habitats.

39. Indonesia has set aside more than 10% of the country area for protected areas. The protected areas are designated on all major islands and island groups to cover all major habitat types. Six categories of Protected Area system are shown in Table below:

Table 4. Protected Area System (PHKA, 2011)

No	Protected Areas	Units	Area(ha)
1	Strict Nature Reserves	239	4,330,619.96
2	Wildlife Sanctuaries	71	5,024,138.29
3	National Parks	43	12,328,523.34
4	Grand Forest Parks	22	350,090.41
5	Nature Recreation Parks	102	257,418.85
6	Game Hunting Parks	13	220,951.44
	Total		22,511,742.29
7	Protection Forests	29/33	31,551,088.02

40. A gap analysis was initiated to determine the representativeness of biodiversity in Indonesia's existing conservation area system and determine the level of representation of ecosystems to ensure their long-term survival. The overlay of the map of conservation areas with the ecosystem classification map resulted in the identification of the critical ecosystems that are currently outside of the existing network of conservation areas. The ecological gap analysis was conductedseparately for each of the seven major islands or group of islands, namely: Sumatra, Kalimantan, Java-Bali, Nusa Tenggara, Sulawesi, Maluku and Papua. Representation of different habitat types (i.e. lowland rainforest, peat swamp forest, montane forest, tropic alpine forest, etc.) in the network of conservation areas was also analyzed per major island or groups of island.

41. Results of the analysis showed that many identified important ecosystems are not represented in the conservation areas network in Indonesia. Although existing conservation areas cover approximately 15% of the country's land area, there are many important habitat types that are under-represented in the network of conservation areas. In Sumatra, for example, only 3.42% of the fresh swamp forests and 6.98% of the peat swamp forests are found within

conservation areas. Representation of lowland rainforests in conservation areas in all of the seven major islands or groups of islands is below 10%, with Kalimantan having the lowest representation at 2.46%. Montane rainforests and tropical pine forests have the highest percentage of representation in Sumatra with 31.63% and 34.73%, respectively. The same trend in habitat representation is followed in all the other major islands.

42. Other approaches to conserve FGR in protected sites include Ramsar sites, MAB Biosphere, East Asian Australian Flyway partnership (EAAFP) Sites, and Heart of Borneo initiative.

B. Forest Management for sustainable FGR conservation *in situ*

43. Meanwhile, with the facts on the ground where the often conflicting between humans and wildlife are causing property losses and safety of the human soul and or wildlife, Guidelines for Conflict Between Humans and Wildlife through Minister of Forestry Regulation No P48/Menhut-II/2008 have been developed.

44. Associated with sustainable management of peatlands in Central Kalimantan, conservation management action plans were prepared as a follow-up of issuance of Minister of Forestry Regulation No. P.55/Menhut-II/2008 on Master Plan for Rehabilitation and Conservation Area Land Development Peatland in Central Kalimantan.

CHAPTER 3
THE STATE OF EX SITU GENETIC CONSERVATION

A. FGR in *ex situ* conservation

45. Ex situ conservation has the goal of conserving flora and fauna outside of its original habitat. Ex situ conservation among others constructs botanical gardens, museums, zoos, collects micro organisms, seeds, and tissue cultures. Because the organisms are managed in man-made environments, ex situ conservation isolates species from the evolutionary process. Indonesia has a plan to conserve all of plant species listed in IUCN category in new developed botanical gardens by 2010 to achieve the target that 60% of threatened plant species be conserved through ex situ collection.

46. Ex situ collections are intended to reduce population extinction risk, preserve genetic diversity and provide source of plants/ seedlings for restoration and recovery programme. To restore genetic diversity of the ex situ plant collections, a large area is required. Therefore, conserving the diversity of Indonesian plants each institute has their own methods. Some places restore small number of species but with more genetic diversity. While Botanic Gardens usually conserve a large number of species but with a narrow genetic diversity.

Table 5. ex-situ collections

Istitution	Area andlocation	Collection
MoF		
Forestry offices under Directorate General of Land Rehabilitation and Social Forestry	104,201 Ha in provinces	29,330,730.13 Kg of seed production
FORDA	33 Research forests (37.000 ha)	234 species of trees (136 genera, 50 families), 167 species are local and 67 are exotic species.
LIPI		
Botanical garden	Bogor	217 families; 1 363 genera; 4 052 species and 22 439 specimens of plant collections
Botanical garden	Cibodas	1243 families, 886 genera, 2 044 species, and 9 814 specimens of plant collections.
Botanical garden	Purwodadi	174 families; 908 genera; 1 901 species and 10 934 species of plant collections

Istitution	Area andlocation	Collection
Botanical garden	Eka Karya-Bali	198 families; 988 genera; 6 471 species and 15 091 specimens of plant collections
Botanical garden	Ecopark	78 families; 556 genera; 1 850 species; 4 500 specimens of plant collections.
Biotechnology Research Center	20 Ha	2, 250 collection number; 108 cultivars; of 16 species fruit trees
Biology Garden in Wamena, Papua	200Ha	1,150 local species cultivars of sweet potatoes, especially from the highland of Papua.
Research Center for spices and medicinal plants	2 gardens at the highland (Manoko and Gunung Putri) and 3 gardens at the low land (Cikampek, Sukamulya and Cimanggu).	1,116 collection numbers in the form of field collection, tissue cultures and seeds.
Department of Health		
Tawangmangu gardens in Central Jawa	13 Ha	850 species of medicinal plants
Puspitek Serpong	350 Ha	160,020 number of specimen from 37 families; 378 genera and 602 species
Provincial Botanical Garden		
Bukit Sari, Jambi	300 Ha	about 400 species
Baturaden, Central Java	142.2 Ha	107 species
Sungai Wain Balikpapan, East Kalimantan		timber trees, Nepenthes and orchids
Enrekang, South Sulawesi		
Puca ,South Sulawesi		economic plants collections

Istitution	Area andlocation	Collection
Kuningan in West Java		Ceremai mountain flora and plants suitable for stony areas
Liwa in Lampung		ornamental plants and plants from South Bukit Barisan
Katingan in Central Kalimantan		fruit trees

47. Some areas in Indonesia establishing arboretum, for example in Depok, Purwakarta and Jepara. It was also noted that there are private botanic gardens such as in Ubud (Bali) and Tomohon (North Sulawesi). Other area which has planning to build botanic gardens is Lombok (West Nusa Tenggara), Batam (Riau), Samosir (North Sumatra) and Sambas (West Kalimantan).

48. Some university also has arboretums, especially under the Faculty of Forestry, Agriculture and Biology. Mulawarman University already established a botanic garden, Botanic Gardens of Mulawarman University, Samarinda in 2001 Several times the garden was damaged by fire, however in 2003 at this150 hectares area, 116 pecies of about 2,600 trees were found.

49. Private garden such as Mekarsari Fruit garden holds 78 families; 326 species and 1,463 varieties of fruit trees collection and also breeds new fruit trees hybrids. This 264 hectares garden was also act as education garden. Other private garden, Taman Bunga Nusantara collected mainly ornamental plants. Local communities cultivated approximately 100 wild species in Indonesia.

50. There are many plant collectors in Indonesia whose propagate and breeds their collections. Orchid collectors usually have wild and cultivated orchid species and hybrids. Traditional medicine factory also usually has medicinal plants collection. Many ornamental plant nurseries also have private garden collection.

Table 6. Priority species for research and development determined by the Forestry Research and Development Agency (FORDA), Ministry of Forestry (Nur Masripatin *et al.* 2004).

Species	Research area	Research organizations
Santalum album	Microbiology, e*x situ* gene conservation, genetic tests (molecular biology), establishment and evaluation of SSO, vegetative propagation, forest protection (pest and disease), reproduction biology, silviculture, chemistry (oil	Centre for Plantation Forest Research and Development (CPFRD), Yogyakarta Forest Biotechnology and Tree Improvement Research Office, Kupang Forest Research Institute, CFP

Species	Research area	Research organizations
	content test)	
Eusideroxylon zwageri	*Ex situ* gene conservation, genetic test (molecular biology), vegetative propagation, silviculture	CPFRD, Yogyakarta Forest Biotechnology and Tree Improvement Research Office, Samarinda Dipterocarp Research Office, Pelambang Forest Research Institute, Banjarbaru Forest Research Institute
Araucaria cunninghamii	*Ex situ* gene conservation, genetic test (molecular biology), establishment of CSO, progeny test, silviculture, chemistry (oil content test)	CPFRD, Yogyakarta Forest Biotechnology and Tree Improvement Research Office, Papua Forest Research Institute
Melaleuca cajuputi subsp. *cajuputi*	Establishment and evaluation of SSO/CSO, reproduction biology, hydrology	CPFRD, Yogyakarta Forest Biotechnology and Tree Improvement Research Office, Kupang Forest Research Institute, Makasar Forest Research Institute
Acacia mangium and Eucalyptus spp.	Forest protection (Pest and Disease), multi- site test, silviculture, evaluation of SSO-F2, reproduction biology, wood technology, hydrology	CPFRD, Yogyakarta Forest Biotechnology and Tree Improvement Research Office, Palembang Forest Research Institute, Banjarbaru Forest Research Institute, Makasar Forest Research Institute
Alstonia spp.	Microbiology, vegetative and generative propagation, e*x situ* gene conservation, establishment of propagation population and SSO, silviculture	CPFRD, Yogyakarta Forest Biotechnology and Tree Improvement Research Office, Palembang Forest Research Institute, Banjarbaru Forest Research Institute, Kupang Forest Research Institute
Intsia spp.	*Ex situ* and i*n situ g*ene conservation, genetic test (molecular biology), vegetative and generative propagation, progeny test, silviculture	CPFRD, Yogyakarta Forest Biotechnology and Tree Improvement Research Office, Palembang Forest Research Institute, Banjarbaru Forest Research Institute
Tectona grandis	Clonal test, intensive silviculture, establishment and evaluation of SSO/CSO, genetic tests (molecular	CPFRD, Yogyakarta Forest Biotechnology and Tree Improvement Research Office, Kupang Forest Research Institute, Makasar Forest Research Institute,

