

# EXECUTIVE SUMMARY SOUTH SUMATRA BIODIVERSITY STRATEGY AND ACTION PLAN (SSBSAP) FOR 2017-2021



PEMERINTAH PROVINSI SUMATERA SELATAN  
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# Executive Summary

Biodiversity is essential to society as a source of food, clothing, shelter, cosmetics and medicines, and plays a vital role in maintaining life support systems on Earth. However, biodiversity is coming under increasing pressure from various factors and drivers causing much of it to become endangered. Biodiversity protection initiatives were embodied in a commitment to conservation at the global level through the signing of the Convention on Biological Diversity (CBD) in 1992. The Government of the Republic of Indonesia ratified the CBD through Law No. 5/1994 on Ratification of the United Nations Convention on Biological Diversity. In follow up to its biodiversity protection commitments, the Government of Indonesia issued the Indonesian Biodiversity Strategy and Action Plan (IBSAP) in 2003, and its subsequent revision in 2016. The intention of the 2017–2020 South Sumatra Biodiversity Strategy and Action Plan (SSBSAP) is to interpret the IBSAP for implementation at the provincial level in South Sumatra. This document was prepared by various stakeholders in a participatory manner through Focus Group Discussions and public consultations.

## PHYSICAL, SOCIAL, ECONOMIC AND CULTURAL CONDITIONS

South Sumatra Province, covering an area of 87,421.17 km<sup>2</sup>, comprises 13 regencies and four cities, and is divided into 231 subdistricts, 2,859 villages and 377 wards. Elevations in South Sumatra range from 0 to 3,144 m above sea level (ASL). The province has a wet tropical climate with average annual rainfall ranging from 2,000-4,000 mm. Rainfall tends to be more intense in higher altitude montane regions. Most large rivers, with the exceptions of the Mesuji, Lalan and Banyuasin, have their sources in the Bukit Barisan mountain range. The Musi River flows into the Bangka Strait, while the Ogan, Komering, Lematang, Kelingi, Lakitan, Rupit and Rawas rivers are all tributaries of the Musi River (see Figure 1).



Figure 1. Administrative boundaries and river network in South Sumatra province

The South Sumatra landscape is divided into five distinct zones: coastal, swamp, lowland, transitional, and montane regions. The east coast comprises swamp land, predominantly peat swamps and tidal brackish waters. To the west of the coastal zone is a lowland area with altitudes below 1,000 m. This zone is dominated by latosol soils, while its riparian zones are highly fertile due to their alluvial deposits, and are often used for farming. The transitional zone, at altitudes of 1,000-1,200 m above sea level, is a hilly area with steep gradients. In the montane zone, the highest peaks in the Bukit Barisan range include Mount Dempo (> 3,000 m ASL), Mount Bungkok (2,125 m ASL), Mount Seminung (1,964 m ASL), and Mount Patah (1,107 m ASL). Fertile andosol soils can be found in this zone, particularly in areas around volcanic cones. South Sumatra is also rich in oil, which has been extracted since the colonial era.

With abundant land and water, and a suitable climate, South Sumatra is a production centre for food crops (rice, corn, soybean, cassava) and various commodities marketed domestically and overseas such as timber, rubber, coconut, palm oil, coffee and pepper. The livestock and fisheries sectors also play important roles, and production of associated commodities has increased significantly year on year. The agriculture sector contributes significantly to the South Sumatra economy providing 19.1% of provincial GRDP, ranking second only to mining and quarrying at 21.8%. Meanwhile, the contribution from processing industries is just below that of the agriculture sector at 18.4%. However, these resources have not been utilized optimally for the benefit of the community, as shown by the numbers of people living below the poverty line and unemployed, at around 5.25% and 5% respectively. Most farmers in South Sumatra still practice traditional farming methods, such as the 'sonor' slash and burn and shifting cultivation system, which used to be regulated through 'Simbur Cahaya' customary law.

However, this law has been displaced due to changes in land tenure, population numbers, education patterns, and customary law enforcement.

South Sumatra has nine isolated conservation areas: Sembilang National Park (SNP); Kerinci Seblat National Park (KSNP); Bentayan Wildlife Reserve; Dangku Wildlife Reserve; Gumai Pasemah Wildlife Reserve; Gunung Raya Wildlife Reserve; Isau-Isau Pasemah Wildlife Reserve; Padang Sugihan Wildlife Reserve; and Pundi Kayu Ecotourism Park.