Species	Research area	Research organizations
	biology), wood technology	Palembang Forest Research Institute, Banjarbaru Forest Research Institute, Centre for Forest Product Research and Development (CFP)

Tabel 7. Ex situ Genetic Conservation done by CPFRD (Haryjanto, L. 2011)

No	Species	Area (Ha)	Location
1	*Santalum album* Linn	4	Research forest of Watusipat, Gunung Kidul, Yogyakarta Province
2	*Intsia bijuga*	6,25	Research forest of Sumberwringin Bondowoso, East Java Province
			Research forest of Playen, Gunung Kidul, Yogyakarta Province
3	*Eusideroxylon zwageri*	3	Research forest of Sumberwringin Bondowoso, East Java
4	*Toona sp*	10,2	Candiroto, Temanggung, Jateng
5	*Alstonia sp*	2	Research forest of Playen, Gunung Kidul, Yogyakarta Province
6	*Artocarpus altilis*	11	Research forest of Playen, Gunung Kidul, Yogyakarta Province
7	*Dendrocalamus asper*	1,5	Research forest of Sumberwringin Bondowoso, East Java
8	*Ficus variegata*	3	Watusipat, Gunungkidul, Yogyakarta Province
9	*Anthocephalus cadamba*	5,5	Watusipat, Gunungkidul Yogyakarta Province
10	*Arenga pinnata*	6	Protected forest Ngargoyoso, Karanganyar, Central Java
11	*Araucaria cunninghamii*	1	Research forest of Sumberwringin Bondowoso, East Java
12	*Shorea macrophylla, S.pinanga, S.gysbertsiana*	3,5	Protected forest Ngargoyoso, Karanganyar, Central Java
13	*Calophylluminophyllum*	9	Forestry Office Cilacap District
	Total	65,95	

B. Management for sustainable *ex situ* FGR conservation

51. FORDA Culture Collection (FORDA-CC) under MoF has started since 2009 to ex situ genetic conservation of tropical microbes in Bogor. Now FORDA-CC have more 3,000 isolates of microbe from different forest area in Indonesa. FORDA-CC collected ectomycorrhizal fungi, arbuscular mycorrhizal fungi, agarwood-producing fungi, rhizobium, phosphate solubizing bacteria, yeast, actinomycetes, PGPR (Plant Growth Promoting Rhizobacteria) Bacteri,

Lignoselulolitik fungi, etc. These collections can be used and benefit sharing to other national or international institutions for researchs about food biotechnology, bioenergy, and healthy (Turjaman *et al*., 2011). Indonesia under LIPI and MOF in 2011 has quote to export of agarwood products about 473 tonnes for *Aquilaria,* and 162 tonnes for *Gyrinops*/ *Filaria*. (Turjaman, M., Faulina, S.A., Santoso, E., Sitepu, E. 2011. FORDA-CC Annual Report. Centre for Conservation and Rehabilitation. FORDA-MoF. Bogor).

CHAPTER 4

THE STATE OF USE AND SUSTAINABLE MANAGEMENT OF FOREST GENETIC RESOURCES

A. Utilization of FGR

52. Article 33 of the 1945 Indonesian Constitution stipulates that the Statecontrols forests and the utilization of the resources therein. The Government regulates utilization of forest by certain regulations. Table 10 shows various ranges of use in forest categories.

Table 8. Forest types and forest resources use

Forest type	Forest resources use						
	production	**education**	**recreation**	**scientific**	**hunting**	**Breeding**	**Environment Protection**
Strict Nature Reserves				X			
Wildlife Sanctuaries				X			
National Parks		X	X	X		X	
Grand Forest Parks		X	X				
Nature Recreation Parks		X	X				
Game Hunting Parks					X		
Protection Forests			X				X
Limited production Forest	HPH						
Production forest	HPH						
Convertible Production Forests	HTI						
Reserved area for HTR	HTR						X
Private forest	HKm, Village Forest						

53. IUPHHK-HA or HPH in older term is a license that is granted for the selective harvest of natural forests over a given period, maximum 60 years, and is renewable for one period. The licenses are intended to maintain the forest as permanent production forest.

54. (ILS) IPK is license for the areas inside or outsidepermanent forest zone that are subject to harvest plan, approved by national and provincial, or provincial and district, forestry authorities, as required by national forestry law, and has been issued only with the free and prior informed consent of the affected communities.The timber product from natural forests, particularly from permit on harvest plan area, increased drastically from 2.8 to 6.6 and 14.5 million m^3 in 2008, 2009 and 2010 respectively.

55. IUPHHK-HTI is a license to grow an industrial forest to supply industrial fiber maximum 100 years, and is renewable. Licensees are allowed to clear 100% of the land area but are required to plant only 25%. This limited planting requirement is not always met. Industrial forests are supposed to be established on degraded land, but in practice they are sometimes established after clear-cutting natural forest. MoF statistics showed area of HTI increased twice from 4.50 million Ha in 2000 to 8.98 million Ha in 2010.

56. IUPHHK-HTR is a license to grow forest trees in between agricultural crops, maximum 100 years and it is not renewable. The licenses are issued by District Mayor and given to community groups or cooperatives.

57. Timber products includes plywood, sawnwood, wood working, block board, veneer, particle board, chipwood and pulp. Plywood and pulp are the main export products and the main export destination is Japan.

58. MoF statistics showed increasing timber products from natural forests, plantation forests, and others as 34,092,484.44 m^3 in 2006 to 42,114,770.44 m^3 in 2010.It is notedthat about 60.5% of which was produced from Riau province, in Sumatra island.

Table 9. Products from industrial licences, 2004-2009 (BPS 2010)

Local name	**Volume (M^3)**				
	2004	**2005**	**2006**	**2007**	**2008**
Agathis	32 134	29 888	1 612	12 754	18 121
Bakau	290 475	213 291	155 582	188 224	55 558
Bangkirai	48 776	64 733	66 136	72 178	77 127
Benuang	14 861	8 029	6 655	7 066	39 945
Damar	2 777	3 543	1 625	2 615	2 409
Duabanga	32 393	0	0	0	0
Indah	72 980	57 799	45 209	24 457	85 434
Jelutung	22 226	1 201	18 580	38 734	24 813
Kapur	307 602	323 635	390 958	496 354	281 591
Kruing	242 706	372 573	308 901	238 990	372 044
Meranti	4 135 592	5 049 694	4 377 991	4 876 171	4 362 297
Mersawa	20 103	14 957	12 675	14 610	106 304

Local name	Volume (M^3)				
	2004	**2005**	**2006**	**2007**	**2008**
Nyatoh	31 434	26 345	23 587	25 760	41 595
Palapi	17 598	15 176	20 522	22 197	35 767
Ramin	81 127	65 393	81 587	65 788	92 425
Resak	3 703	6 045	4 548	3 566	7 458
Others	1 117 565	945 863	909 309	925 403	908 950
mixed	1 684 351	1 571 497	1 475 917	1 499 361	1 546 896
Indonesia total	8 158 403	8 769 662	7 901 394	8 514 228	8 058 734

59. List of important commercial plants catagories I and II in Forestry regulation is in Annex III

60. Forest tree improvement has been carried out at many locations aiming to produce superior seeds as shown in Table below.

Table 10. Population Test for Wood (Leksono, B. 2011)

N	Species	Area	Location	Institution
1	*Tectona grandis*	2,5	Gunung Kidul, Yogyakarta	BBPBPTH
		2,7	Wonogiri, Central Java	BBPBPTH
		1,5	Batulicin dan Rantau, West kalimantan	BPTH Banjarbaru
		0,5	Kemampo, South Sumatra	BPTH Palembang
		2,7	Gunung Kidul, Yogyakarta	BBPBPTH
		2	Malili, South Sulawesi	Dishut South Sulawesi
		20	Muna, Buton, North Sulawesi	Dishut North Sulawesi
2	*Instia bijuga*	4	Sobang, West java	BBPBPTH
		2,5	Bintuni, Papua	Dishut Papua
3	*Alstonia scholaris*	1	Gunung Kidul, Yogyakarta	BBPBPTH
		1,5	Bali Barat, Bali	BPTH Bali-Nusra
4	*A. Agustiloba*	1,5	Wonogiri, Central Java	BBPBPTH
	Total area	**42,4**		

B. Non-Timber Forest Product

61. Forestry regulation No P.35/Menhut-II/2007) on Non-Timber Forest Product (NTFP) has listed 565 species as important NTFPs managed under MoF including 490 plant species and 75 animal species.The list is in various catagories based on uses, such as resin, essential oil, fat oil, carbohydrate, fruit, tannin, coloring agent, getah, herb, ornamental plant, rattan bamboo, palm, alkaloid, bush meat and others.