## **ECOSYSTEM AND BIODIVERSITY STATUS AND CHANGING TRENDS**

South Sumatra province has almost all types of ecosystems listed in the IBSAP, with the exceptions of seagrass, karst, heath forest, savannah, sub-alpine forest, and nival ecosystems. It also has two types of artificial ecosystems not listed in the IBSAP: Industrial Plantation Forest (HTI) and estate crop ecosystems. However, some information relating to certain ecosystems could not be collected during the SSBSAP drafting process. Accordingly, the collection of supplementary information on marine and coral reef, riparian and oxbow lake ecosystem biodiversity will form part of the action plan. Meanwhile, biodiversity inventoried to date includes 877 plant species, which are listed in Annex 10 of the SSBSAP; and 65 species of amphibians, 71 species of reptiles, 81 species of mammals (11 primate and 70 non-primate), 334 species of birds, and 133 species of arthropods, all of which are listed in Annex 11; and aquatic biota comprising 270 fish species, 75 species of zooplankton, 66 species of periphyton, and 79 species of zoobenthos, which are listed in Annex 12 of the SSBSAP.

### **Natural Ecosystems**

#### **Lowland forest and montane forest ecosystems**

South Sumatra province has various types of natural and artificial ecosystems containing a variety of biodiversity of significant ecological, social, cultural and economic significance to society. Natural ecosystems comprise river/riparian, lake and forest ecosystems stretching from the lowlands (0-1,200 m ASL), lower montane forests (1,200-2,500 m ASL), upper montane forests (2,500-3,000 m ASL) and sub-alpine regions (> 3,000 m ASL). The lowland forest can be divided into dryland forest, swamp forest and mangrove forest ecosystems. Artificial ecosystems consist of agriculture, estate crop, agroforestry, and plantation forest ecosystems.

According to data published by the Forestry Planology Agency in 2000, lowland forests covered approximately 11.25% of South Sumatra province, or about 0.99 million hectares (ha). However, since then the area has decreased steadily to around 7.5%, or 0.65 million ha. The rate of lowland forest loss is approximately 22,500 ha a year. In addition to this rapid decrease in area, lowland forests are now fragmented into several disparate regions. Examined thoroughly, dryland forest has been shrinking consistently since 2000, and swamp forest since 2009, while mangrove forest has remained relatively stable despite some becoming lower-quality secondary mangrove. In contrast to natural forest, plantation forests have continued to increase in area since 2000 (see Figure 2). Deforestation has been

ongoing for many years in lowland forest areas due to their fertility and easy access from roads constructed by forestry and mining concession companies.

Based on the results of digital data processing for Minister of Environment and Forestry Decree No. 454/MENLHK/SETJEN/PLA.2/6/2016 and the Indonesia Land Cover Map for 2015, 13% of lowland forest ecosystems constituted protection forest (HL), approximately 32% of which was forested; 54% was permanent production forest (HP), of which only 4% was forested; 7% was limited production forest (HPT), of which 31% was forested; 5% was convertible production forest (HPK), all of which was non-forested; and 21% was conservation forest (HK, KSA and KPA), of which 49% was still forested. This data shows only 19% of lowland forest ecosystems in South Sumatra province's forest estate still has any forest cover. Lowland forest ecosystems with remaining natural forest cover are mostly located in the Kapas-Meranti production forest and Dangku Wildlife Reserve areas, and in other remnants of forest.

Lower montane forests, which consist solely of dryland forest, are under less pressure than lowland forests due to their limited access and most having conservation forest status. Consequently around 82% of lower montane forests are still forested. Deforestation in lower montane forests during the 2000–2015 period amounted to approximately 6,900 ha or around 460 ha annually. Around 63.99% of montane forest ecosystems in the western part of South Sumatra province constitute protection forest, while 35.66% have conservation forest, and 0.02% limited production forest status. The highest peak is Mount Dempo located in the Mount Dempo Protection Forest area. Conservation areas with montane forest ecosystems are the Gunung Raya, Pasemah Gumai, and Isau-Isau Pasemah wildlife reserves, and Kerinci Seblat National Park.