62. Statistics of NTFP Product is shown in Table below. Currently, rattans rank second to timber in importance. The rattan sector flourished into a multi-billion dollar industry. Social significance of rattans is also highly recognized since they provide sustainable source of income to communities living in the uplands.

Table 11. NTFP Product (FRA 2010)

No	NTFP	Unit	2005*
1	Resin	Ton	686,871
2	Rattan	Ton	563,433
3	Cajuput oil	Litre	88,830
4	Sap	Ton	44,397
5	Gum resin	Ton	18,334
6	Turpentine	Ton	12,585
7	Agarwood	Ton	2,358
8	honey	Ton	2,195
9	Other products from Agarwood	Ton	1,690
10	Copal	Ton	298
11	All other animal products	Ton	57
	Total		**1,421,048**

63. Indonesia is one of the major rattan producing countries in the world. Two (2) major rattan resources: natural forests and plantations. Rattans are well distributed in primary and secondary forests. Around 312 rattan species representing 7 genera (listed below) have been documented: Calamus, Ceratolobus, Daemonorops, Korthalsia, Myrialepis, Plectocomia, Plectocomiopsis, and Pogonotium. Only 53 species are being used in various forms, locally and commercially. About 28 of the 53 rattan species have high commercial value.

64. Over 3 million ha of forests produce 570,000 tons of rattans annually. Rattan plantations cover about 1,165 ha and are distributed in Kalimantan (Central, South, West and East), Sulawesi (North, South and Southeast), Gorontalo, Aceh, Riau, Jambi, North Sumatera, Bangka Belitung and West Java. Rattan

species used in plantation include: Calamus manan- C. caesius - C. trachycoleus - C. inops- D. robustus.

65. Rattan processing enterprises are producing primary products such as whole rattan, rattan W & S (washed and sulphurized), split rattan and course polished rattan. The semi-finished products group comprises products of rattan W & S which include fine polished rattan, skin, separate furnitu recomponent, and core.

66. Rattan fruit scales when crushed produce dyes called dragon's blood ranging from orange to red color used to dye textile and baskets. A resin extracted from fruits of various rattan species specifically from Genus Daemonorops (Daemonorops draco, D. didymophylla, D. draconcellus, D.malthanensis, D. microcantha Mart, and D. branchystachys) is another important rattan product. Traditionally, dragon's blood was one of the major products from rattans of tropical forest of Indonesia.

67. Indonesia has 160 species of bamboo (10% from 25 genera). 43 new species have been reported. 122 origin species (88 endemic species) and 38 introduced species. 65 species are economically important. Bamboo forest (67%) belong to the farmer, only 33% grows in the government land. (Widjaya, 2011).

68. *Aquilaria* and *Gyrinops* are the two most important agarwood-producing genera, within the family of Thymelaeaceae (Order: Myrtales; Class: Magnoliopsida. There are 24 species belong to the genus *Aquilaria* and seven species belong to the genus of *Gyrinops.* Both genera are listed in CITES (Appendix 2). *Gonystilus*, *Enkleia*, and *Wikstroemia* have also agarwood-producing genera but low-quality of agarwood (Sitepu et al., 2010; Turjaman et al., 2006).

69. Sago has main function as carbohydrate supply especially in Eastern part of Indonesia. In Indonesia, the highest sago biodiversity are located in Papua and Maluku Islands. Both of the islands also have large area of sago distribution. There were 61 species of sago have been found in Indonesia and 5 of them are identified to be economically beneficial for the communities such as: Metroxylon rumphii, M. Longespinum, M. Sylvetre, M. Sagu and M. Microcanthum.

70. Several tree species were identified to have high value of calory. Recently FORDA has developed several woods fuel such as Acacia leucaphloea, Albizia procera, Calliandra calothyrsus and Acacia auriculiformis. Moreover, FORDA is also developing tree species as biofuel such as Callophylum inophylum, Arengapinnata and Borassus flabellifer.

71. In 2001, around 2039 species can be used for biomedicine (IPB, 2001). 1683 species (86%) were found in tropical low land forest. These species can be clasified into 203 families (mostly fabaceae family: 110 species). At lease 78 species were used by 34 etnic groups to recover from malaria; 133 species were used by 30 ethic groups to recover from fever; 110 species were used by 30 ethic groups to recover from digestion problems and 98 species were used by 27 ethnic groups to recover from dermal problems (IPB, 2001). Those plants are mailnly situated in protected areas. Based on research in East Kalimantan alone, there are several species could be used as food (fruits): 101 species, sago: 7 species, oil/ fat: 4 species, vegetables: 40 species (Kade Sidiyasa,

2011. “*Jenis-jenis Tumbuhan Asli Kalimantan sebagai Penghasil Pangan di Kalimantan*”). Moreover,in 2010 1285 species in Borneo have been clasified as endemic tree species, 5 species silk worm in Indonesia, 1 species (Bombyx mory) has been domesticated, 2 hybrid have been comercially released namely: BS08 and BS09.

CHAPTER 5

THE STATE OF NATIONAL PROGRAMMES, RESEARCH, EDUCATION, TRAINING AND LEGISLATION

A. National Programmes, Research and training, Information system and public awareness

72. Out of the seven Programs of MoF in medium-term plan 2010-2014, three programs related to preservation and utilization of FGR are: Increasing Production Forest Utilization, Biodiversity Conservation and Forest Protection Program, and Forestry Research and Development Program. For the last five years (2003–2007), approximately three million ha of degraded forest and land would be rehabilitated through a national programme called '*Gerakan National Rehabilitasi Hutan dan Lahan*' (National Movement on Forest and Land Rehabilitation). One Man One Tree and one Billion Indonesia Trees movements

73. Integrated Research Program of FORDA in genetic conservation are: Forest Tree Improvement; Flora Fauna and Microorganism Conservation; Ecosystem based: Conservation Area Management Model; Bioecology, Socioeconomic and Cultural Adaptation to Climate Change. Some institutions under FORDA have spesific tasks for FGR conservation i.e: Forest Conservation and Rehabilitation Research and Development Center; Biotechnology and Forest Tree Improvement; Aek Nauli Forestry Research Institute (Core: biodiversity, conservation and rehabilitation); Makasar Forestry Research and Development Institute; Manado Forestry Research and Development Institute; Kupang Forestry Research and Development Institute; Manokwari Forestry Research and Development Institute; Institute of Research and Technology of Natural Resource Conservation of Samboja (core: natural resource conservation).

74. FORDA and LIPI have been leading organizations in the FGR research as well as provide information system. LIPI organizes several programmes related to biodiversity i.e. Indonesian Biodiversity Network (NBIN), PROSEA (Plant Resources of South East Asia), and MAB (Man and the Biosphere) Programme Indonesia. NBIN is an integrated agency under the Clearing House Mechanism establishedby the Ministry of the Environment as the National Focal Point to the biodiversity implementation inIndonesia. PROSEA is an international cooperation programme aimed to document information onplant resources in South East Asia and make available for education, research, industry and end user

75. Under the Ministry of Agriculture, there is research and development program on *biotechnology and agricultural genetic resources.*

76. Both formal and informal education have been done to improve the performance in FGR research and management. Capacity building can be done both through formal education and 'learning by doing' exercises. Generally, training in FGR is included in tertiary education. A number of FGR related courses, such as genetic conservation, biodiversity conservation and tree

improvement are offered at both undergraduate and postgraduate levels. Most of these courses are managed by the Faculty of Forestry or, to a lesser extent by the Faculty of Agriculture (Department of Forestry). Some prominent universities with such courses are University of Gadjah Mada in Yogyakarta, Bogor Agricultural Institute in Bogor, and University of Mulawarman in East Kalimantan.

77. Strengthening the human resources is crucial for the government organizations. However, as domestic funding is limited, majority of capacity building activities have been carried out through bilateral cooperation in the form of (project-based) technical assistance programmes (with e.g. JICA, GIZ, DFID) and research grants from international agencies such as FAO, ITTO, Tropenbos International, CSIRO and ACIAR. Funding provisions for training and postgraduate studies overseas have normally been a part of the projects.

B. Legal framework and Institutions/ networking involved for FGR conservation

78. Although Indonesia has ratified Nagoya Protocol in May 2011, at national level, there. Genetic Resources Management Bill is still under legislation process by the House of Representatives. National committee on Germ Plasm is established under the Ministry of Agriculture, The Committee is more focus on Agricultural genetic resources.

79. FGR conservation is subsided under forest conservation and management by MoF. Not until the end of 2010 that MoF has started to accommodate FGR conservation in its PHPA structure as Section of Forest Genetic Resources under Sub-directorate of Species Preservation and Utilization, Directorate of Biodiversity Conservation.

80. AFORGEN Project mainly in plant genetic resources, has reported list of related institutions and stakeholders in plant genetic resources conservation (see appendix). The list can be used as base to forest genetic resources when added with institutions and network on wildlife and microorganism which are wider scope of FGR)

81. Some legislation in Indonesia related to forestry and biodiversity has been enacted, although most of the legislation does not directly concern genetic resources. Regulations which affect the policy on forest genetic resources in Indonesia can be described as follows:

    a) Indonesian Biodiversity Strategy and Action Plan (IBSAP) 2003–2020.

       IBSAP 2003-2020 has recently been released. The following eight points of policy direction for IBSAP implementation have been determined (BAPPENAS 2003)

       - Enhance the capacity of communities in managing biodiversity.
       - Enhance the assessment and development of knowledge and technology in sustainable management of biodiversity
       - Increase function sustainability and ecosystem balance at the local, regional and national levels.

b) Act No. 5/1990 on Conservation of Living Resources and Their Ecosystems; This act emphasizes protection efforts including the protection of buffer zones and biodiversity preservation. There are no specific statements related to forest genetic resources conservation and management. Under this act, conservation areas were divided into two: sanctuary reserve and nature conservation. The sanctuary reserves consist of nature reserves and wildlife sanctuaries, whereas the nature conservation areas comprise national parks, grand forest parks and nature recreation parks.

c) Act No. 5/1994 on Ratification of Convention on Biological Diversity (CBD): approves the application of the convention and related agreements in Indonesia.

d) Act No 32/2009 on Environment: regulates policy aspects and environmental management of natural and man-made resources including genetic resources.

e) Act No 41/1999 on Forestry: Conservation forest is defined as a forest area with specified characteristics and having as a main function the conservation of biological diversity (flora and fauna) and the ecosystems. Conservation forests are divided into three different categories: sanctuary reserve, nature conservation area and hunting area. The act includes a specific statement on the conservation of flora and fauna, but there are no statements directly related to genetic resources.

f) Act No 29/2000 on Protection of New Variety of Plants :The act regulates the property rights and benefit sharing of genetic resources and related products. It also relates with international agreements such as the CBD, the International Convention for the Protection of New Variety of Plants (the UPOV Convention), and the agreements of World Trade Organization (WTO).

g) Minister of Forestry Decree No. 67/2004 on Distribution and Utilization of Teak Planting materials: regulates the use of teak genetic materials in the country including the need to use planting materials for which the origin is known.

h) Minister of Forestry Decree on Forest Tree Seeding No. P.10/2007: This decree regulates the conservation and management of forest genetic resources, certification of forest seed source, tree improvement activities, and provision and distribution of seeds of forest trees. This is the only regulation directly related to FGR conservation in Indonesia. Several Directorate General Regulations were also set up following the decree in order to implement the regulation.

i) Government Regulation No. 28/2011 regarding management of protected areas: the goal is preserving plants and wildlifes diversity to avoid species extinctions, life support system, and utilization of biodiversity in sustainability way.

82. Currently Indonesia is in the process of formulating an act which will directly regulate utilization, management, and conservation of genetic resources, including forest genetic resources. The draft of the act is being finalized since several years.

83. In the national context, the Forestry Act No.41/1999 deals with the access to forest resources for different groups of communities. For example, under the Forestry Act, it is possible for individuals and cooperatives to be granted license to some forest-based business, such as environmental services and NTFPs. In addition, under this Act, a large-scale enterprise can be granted license to forest-based business involving a local cooperative.

84. Tenure and user rights for forestland and resources are also recognized by the Forestry Act (UU No. 41/1999). Furthermore, as a follow-up to the MoF Decree no. 31/Kpts-II/2000 regarding the implementation of community forest-based management, the Government has released 26 permits for local community-based forest management, covering an area of approximately 66,214 ha in 10 provinces.

85. Property rights and benefit sharing from genetic resources and products derived from the forests are also regulated under the Act No. 29/2000 regarding the Protection of New Varieties of Plants. In relation to the international arrangements, the formulation of Act No. 29/2000 also considered relevant aspects of international agreements such as the CBD, the International Convention for the Protection of New Varieties of Plants and the WTO/Trade.

C. Challenges, needs and priority

86. Major challenges for the conservation and management of FGR in Indonesia include: the lack of specific regulations related to conservation and management of the resources, the lack of funds, facilities and qualified human resources, awareness of the importance of conservation and management of FGR is relatively low and mobilization of alternative funding is still difficult. The first and third challenges require more national efforts, while the remaining two require collaborative activities at regional and international levels.

87. Some future priorities are:

    1. Setting of priority species which are approved by stakeholders in each participating country should be prioritized as the main programme.
    2. Conservation and management of FGR should be supported by many institutions. In order to gain support, conservation and management of FGR should provide benefits for stakeholders. Participation of the people is crucial for the success of the programme.
    3. Government facilitation is needed in the programmes of conservationa and management of FGR in order to provide direction, technical assistance and other stimulation for participation
    4. Conservation and management of FGR at village level is an alternative form of participation of the people in the programme
    5. Future policy in Indonesia would emphasize rehabilitation of degraded forests and lands, and conservation of the remaining natural forests.

Advances in research and information exchange are needed in terms of species domestication, tree improvement and genetic conservation.

6. Research on environmental management of plantation forests, particularly in monoculture plantations, is important for a sustainable management of genetic resources.

CHAPTER 6
THE STATE OF REGIONAL AND INTERNATIONAL COLLABORATION

A. Regional/Sub-regional FGR-based or thematic networks engaged

88. Regional or sub-regional collaborations and thematic networks for forest genetic resources Indonesia as well as specific flag-ship species conservation that Indonesia has participated areshown in Table below.

Table12. Collaborations for forest genetic resources conservation

	Activities	Species involved	Benefits resulted
AFORGEN	Workshop, plot establishment, training	Plant spp	Sharing information on the status of research and development on FGR, and gathering relevant inputs for FGR conservation and management. 4 demostration plots on village level FGR conservation and management (in Indonesian, *Konservasi Sumberdaya Genetik Tanaman Hutan Tingkat Desa,* KSDGTH-TD*)*
APAFRI		Plant spp	
E8		Elephants	
GTI, ZSL,WCS, WWF, FFI		Tigers	
GRASP		Apes	
GMBP		Rhino	
JGC, Aspinal Foundation		Owa	
Phillippines	Breeding capacity building	Kakatua	
Japan		Bali starling	
MALINDO		Smuggled Spp	
RSOP		Palm oil	
OIE		HPAI, FMD	Control of animal diseases
ASEAN-WEN			International trade

B. International collaborations

89. Over the past ten years, various international collaborations have been developed, indirectly regard to the conservation and sustainable use of forest genetic resources, although not with any specific purposes on FGR, but by safeguarding forest habitats and sustainable use FGR are indirectly conserved and protected. DNS Projects and other research and information sharing are cooperated such as INBAR (rattan and bamboos), IUFRO.

90. Some of the research projects are: ITTO PD425/06 Rev.1 (I) (2008-2011) donor country: JAPAN Title: Production and utilization technology for sustainable development of agarwood (gaharu) in Indonesia; Impact on FGR: Agarwood production (NTFP), Many forest communities do plant agarwood seedlings with multi-species different more than 2,000,000 trees in Indonesia (Turjaman, 2011).

C. Commitments in International Conventions, Agreements, and Treaties related to sustainable use, development and conservation of FGR

91. Indonesia has signed many international conventions, treaties or agreementsfor conservation of biodiversity, ecosystems and natural resources

Table 13. Commitments in International Conventions, Agreements, and Treaties related to sustainable use, development and conservation of FGR

	since	by	Responsible under	Impact on FGR
CITES	12/28/1978	President	MoF	International Trading spp
CBD	1/08/1994	law	MoE	All spp
Ramsar	19/10/1991	president	MoF	Wetlands spp
WH	30/05/1989	president		World Natural WH sites spp
Climate Change (UNFCCC)		National Law	Kementerian LH	All spp
Desertification (CCD)		National Law	MoF	All spp (semi arid areas)
Signatory to other international treaties	Party to: Biodiversity, Climate Change, Endangered Species, HazardousWastes, Law of the Sea, Nuclear Test Ban, Ozone Layer Protection, ShipPollution, Tropical			protect ormanage biological resources

	since	by	Responsible under	Impact on FGR
designed to	Timber 83, Tropical Timber 94, Wetlands signed, but notratified: Desertification, Marine Life Conservation			

D. Needs and priority

92. At this stage, the establishment of a network may encourage more intensive communication among the countries in the region. Some similarities among the countries, for example in forest tree species, ecosystems and socio cultural environment, can be used as entry points for developing the network. Extending the network to reach existing regional organizations, such as ASEAN, SEAMEO-BIOTROP and APC should also be considered in order to gain support from a broader scope of stakeholders in each of the member countries.

93. Some aspects that have been proposed to be addressed at the international level are also relevant to be brought into collaboration at the regional level. These include e.g. tackling issues related to access, benefit sharing, biosecurity and intellectual property rights. Joint efforts in fighting against illegal trade of FGR and research collaboration on FGR-related fields should also be promoted at the regional level. Information sharing on FGR conservation, utilization and management as well as exchange of genetic material for research purposes are also potential fields for collaboration among countries in the same or similar regions.

94. Various FGR conservation and management issues are covered under international agreements such as the CBD and the Cartagena Protocol, the International Treaty on Plant Genetic Resources for Food and Agriculture and other agreements in the WSSD process as well as the Trade-Related Aspects of Intellectual Property Rights (TRIPS). International cooperation through APFORGEN-APAFRI-IPGRI should be directed to address some crucial issues on FGR, such as access, benefit sharing, biosecurity and intellectual property rights. The cooperation should also include joint efforts in fighting against illegal trade of FGR. Research collaboration on FGR-related fields should also be promoted.