The dominant forest type after dryland forest is swamp forest. The conversion and exploitation of this forest type began when little dryland forest remained. During the period from 2000–2015, most swamp forests were converted to dryland farming areas, oil palm plantations and *Acacia crasicaarpa* industrial plantation forests, or became abandoned land or scrub (see Figure 2).

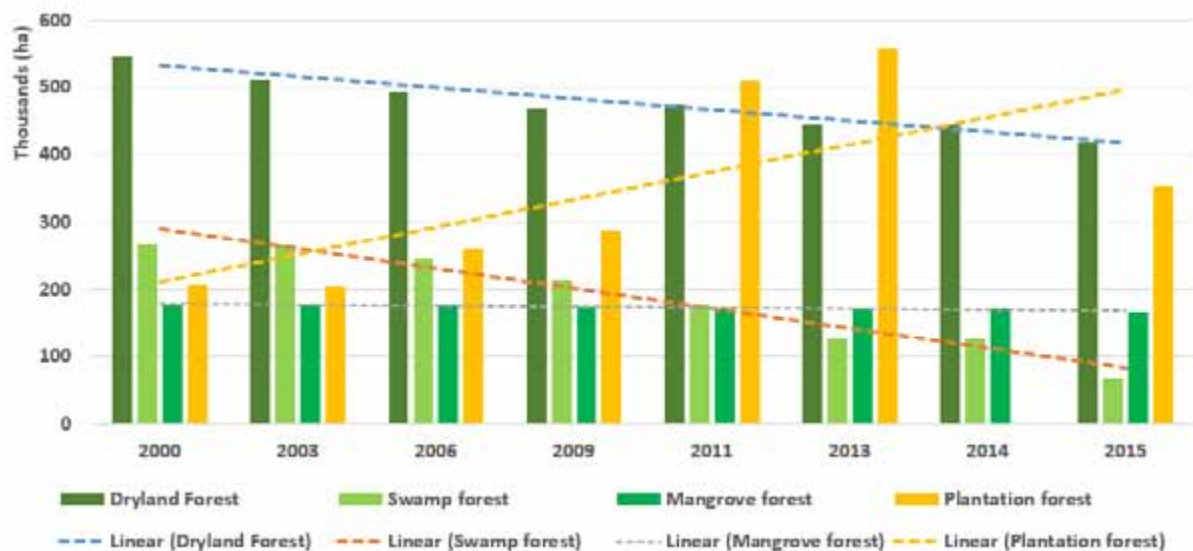


Figure 2. Changing trends in lowland forest area in South Sumatra province

Lowland forest and montane ecosystems are home to almost all fauna species inventoried during the South Sumatra Biodiversity Strategy and Action Plan preparation process. This amounted to a total of 1,174 species, including notable South Sumatra species such as the Sumatran tiger (*Panthera tigris sumatrae*, Pocock 1929), Sumatran elephant (*Elephas maximus ssp. sumatranus*, Temminck 1847), Malayan tapir (*Tapirus indicus*, Desmarest 1819), Java mouse-deer (*Tragulus javanicus*, Osbeck 1765), Malayan sun bear (*Helarctos malayanus*, Raffles 1821), siamang (*Symphalangus syndactylus*, Raffles 1821), Horsfield's tarsier (*Tarsius bancanus ssp. bancanus*, Hill 1955), false gharial (*Tomistoma schlegelii*, Müller 1838), Storm's stork (*Ciconia stormi*, Blasius 1896), blue-eared kingfisher (*Alcedo meninting*, Horsfield 1821), brahmyn kite (*Haliastur indus*, Boddaert 1783), white-bellied sea eagle (*Haliaeetus leucogaster*, Gmelin 1788), crested serpent eagle (*Spilornis cheela*, Latham 1790), helmeted hornbill (*Rhinoplax vigil*, Forster 1781), great argus (*Argusianus argus*, Linnaeus 1766), giant featherback (*Chitala lopis*, Bleeker 1851), semah mahseer river carp (*Tor douronensis*, Valenciennes 1842), gray eel-catfish (*Plotosus canius*, Hamilton 1822), and striped wallago catfish (*Wallagonia leerii*, Bleeker 1851).