CHAPTER 7

ACCESS TO FOREST GENETIC RESOURCES AND SHARING OF BENEFITS ARISING FROM THEIR USE

A. State of Access to FGR

95. National Act No. 41/1999 regulates the acknowledgement of customary people. In article 67, the existing and acknowledged customary people has rights to:

a. Utilize the forest resources for daily needs.

b. Manage the forest area based on the customary law and not contradictingwith the nationalact.

c. Take delivery of community empowerment program for improving thewelfare.

96. The acknowledged customary people will fulfil the following criteria:

a. Live in a group of people.

b. Has the institutional tool and organzation.

c. Has a clear customary area.

d. Has running law instruments.

e. Utilizing the forest resources for daily needs.

f. The government has encouragedlocal populations to take a more active role in forest management and theestablishment of social forestry programs. This was supported by a decree in 1998that authorised communities to undertake timber harvesting through cooperatives.

g. In 1998, the Ministry of Forestry alsopublished two decrees in advance of the circulation of a new 1999 Basic ForestryLaw. The first transfers central forestry functions in regard to the Management ofGrand Forests (Taman Hutan Raya) to the governors of each province and theManagement of National Parks to district heads. The second decree sets limits onthe maximum area that any private company can hold in forest or timber plantationconcessions.

h. A community timber plantation programme in Indonesia called HTR (*Hutan Tanaman Rakyat*, community timber plantation). Launched in 2006, the programme seeks to establish over 5 million hectares of new plantations by 2016. Recent regulation P 55/Menhut II/2511 regulates permit for HTR. Access of many types of community forestry can be compared in Table below.

Table 14. Access of many types of community forestry

Land tenure					
Types of management system	Ownership	Rights givento land users/	Main actors (land users) who	Management purposes	

Land tenure					
		managers	use the rights		
Community Forest or*Hutan Kemasyarak-tan*(HKm)	State	Access, use and manage		- Production - conserv-ation	- Damar forestin Lampung - Teak Community Forest in Java.
Community Plantation Forest or *Hutan Tanaman Rakyat* (HTR)	State	Access, use and manage		Production	HTR permits in North Sumatera, Jambi, and SouthSulawesi
Village Forest	State (District to local	Access, use and manage		- Production - Conservation	Village forests in Java
Company-community partnership models	State, managed by State owned company	Access, use and manage		- Production - Conservation	Perhutani partnership models in Java
Company-community partnership models	State, under Private company managemen t	Access, use and manage		Production	PT. Musi Hutan Persada in South Sumatera
Farm Forest	Private	Access, use, manage and transfer		Production	Smallholder teak farm forests inJava

B. Sharing of Benefits

97. In 2010, the area of 101,012 Ha out of the community forestry reserved area of 634,917 Ha are permitted.

98. The lack of provisions on the rights of local communities has resulted in many cases of conflicts between local communities and concession holders. The government failed to adequately enforce harvesting and replanting regulations causing production forests becoming open access. Inaccurate mapping in local land use planning overlay on reserved area for community forests make it harder for community to claim their right.

99. Now that Indonesia has committed to reducing carbon emission to 26% and speed up REDD+ pilot programs throughout the country, forest land tenure issue is becoming more challenging in the scheme of benefit sharing of REDD+ on who own the forests and who own the trees.

100. At present, there is no formal legal regulations and institutions on issuing rights on forest land, existing traditional forest, community forest is permitted for the use but not the ownership. Land tenure reform for collective rights traditional rights is in need for conflict resolution and for fairer and effective benefit sharing.

CHAPTER 8

THE CONTRIBUTION OF FOREST GENETIC RESOURCE TO FOOD SECURITY, POVERTY ALLEVIATION AND SUSTAINABLE DEVELOPMENT

A. FGR contributions for livelihood, Food security and Poverty Alleviation

101. Data from Indonesian Statistics bureau shows that by March 2011 number of poor population people living under poverty line has reached 30.02 million (12.49%) in which about two-third (18.97 million) living in rural area. The index of depth and severity of poverty in rural area group is 2.08% and 0.55% respectively. Most of the poor population found in the island of Java (9.21 million), Sumatra (4.32 million), Sulawesi (1.79 million), Maluku and Papua (1.54 million). Rural poor people rely mainly on forest resources and agriculture. NTFPs obtained from nearby forests are main source for their livelihood.

102. Number of villages associated with the current forest area is recorded as 31,957 villages, which distributed in the forest area 1305 villages (4.08%), forest edge 7,943 villages (24.86%) and around forest areas 22,709 villages (71.06%). Most villages in the forest area are in Central Kalimantan (208 villages), and at the edge of the forest in Central Java (1581 villages) and 6,795 villages around the forest area). Community welfare improvement surrounding forest areas and Community Empowerment Programme are continuously implemented under MoF programme.

103. Potential FGR for food, drugs, and timber are reported in former chapter. However, there is no specific direction or guidelines in species priority for food security or poverty alleviation. In general all local fruits or food trees in the areas as well as NTFPs development are promoted such as rattan, bamboo, forest natural honey, agarwood plantation.

104. Some breeding programme for forest plants and animals are also initiated but slow progress due to lack of capacity, strict regulations and poor marketing.

B. FGR contributions for Sustainable development and MDGs

105. Forest sustainable management has long been the principle of forest management in Indonesia. Sustainable development is by no means separated from conservation and wise use of forest natural resources and ecosystem services. Forest genetic resources, in particular, are core sources of food drugs, and other materials for living. Conservation of forest genetic diversity is to underpin the health of forest and maintain capacityof ecosystemsto delivergoods and services andsupport livelihoods.

106. From the eight main goals of MDGs, Biodiversity conservation considerations are included in thegoals, targets, and indicators of Indonesia MDGs (goal no. 7, target no. 9) which is as follows: Ensuring environmental conservation with the

target to integrate sustainable development principleswith national policy and programmes and to restore degraded environmental resources.

107. Some Indicators usedin achieving such targets (see results in chapter one) are:
    1. The ratio between tree-covered areas based on Landsat satellite images to total land areas (%);
    2. The ratio between tree-covered areas based on total forest area, preservation areas, andconservation areas, including agricultural areas and community forest to total land area (%);
    3. The ratio between preservation areas to total land area (%).

REFERENCES

AFORGEN 2009, National Status Report, FAO

ASEAN Center for Biodiversity,2010.Protected Areas Gap Analysis in the ASEAN Region

Bappenas (2003), IBSAP- Indonesian Biodiversity Strategy and Action Plan 2003-2020

FRA 2010, Country report , FAO

BirdLife International and IUCN-WCPA South-East Asia (2007) Gap analysis of protected areas coverage in the ASEAN countries. Cambridge, U.K.: BirdLife International

Haryjanto, L. 2011. Proceedings of Scientific Meeting of Forest Genetic Resources Conservation. Strategic Role of Forest Genetic Resources Conservation Program In Support of Forest Tree Improvement. Yogyakarta Forest Biotechnology and Tree Improvement Research Office, Yogyakarta

Kade Sidiyasa, 2011. "Jenis-jenis Tumbuhan Asli Kalimantan sebagai Penghasil Pangan di Kalimantan"

Kartawinata, K. 2004. Biodiversity Conservation in Relation to Plants Used for Medicine and Other Products inIndonesia. Journal of Tropical Ethnobiology. Vol 1 (2). P. 1-11)

Leksono, B. 2011, Integrative Research Forest Tree Improvement to Produce Superior Seeds. Proceedings of the Workshop on Synthesis of Plantation Forest Research 2010. Plantation Forest Research, Bogor.

LIPI 2008 ,Research Centre for Biology, in press

Ministry of Environment 2009, National Report CBD-4

Ministryof Forestry, 2010, Statistik Kehutanan. (in Indonesian).

Prajadinata, S,R Effendy, Murniati. 2011. Review of management and conservation status of Ulin (Eusideroxylon zwageri Teijsm & Binn) Ebony (Diospyros celebica Bakh) and Cempaka (Michelia champaca Linn) in Indonesia. ITTO Project PD 539/09 Rev.1 (F). Bogor.

Riswan, S and Yamada I, 2006, A Note on The Progress of Biodiversity research in Indonesia.

Rimbawanto, A, T Pamungkas, L Hakim, Prastyono, D Eko. 2005. Database jenis-jenis prioritas untuk konservasi genetik dan pemuliaan. Buku 1. Pusat Litbang Hutan Tanaman. Jogyakarta.

Rimbawanto, A,T Pamungkas, L Hakim, Prastyono, D Eko. 2006. Database jenis-jenis prioritas untuk konservasi genetik dan pemuliaan. Buku 2. Pusat litbang hutan Tanaman. Bogor – Jogya.

Sitepu, I.R., Santoso, E., Siran, S.A., and Turjaman, M. 2011. Fragrant wood gaharu: whenthe wild can no longer provide. ITTO PD425/06 Rev. 1: (I), ITTO and FORDA, Bogor.

Ministry of Environment 2009, SoER- State of Environment Report

Turjaman, M., Tamai Y., Santoso, E., Osaki, M., Tawaraya, K. 2006. Arbuscular mycorrhizal fungi increased early growth of two nontimber forest product species Dyera polyphylla and Aquilaria filaria under greenhouse conditions. Mycorrhiza 16:459-464.

Turjaman, M. 2011. Completion Report.Production and utilization technology for sustainable development of eaglewood (gaharu) in Indonesia.ITTO and FORDA. Bogor.