### Mangrove forest ecosystems

Mangrove ecosystems in South Sumatra, which comprise expanses of *Rhizophora*, *Avicenia*, *Nipa* and *Nibung*, play vital roles in preventing coastal abrasion, mitigating global climate change through terrestrial carbon sequestration, and serving as habitats for many important wildlife species such as the Sumatran tiger (*Panthera tigris sumatrae*), leopard cat (*Felis bengalensis*), clouded leopard (*Neofelis nebulosa*), silvered leaf monkey (*Presbytis cristata*), agile gibbon (*Hylobates agilis*), long-tailed macaque (*Macaca fascicularis*), southern pig-tailed macaque (*Macaca nemestrina*), otter civet (*Cynogale bennettii*), Eurasian otter (*Lutra lutra*), estuarine crocodile (*Crocodylus porosus*) and false gharial (*Tomistoma schlegelii*). These ecosystems also host around 112 species of birds; 44 of which use mangrove areas as their main habitat, 22 species that regularly visit mangrove areas, and over 25



species of migratory waterbirds, including the Asian dowitcher (*Limnodromus semipalmatus*), Nordmann's greenshank (*Tringa guttifer*), far eastern curlew (*Numenius madagascariensis*), and various tern species (Sternidae).

Mangrove forests in South Sumatra province are scattered along the east coast of Ogan Komering Ilir and Banyuasin regencies, especially in protection forest areas and Sembilang National Park, and cover an estimated 83,447 ha. Problems encountered in the management of mangrove ecosystems relate to disturbance from community activities. In the period from 2000–2015, mangrove forests were degraded and converted into plantation forests, and for farming and aquaculture. Illegal conversion for shrimp farming is estimated to have destroyed 18% of the mangrove belt around the Banyuasin peninsula from 1995–2000. Furthermore, the construction of an international port in Tanjung Api-Api has had a direct impact on approximately 4,000 ha of mangrove forest ecosystems with important ecological value for local community fisheries. In spite of these activities, mangrove forests did not change significantly in the period from 2000–2015, and only a small percentage was converted for farming and aquaculture.

### Coastal forest ecosystems

Coastal forest ecosystems can be found in Sembilang National Park; however, their extent is not fully known as they may be classified as mangrove ecosystems. Such ecosystems have vital functions in protecting terrestrial ecosystems against tsunamis, wind and coastal abrasion, and serving as habitats for plants and wildlife. Unlike mangroves, coastal forest ecosystems grow on dry, sandy or rocky soils and are located above the high tide line. These coastal forest ecosystems consist of *Pes-caprae* and *Barringtonia* formations, with plant species including *Barringtonia speciosa*, *Terminalia catappa*, *Calophyllum inophyllum*, *Hibiscus tiliaceus*, *Thespesia populnea*, *Casuarina equisetifolia*, *Pisonia grandis* and *Ipomea pes-caprae*. *Calophyllum inophyllum* has potential for development as a biofuel.

### Riparian and lake ecosystems

Riparian ecosystems are those formed along the banks of rivers. These ecosystems have a variety of important ecological functions: as habitat and corridors for flora and fauna, which is highly apparent during the dry season; and in preventing run-off flowing into rivers, thereby reducing total suspended solids (TSS) in the water. Using a 100 m stream buffer, riparian zones in South Sumatra cover an area of approximately 195,757.4 ha. These riparian zones are now highly degraded with only 8.7% (17,089 ha) still being forested. The remainder constitutes plantations, scrub, open land, mining and dryland farming areas, as well as paddy fields and settlements. The area of riparian forests has fallen by 1.6% since the year 2000.

The largest and most complex river system in South Sumatra is the Musi River. The roughly 700-km-long Musi River, which has its sources in the Bukit Barisan mountain range and Ranau Lake, flows eastward through the provincial capital, Palembang, and into the Bangka Strait. It has a number of distributaries including the Batang Tembesi, Batang Tebo, Batang Tebir, Batang Sumai, Batang Merangin, Batang Buyo and Alai rivers.

South Sumatra is a recognized high fish biodiversity region with at least 233 fish species from 38 families found in the Musi River and its tributaries alone (Utomo, et al. 2007; Husnah, et al. 2008). Fish found in swamp/oxbow lake ecosystems consist of two groups: black fish and white fish. Examples of black fish include climbing perch (*Anabas testudineus*), snakehead murrel (*Channa striata*), snakeskin gourami (*Trichogaster pectoralis*) and kissing gourami (*Helostoma temminckii*). Examples of white fish are selais janggut (*Kryptopterus* spp.), yellow catfish (*Mystus nemurus*), catfish (*Pangasius* spp.), Hoven's carp (*Leptobarbus hoevenii*), and tinfoil barb (*Barbodes schwanefeldii*). Musi and Lematang River freshwater ecosystems in South Sumatra are also home to the giant freshwater stingray (*Urogymnus polylepis*). There were eight reports of great freshwater stingrays being caught in South Sumatran waterways from 2011 to 2016; four in the Musi River, three in the Lematang River and one in the Bungin River.

Lake Ranau is home to 17 fish species often caught by local fishermen. However, approximately 80% of the lake's fish comprises five species: the Mozambique tilapia (*Oreochromis mossambicus*), hampala barb (*Hampala macrolepidota*), hard-lipped barb (*Osteochilus hasselti*), Malayan leaf fish (*Pristolepis fasciatus*) and Nile tilapia (*Oreochromis niloticus*). A further four species making up around 12% of the total fish population are the Asian redbtail catfish (*Hemibagrus nemurus*), bronze featherback (*Notopterus notopterus*), three-spot gourami (*Trichogaster trichopterus*) and tinfoil barb (*Barbonymus schwanefeldii*). The only endangered fish species, making up around 1% of the total population, is the semah mahseer river carp (*Tor* sp.). This suggests that introduced fish species are more predominant.

Phytoplankton found in Lake Ranau comprises a total of 29 genera with fifteen Bacillariophyceae, seven Chlorophyceae, two Chrysophyceae and five Cyanophyceae. Numbers of plankton range from 349 – 2,333 individual cells per litre, with diversity indices (H') ranging from 1,803 to 2,662. Predominant genera are *Ulothrix*, *Synedra*, *Surirella*, *Pinnularia*, *Navicula*, *Ankistrodesmus*, *Fragillaria*, *Anabaena*, *Eunotia*, *Aphanocapsa* and *Cosmarium*. Based on its composition, abundance and diversity index values, Lake Ranau has a moderate fertility level and water quality ranging from mildly contaminated to uncontaminated.

### Non-tidal swamp ecosystems

Swamp ecosystems are wetlands found in transition zones between land and water, and are either inundated permanently or at certain times of year as a result of impeded drainage. Wetlands can be classified from various dimensions with typologies based on river ebb and flow strength, and on soil type and condition. Wetlands are the most prevalent land type in South Sumatra, and comprise both non-tidal swamp and tidal swamp ecosystems.

Ecosystem services from non-tidal swamps currently include fishing, water provision, animal husbandry, agriculture and transportation. Major non-tidal swamp ecosystems are the Pampangan wetlands in Ogan Komering Ilir regency and the Pemulutan wetlands in Ogan Ilir regency.

Non-tidal swamp ecosystems have high levels of local rice biodiversity, though the number of varieties has been decreasing. In 2001, 19 local rice varieties were identified, but in 2015, only 10 varieties could be found: Siputih, Kawo, Sania, Pelita, Rampak, Boneng, Sanapi, Sawah Kanyut, Siam and Sawah

Kemang. Particular local rice plant genetic resources can be found in the villages of Batu Ampar, Kijang Ulu, Kayuagung, Pematang Beluran and Jejawi in Ogan Komering Ilir regency; and Tanjung Alai, Tanjung Menang, Muaro Baru, Lebak Laut, Sakatiga, Talang Balai Baru, Sukapindah, Muara Penimbung, and Ulak Kerbau in Ogan Ilir regency. Factors affecting these ecosystems are land and forest fires.