Widyatmoko, A, ILG Nustjajaningsih, Prastyono. 2011. Study on the level of genetic diversity of Diospyros celebica, Eusideroxylon zwageri and Michelia spp using RAPD markers. ITTO Project 539/09 Rev.1 (F). Bogor.

Appendices

Appendix I.

Working Group for the Preparation of the Country Report

A. Advisory Committee
   1. Dr. Ing Ir Hadi Daryanto, DE, Secretary General, Ministry for Forestry
   2. Ir. Hartono, MSc., Secretary Directorate General of Forest Protection and Nature Conservation
   3. Ir. Djoko Winarno, Secretary General of Bina Pengelolaan DAS and Perhutanan Sosial
   4. Ir. Wisnu Wibowo, MSc, Secretary FORDA
   5. Ir. Herry Priyono, MM., Acting Sekretary Directorate General of BUK

B. Team work

   Chair
   Dr Ir. Novianto Bambang W, MSi, Director of Biodiversity Conservation

   Secretariat
   1. Ir. Agus Sriyadi Budi Sutito, MSc
   2. Ir. Ikeu Sri Rejeki, SSi, MSE

   Member:

   1. Ir. Atok Subiakto, M.App.Sc., Risearcher FORDA
   2. Dr. Hani Siti Nuroniah, SSi, MSi., Riseracher Forda
   3. Dr Yuyu Suryasari Poerba, Biological research Center, LIPI
   4. Dr. Magdalena, SSi, MSi., Secretariat Ditjen Bina Usaha Kehutanan
   5. Ir. Lita Liana, MSi., Directorate of Bina Perbenihan Tanaman Hutan
   6. Dr. Ir. Agustinus Winanto Taufik, MSc, Directorate of Biodiversity Conservation

Appendix II

Species priority for genetic conservation

No	Species	Conservation Status*	Ex situ conservation	In situ conservation
1	*Agathis borneensis*	vulnerable	unknown	• TN. Gunung Palung (West Kalimantan) • TN Kayan Mentarang (East Kalimantan), • TN Bukit Barisan Selatan, Sumatra • TN Bukit Dua Belas (Sumatra)
2	*Dalbergia latifolia*	vulnerable	unknown	TN Bali Barat
3	*Dipterocarpus sublamellatus*	endangered	unknown	TN Bukit Barisan Selatan
4	*Duabanga moluccana*	unknown	Wanariset Rarung NTB	Gunung Tambora, NTB
5	*Eusideroxylon zwagery*	vulnerable	• Sumberwaring in Research Forest-Bondowoso, East Java • Arboretum FORDA – Bogor • Suban Jeriji, South Sumatra • KHDTK Kemampo, South Sumatra • PT Kiani Hutani Lestari, East Kalimantan • KHDTK Samboja, • Sebulu, East Kalimantan • Barabai City Forest, South Kalimantan • Semboja arboretum,	• PT ITCIKU Balikpapan, East Kalimantan • PT Sari Bumi Kusuma, Kotawaringin Timur, Central Kalimantan • Arboretum PT Suka Jaya Makmur, Ketapang, West Kalimantan • Sumber Barito, Murung Raya, east Kalimantan • KHDTK Samboja, East Kalimantan • Tanjung Harapan, Nunukan, east Kalimantan • Paser, East Kalimantan • Kutai National Park, East kalimantan • Bukit Soeharo, east Kalimantan • Setulang, Malinau, East Kalimantan • KHDTK Kintap, South Kalimantan • PT Reki, Musi Banyuasin, South Sumatera • PT Reki, Sungai Kandang, Jambi • Mambang Custom Forest,

			Samarinda • PT Hutan Sanggau Labanan Lestari, Berau, east Kalimantan • Pulau Mas, Sanggau, West Kalimantan • Hutan Senami, Jambi	Musirawas, South Sumatera • Cagar alam Durian Luncuk, Jambi • TN Bukit Dua Belas, Sumatra • TN Gunung Palung, TN Danau Sentarum, West Kalimantan • TN Kutai, TN Kayan Mentarang, east kalimantan • Protect forestGunung Kubing and Gunung Tajam, Belitung • Protect foret Jangga Baru, Batang Hari Jambu
6	*Gonystylus bancanus*	vulnerable	unknown	• TN Bukit Barisan Selatan, Sumatra • TN Way kambas, Sumatra • TN Gunung Palung, Kalimantan • TN Danau Sentarum, Kalimantan • TN Yanjung Puting, Kalimantan • TN Kayan Mentarang,Kalimantan
7	*G. macrophyllus*	unknown, Appendix II CITES	unknown	unknown
8	*Gyrinops verstigii*	Unknown	unknown	unknown
9	*Koompassia malaccensis*	Lower risk, conservation dependent	unknown	unknown
10	*Pericopsis mooniana*	vulnerable	unknown	Cagar Alam Lamidae, Kolaka, Soueheat Sulawesi
11	*Pinus merkusii*	vulnerable	unknown	• TN Kerinci Sebelat, Sumatra • Cagar Alam Sibualbuali, Kerinci • Bukit Tapan, Kerinci
12	*Pterocarpus indicus*	vulnerable	unknown	unknown
13	*Shorea balanocarpoides*	unknown	unknown	• TN Bukit Dua Belas, Sumatra • TN Bkit Tiga Puluh, Sumatra • TN Bukit Barisan Selatan,

				Sumatra • TN Way Kambas, Sumatra • TN Danau sentarum, West Kalimantan • TN Kutai, East kalimantan
14	*S. balangeran*	Critically endangered	unknown	• TN Berbak • TN Way Kambas, Sumatra
15	*S. faguetiana*	unkown	unknown	unknown
16	*S. gibbosa*	unknown	unknown	unknown
17	*S. macrantha*	unknown	unknown	• TN Berbak • TN Way Kambas, Sumatra
18	*S. mecistopteryx*	unknown	unknown	• TN Kutai, East Kalimantan • TN Danau Sentarum, West Kalimantan
19	*S. seminis*	unknown	unknown	unknown
20	*S. splendida*	unkown	Sanggau, West Kalimantan	unknown
21	*S. stenoptera*	unknown	Sanggau, west Kalimantan	unknown
22	*Swietenia mahagoni*	-	unknown	Not available (exotic species)
23	*Vatica obovata*	Critically endangered	unknown	unknown
24	*V. teysmanniana*	Critically endangered	unknown	unknown
25	*Acacia crassicarpa*	unknown	• Riam Kiwa, South Kalimantan • Kampar kiri, Riau • Wonogiri, Central Java	unknown
26	*Alstonia scholaris*	unknown	• Yogyakarta	• TN Buki tiga puluh, riau • TN Meru Betiri, east Java • TNManupeu – Tana Daru, west Sumba • TN Laiwanggi-Wanggameti, West Sumba • TN Gunung Palun, West Kalimantan • TN Kayan Mentarang, East

				Kalimantan
27	*Aquilaria malaccensis*	vulnerable	unknown	TN Kayan Mentarang, East Kalimantan
28	*Araucaria cunninghamii*	Not evaluated	Sumber Wringin, Bondowoso East Java	Gunung Tuan, G. Tumbii, G. Nerwah, G. Umbii, G. Morepem, G. Dakarau
29	*Castanopsis argentea*	Data deficient	Central Java and West Java	TN Lore Lindu, Central Sulawesi
30	*Cinnamomum iners*	unknown	unknown	unknown
31	*Cinnamomum porrectum*	unknown	unknown	unknown
32	*Dyospyros celebica*	vulnerable	• Cikampek, west Java • Wanagama, central Java • Nupaboma village, Palu South Sulawesi • Maleali and Sausu Piore Village, Parigi Moutung, south Sulawesi • Donggala, South Sulawesi	• Batang Hari, Jambi • Musi Rawas, South Sumatera • Sanggau, West Kalimantan • Katingan, Central Kalimantan • Penaja Paser Utara, East Kalimantan • TN Bogani Nani Warta, Bone, North Sulawesi • Cagar alam Kalaena and Fahurumpenai, South Sulawesi • Cagar Alam Pangi-Binanga, Central Sulawesi
33	*Dyospyros malabarica*	unknown	Wanariset Rarung, NTB	unknown
34	*Dyera costulata*	unknown	unknown	• Tn Bukit Dua Belas, Jambi • TN Bukit Tiga Puluhm Riau • TN Sembilang, South Sumatra • TN Gunung Paung, West Kalimantan • TN Danau Sentarum, West Kalimantan • TN Tanjung Puting, East

				kalimantan • TN Kayan Mentarang, east Kalimantan
35	*Dryobalanops aromatica*	Criticall endangered	PT Inanta Natal, Tapanuli Selatan, North Sumarta	• TN Kutai, east Kalimantan • TN Manusela, Maluku
36	*Elmirrillia ovalis*	Data deficient	West Java	Gunung Klabat, North Sulawesi
37	*Eucalyptus urophylla*	unknown	Timor Tengah Selatan, NTT	Cagar Alam Gunung Mutis, NTT
38	*Hopea mengarawan*	Critically endangered	unknown	unknown
39	*Intsia bijuga*	Vulnerable	• Sumber Wringin, Bondowoso, East Java • Research Forest: Pasir Awi, Darmaga, Yanlapa, Haurbentes, Carita, Pasir Hantap, Cikampek (West Java)	36. TN Bogani Nani Warta Bone, North Sulawesi
40	*Lophopethalum javanicum*	uknown	unknown	unknown
41	*Manilkara kauki*	Data deficient	unknown	TN Alas Purwo, East Java
42	*Octomeles moluccana*	unknown	unknown	• TN Kutai, East Kalimantan • TN Manusela, Maluku
43	*Palaquium rostratum*	unknown	Puding Besar,bangka Belitung	unknown
44	*Parashorea aptera*	Critically endangered	unknown	unknown
45	*Peronema canescens*	unknown	Research forest Sebulu and Semboja, East Kalimantan	unknown

46	*Podocarpus imbricatus*	Not evaluated	unknown	• TN Gunung Halimun, West Java • TN Gede Pangrango, West Java • TN Bromo Tengger, east Java
47	*Santalum album*	endangerous	Yogyakarta	TN Ballli Barat
48	*Shorea atrinervosa*	unknown	unknown	unknown
49	*Shorea javanica*	Lower risk, near threatened	• Carita, Banten • Research forest Haurbentes, Yanlapa, Pasir Awi, darmaga, Cikampek, Pasirhantap, Cigerendeng (West Java)	Cagar Alam Leuweng Sancang, West Java
50	*Shorea johorensis*	Critically endangered	unknown	unknown
51	*Shorea leprosula*	endangered	• Research forest: Pasir Awi, Darmaga, Yanlapa, Haurbentes, Cigerendeng, ,carita, Pair Hantap (West Java) • Arboretum Samboja, East Kalimantan • Purba Tengah, North Sumatera, • Gunung Dahu, West Java	unknown
52	*Shorea macrophylla*	vulnerable	• Carita, Banten • Haurbentes, Yanlapa, Pasir Awi, Darmaga, Cikampek, Pasirhantap, Cigerendeng	TN Kutai, East Kalimantan

			(West Java)	
53	*Shorea palembanica*	vulnerable	• Carita, Banten • Haurbentes, Yanlapa, Pasir Awi, Darmaga, Cikampek, Pasirhantap, Cigerendeng (West Java)	• TN Kutai, East Kalimantan • TN Danau Sentarum, west Kalimantan • TN Tanjung Putting, central Kalimantan • TN Bukit Dua Belas, Jambi • TN Berbak, jambi • TN Bukit Barisan Selatan, South Sumatra • TN Way Kambas, Lampung
54	*Shorea pinanga*	vulnerable	• Carita, Banten • Haurbentes, Yanlapa, Pasir Awi, Darmaga, Cikampek, Pasirhantap, Cigerendeng (West Java)	• TN Kutai, East Kalimantan • TN Danau Sentarum, west Kalimantan • TN Tanjung Putting, central Kalimantan
55	*Shorea platyclados*	endangered	• Purba Tengah, North Sumatra	unknown
56	*Shorea singkawang*	Critically enagered	unknown	unknown
57	*Sindora inermis*	vulnerable	unknown	unknown
58	*Toona sureni*	Data deficient	Java	• TN Manupeu-Tanna Daru, West Sumba • TN Laiwanggi-Wanggameti, East Sumba
59	*Vitex cofassus*	Data deficient	unknown	unknown
60	*Zanthoxylum rhetsa*	Data deficient	unknown	unknown

Based on red IUCN red list catagories: extinct, extinct in the wild, critically endangered, endangered, vulnerable, lower risk, data deficient, not evaluated. Unknown mean data are not available.

Annex III. List of important commercial plants in catagories under Forestry regulation No 163/ Kpts-II/2003

Category I.

No.	Trade names	Local names	Scientific names
1.	Agathis	Dama (Sulawesi), Damar (Jawa), Damar Sigi (Sumatera), Damar Bindang (Kalimantan)	(Agathis spp)
2.	B a l a u	Damar Laut, Semantok (Aceh), Selangan Batu, Anggelam, Amperok	(Shorea spp; Parashorea spp)
3.	Balau Merah	Balau laut, Batu tuyang, Damar laut merah, Putang, Lempung abang	(Shorea spp)
4.	Bangkirai	Benuas, Balau mata kucing, Hulo dereh, Kerangan, Puguh, Jangkang putih	(Shorealaevis Ridl); (Shorealaevifolia Endert); (Hopea spp); Shoreakunstleri
5.	D a m a r	Damar	(Araucaria spp)
6.	Durian	Durian burung, Lahong, Layung, Apun, Begurah, Punggai, Durian hantu, Enggang	(Duriocarinatus Mast); (Durio spp, Coelostegia spp)
7.	G i a	Delingsem, Kayu batu, Melunas, Kayu kerbau, Momala	(Homaliumtomentosum (Roxb) Benth, Homalium Foetidum (Roxb) Benth)
8.	G i a m	Resak batu, Resak gunung	(Cotylelobium spp)
9.	Jelutung	Pulai nasi, Pantung gunung, Melabuai	(Dyera spp)
10.	K a p u r	Kamper, Ky. kayatan, Empedu, Keladan	(Dryobalanops spp)
11.	Kapur Petanang	Kapur Guras	(Dryobalanopsoblongifolia Dyer)
12.	Kenari	Kerantai, Ki tuwak, Binjau, Asam-asam, Kedondong, Resung, Bayung, Ranggorai, Mertukul	(Canarium spp, Dacryodes spp, Trioma spp, Santiria spp)
13.	Keruing	Tempuran, Lagan, Merkurang, Kawang, Apitong, Tempudau	(Dipterocarpus spp)
14.	K u l i m	Kayu bawang hutan	(Scorodocarpusborneensis Becc)
15.	Malapari	Malapari	(PongamiaPinnata (L) Pierre)
16.	Matoa	Kasai, Taun, Kungki, Hatobu, K. sapi (Jawa), Tawan (Maluku), Ihi mendek (Irian Jaya)	(Pometia spp)
17.	Medang	Sintuk, Sintok lancing, KitTeja, Ki tuha, Ki sereh, Selasihan	(Cinnamomum spp)
18.	Meranti Kuning	Damar tanduk, Damar buah, Damar hitam, Damar kelepek	Shoreaacuminatissima Sym, Shorea balanocarpoides Sym, Shoreafaguetiana Heim, ShoreaScollaris, V. Sloot; Shoreagibbosa Brandis
19.	Meranti Merah	Banio, Seraya merah, Kontoy bayor, Campaga, Lempong, Kumbang, Majau, Meranti ketuko, Ketrahan, Ketir, Cupang	(ShoreaPalembanica Miq, Shorealepidota BI, Shoreaovalis BI, ShoreaJohorensis Foxw, Shorea leptoclados Sym, Shorealeprosula Miq) (ShoreaPlatyclados sloot. Ex foxw.)
20.	Meranti Putih	Baong, Baung, Kebaong, Belobungo, Bayong (Sumatera, Kalimantan), Damar kaca, Damar kucing, Kikir, Udang, Udang ulang, Damar hutan, Anggelam tikus, Kontoi tembaga, Maharam potong, Damar mata kucing, Bunyau, Pongin, Awan punuk, Mehing (Sumatera, Kalimantan), Damar tenang putih, Honi (Maluku), Damar lari-lari, Temungku (Sulawesi),	(ShoreaVirescens Parijs), Shorearetionodes V.SI), (ShoreaJavanica K. et. Val), (Shoreabracteolata Dyer), (Shoreaochracea Sym),(Shorealamellata Foxw), (Shoreaassamica Dyer), (Shoreakoordesii Brandis)

		Lalari, Tambia putih (Sulawesi), Hili (Maluku)	
21.	Merawan	Ngerawan, Cengal, Amang besi, Cengal balaw, Emang, Tekam	(Hopea spp); Hopeadyeri; (Hopeasangal Kort)
22.	Merbau	Anglai, Ipil, Tanduk (Maluku), Kayu besi (Papua), Maharan (Sumatera)	(Intsia spp)
23.	Mersawa	Damar kunyit, Masegar, Ketimpun, Tabok, Tahan, Cengal padi	(Anisoptera spp)
24.	Nyatoh	Suntai, Balam, Jongkong, Hangkang, Katingan, Mayang batu, Bunut, Kedang, Bakalaung, Ketiau, Jengkot, Kolan	(Palaquium spp); (Payena spp, Madhuca spp)
25.	Palapi	Mengkulang, Teraling, Dungun, Talutung, Lesi-Lesi.	Heritiera (Tarrietia spp)
26.	Penjalin	Rempelas, Ki jeungkil, Ki endog (Sunda), Cengkek (Jawa), Pusu (Sumbawa)	(Celtis spp)
27.	Perupuk	Kerupuk, Pasana, Aras, Mandalaksa	(Lophopetalum spp)
28.	Pinang	Melunak, Ki sigeung, Kelembing, Ki sinduk	(Pentace spp)
29	P u l a i	Kayu gabus, Rita, Gitoh, Bintau, Basung, Pule, Pulai miang	(Alstonia spp)
30.	Rasamala	Tulasan (Sumatera), Mala (Jawa), Mandung (Mnkb)	(AltingiaexcelsaNoronha)
31.	R e s a k	Damar along, Resak putih	(Vatica spp)

Category II

No.	Trade names	Local names	Scientific names
1.	B a k a u	Tumu, Lenggadai, Jangkar, Tanjang, Putut, Busing, Mata buaya	(Rhizophora spp dan Bruguiera spp)
2.	B a y u r	Walang, Wayu, Balang, Wadang	(Pterospermum spp)
3.	Benuang	Benuang bini, Winuang	(Octomelessumatrana Miq)
4.	Berumbung	Kayu lobang, Barumbung, Kayu gatal	(Adinaminutiflora Val); Pertusadina spp
5.	Bintangur	Bunoh, Nyamplung, Penaga	(Calophyllum spp)
6.	B i p a	Kayu wipa	(Pterygota spp)
7.	B o w o i	Rayango, Merang, Terangkuse	Serianthesminahassae Merr & Perry (Syn Albiziaminahasae Koord)
8.	B u g i s	Grepau	(Koordersiodendronpinnatum Merr)
9.	Cenge	Cenge, Cingo	(Mastixiatostrata BI)
10.	Duabanga	Benuang laki, Takir, Aras	(Duabangamoluccana BI)
11.	Ekaliptus	Ampupu (Sulawesi), Aren (Maluku), Leda, Tampai, Kayu putih	(Eucalyptus spp)
12.	G e l a m	Kayu putih	(Melaleuca spp)
13.	Gempol	Wosen, Klepu pasir, Anggrit	(Nauclea spp)
14.	Gopasa	Teraut, Laban	(Vitex spp)
15.	Gerunggang/ Derum	Madang baro, Adat, Temau, Mampat, Butun, Kemutul	(Cratoxylum spp)
16.	J a b o n	Kelampayan, Laran, Semama	(Anthocephalus spp)
17.	Jambu-jambu	Kelat, Ki tembaga, Jambu	(Eugenia spp)
18.	Kapas-kapasan	Hapas-hapas, Tapa-tapa, Leman	(Exbucklandiapopulnea R. Brown)

19.	Kayu kereta	Rengas sumpung, Merpauh, Bagel mirah	(Swintonia spp)
20.	Kecapi	Papung, Kelam, Sentul	(Sandoricum spp)
21.	Kedondong Hutan	Coco, Kacemcem, Leuweung	(Spondias spp)
22.	Kelumpang	Kepuh, Kalupat, Lomes	(Sterculia spp)
23.	Kembang semangkok	Merpayang, Kepayang	(Scaphiummacropodum J. B)
24.	Kempas	Impas, Tualang ayam, Hampas	(Koompassiamalaccensis Maing)
25.	Kenanga	Kananga	(Cananga sp)
26.	Keranji	Kayu lilin, Maranji	(Dialium spp)
27.	Ketapang	Kalumpit, Jelawai, Jaha, Klumprit	(Terminalia spp)
28.	Ketimunan	Seranai, Temirit, Kayu reen	(Timonius spp)
29.	Lancat	Kundur, Modjiu, Raimagago	(Mastixiodendron spp)
30.	L a r a	Lompopaito, Nani, Langera	(Metrosideros spp dan Xanthostemon spp)
31.	Mahang	Merkubung, Mara, Benua	(Macaranga spp)
32.	Medang	Manggah, Huru kacang, Keleban, Wuru, Kunyit	(Litseafirma Hook f; Dehaasia spp)
33.	Mempisang	Mahabai, Hakai rawang, Empunyit, Jangkang, Banitan, Pisang-pisang	(Mezzetiaparviflora Becc); (Xylopia spp); Alphonsea spp; Kandeliacandell Druce
34.	Mendarahan	Tangkalak, Au-au, Ki mokla, Kumpang, Ky luo, Darah-darah, Huru	Myristica spp, Knema spp
35.	Menjalin	Lilin, Ki endog, Segi landak	(Xanthophyllum spp)
36.	Mentibu	Jongkong, Merebung	(Dactylocladusstenostachys Oliv)
37.	Merambung	Merambung	(Vernoniaarborea Han)
38.	P u n a k	Kayu malaka, Cerega	(Tetrameristaglabra Miq)
39.	P u s p a	Sinar telu, Madang getah, Seru	(Schima spp)
40.	Rengas	Rengas tembaga, Rangas	(Glutaaptera (King) Ding Hou
41.	Saninten	Sarangan, Kalimorot, Ki hiur	(Castanopsisargentea A. DC)
42.	Sengon	Jeungjing, Tawa kase, Sika (Maluku)	(Paraserianthesfalcataria (L) Nielsen Syn)
43.	S e p a t	Waru gunung, Kalong	(Berryacordofolia Roxb)
44.	Sesendok	Kayu bulan, Sendok-sendok, Kayu raja, Garung, Kayu labu	(Endospermum spp)
45.	Simpur	Sempur, Segel, Janti, Dongi	(Dillenia spp)
46.	Surian	Kalantas, Suren	(Toonasureni Merr)
47.	Tembesu	Tomasu, Kulaki, Malbira, Kitandu	(Fragraea spp)
48.	Tempinis	Damuli, Kayu besi	(Sloetiaelongata Kds)
49.	T e p i s	Banitan, Pemelesian, Kayu tinyang, Kayu bulan, Banet, Kayu kalet	(Polyalthiaglauca Boerl)
50.	Tenggayun	Buku ongko, Pejatai, Purut bulu	(Parartocarpus spp)
51.	T e r a p	Tara, Cempedak, Kulur, Teureup	(Artocarpus spp)
52.	Terentang	Tumbus, Pauh lebi	(Campnosperma spp)
53.	Terentang ayam	Pauhan, Antumbus, Talantang	(Buchanania spp)
54.	T u s a m	Pinus, Damar batu, Uyam	(Pinus spp)
55.	U t u p	U t u p	(Aromadendron sp)

Category III.

No.	Trade names	Local names	Scientific names
1.	Eboni Bergaris	Maitong, Kayu lotong, Sora, Amara	Atagory
2.	Eboni Hitam	Kayu hitam, Maitem, Kayu waled	(Diospyrosrumphii Bakh)
3.	E b o n i	Baniak, Toli-toli, Kayu arang, Kanara, Gito-gito, Bengkoal, Malam	(Diospyros spp D.ebenum Koen, D.ferrea Bakh, D.lolin Bakh, D.macrophylla BI, D.cauliflora BI, D.areolata King et G)

Catagory IV.

No.	Trade names	Local names	Scientific names
1.	Bongin	Pauh kijang, Sepah, Kayu batu	(Irvingiamalayana Oliv)
2.	Bungur	Wungu, Tekuyung, Benger, Ketangi	(Lagerstroemiaspeciosa Pers)
3.	Cempaka	Minjaran, Wasian, Manglid, Sitekwok, Kantil, Capuka	(Michelia spp, Elmerrillia spp Dandy)
4.	Cendana	Kayu kuning, Lemo daru	(Santalumalbum L)
5.	D a h u	Dao, Sengkuang, Basuong, Koili	(Dracontomelon spp)
6.	J o h a r	Juar, Trenggguli, Sebusuk, Bobondelan	(Cassia spp)
7.	K u k u	Kayu laut, Papus, Nani laut	(Pericopsismooniana Thw)
8.	Kupang	Kayu ruan, Saga	(Ormosia spp)
9.	L a s i	Adina, Kilaki	(Adinaucleafagifolia Ridsd)
10.	Mahoni	Mahoni	(Swietenia spp)
11.	M e l u r	Sampinur tali, Jamuju, Ki merah, Cematan, Alau, Kayu embun, Kayu cina, Sandu, Sampinur bunga	(Dacrydiumjunghuhnii Miq); (Podocarpus spp); (Dacrydium spp)
12.	Membacang	Limus piit, Ambacang, Wani, Mempelam, Asam. Mangga	(Mangifera spp)
13.	M i n d i	Bawang kungut	(Melia spp)
14.	Nyirih	Nyireh, Niri	(Xylocarpusgranatum j. Konig)
15.	Pasang	Mempening, Baturua, Kasunu, Triti	(Quercus spp)
16.	Perepat Darat	Marapat, Teruntum batu	(Combretocarpusrotundatus Dans)
17.	Raja Bunga	Segawe, Klenderi, Saga	(Adenanthera spp)
18.	Rengas	Ingas, Suloh, Rangas, Rengas burung	(Gluta spp); (Melanorrhoea spp)
19.	R a m i n	Gaharu buaya, Medang keladi, Keladi, Miang	(Gonystylusbancanus Kurz)
20.	Sawo kecik	Subo, Ki sawo	(Manilkara spp)
21.	Salimuli	Kendal, Klimasada, Purnamasada	(Cordia spp)
22.	Sindur	Sepetir, Sasumdur, Mobingo	(Sindora spp)
23.	Sonokembang	Angsana, Linggua, Nala, Candana	(Pterocarpusindicus Willd)
24.	Sonokeling	Linggota, Sono sungu, Sonobrits	(Dalbergialatifolia Roxb)
25.	Sungkai	Jati seberang, Jati londo	(Peronemacanescens Jack)
26.	Tanjung	Sawo manuk, Karikis	(Mimusopselengi L.)
27.	T a p o s	Kelampai, Setan, Kedui, Wayang	(Elateriospermumtapos BI)
28.	Tinjau Belukar	Lontar kuning	(Pteleocarpuslampongus Bakh)
29.	T o r e m	Sawai, Torem	(Manikarakanosiensis H.j. L. et B. M.)

30.	Trembesi	Ki hujan	(Samaneasaman Merr)
31.	U l i n	Kayu besi, Bulian, Kokon	(Eusideroxylonzwageri T.et.b.)
32.	W e r u	Beru, Ki hiyang, Bengkal	(Albiziaprocera Benth)