### Tidal swamp ecosystems

Tidal swamp ecosystems are wetlands characterized primarily by water regimes that fluctuate due to the ebb and flow of surrounding waterways. Tidal swamps can be divided into areas with mineral soils and peatland. Mineral soils are developed through pedogenic processes, in the form of clay, dust and sands of alluvial river or marine sediments. Peat soil, meanwhile, is formed through geogenic processes with accumulation of both decomposed and undecomposed decayed vegetation. These soil types are different in nature and physical, chemical and biological characteristics, and provide different potentials. Soils differ in terms of their organic matter content, water content, cation-exchange capacity, base saturation properties, and nutrient availability for plants. The diverse characteristics of tidal swamps affect biodiversity and the local wisdom of farmers dealing with their natural conditions. Factors threatening these ecosystems are land and forest fires, especially during the dry season.

These ecosystems are found along the east coast of South Sumatra province, and particularly in Banyuasin and Banyuasin regencies. Native vegetation includes palms, sago palms and woody swamp trees, though most tidal swamp areas have been cleared by communities and converted to land for growing rice, corn, cassava, sweet potato, ground nut, chilli, tomato, eggplant, bitter melon, cucumber, squash, green bean, spinach and other vegetable crops.

### Peat swamp ecosystems

Peat swamps are wetland ecosystems characterized by the accumulation of organic material over long periods of time. Peat accumulates as a result of the organic material decomposition rate being slower than its rate of accumulation on the wetland forest floor. Naturally, peat forms the topsoil, while alluvial soils lie in the lower layers at varying depths. Land is defined as peatland if peat thickness exceeds 50 cm. Peatlands in South Sumatra, according to the updated peatland distribution map published by Wetlands International (2005), cover a total area of 1,262,385 ha, with 768,501 ha in Ogan Komering Ilir regency, 593,311 ha in Banyuasin, 24,104 ha in Muara Enim, and 34,126 ha in Musi Rawas. Peatlands are found not only in protected and conservation areas, but also in production forests. For example, peatlands in the Simpang Heran-Beyuku, Mesuji and Pedamaran production forests in Ogan Komering Ilir regency cover a total area of approximately 617,350 ha, while the Lalan River and Mangsang-Mendis production forests in Musi Banyuasin and Banyuasin regencies respectively cover a total area of around 331,304 ha. Predominant peat swamp forest tree species include red meranti (*Shorea* sp.), swamp jelutong (*Dyera lowii*), tarentang (*Camposperma coriaceum*), pulai (*Alstonia pneumatophora*), ramin (*Gonystylus bancanus*) and kempas (*Koompassia* sp.).

Important peat swamp ecosystems in the province are in the Merang–Kepayang peat swamp area, and the Air Sugihan and Sembilang areas in Berbak and Sembilang national parks. The Merang–Kepayang

peat swamp forest ecosystem is representative of natural peat swamp forest in Sumatra and an extremely important carbon sink. This ecosystem also plays a vital role as a wildlife corridor connecting Sembilang and Berbak national parks. Important species found there include large mammals such as the Sumatran tiger (*Panthera tigris sumatrae*), Malayan tapir (*Tapirus indicus*) and Malayan sun bear (*Helarctos malayanus*), as well as 27 birds species and 57 fish species. It was also found to be home to 42 genera and 178 species of flora.

## Artificial Ecosystems

### Industrial plantation forest

South Sumatra Forestry Office data from 2013 shows industrial plantation forest (HTI) concessions belonging to 19 companies covering a total area of 1,330,270 ha in South Sumatra. These companies hold Industrial Plantation Forest Timber Product Utilization Business Permits (IUPHHK-HTIs). Industrial plantation forests in South Sumatra are aimed at providing raw materials for the needs pulp and paper industry. These concessions are located across South Sumatra in Musi Banyuasin, Ogan Komering Ilir, East Ogan Komering Ulu, South Ogan Komering Ulu, Muara Enim, Penukal Abab Lematang Ilir (PALI), Lahat, Musi Rawas and North Musi Rawas regencies. Large concession companies operating in South Sumatra are PT Musi Hutani Persada (PT MHP) and subsidiary companies of the Sinar Mas Group, including PT Rimba Hutani Mas, PT Bumi Persada Permai, PT Sumber Hijau Permai, PT Tripupa Jaya, PT Bumi Andalas Permai, PT Sebangun Bumi Andalas and PT Bumi Mekar Hijau. The predominant tree species grown in industrial plantation forest ecosystems is *Acacia mangium*, followed by *Eucalyptus pellita*, *Gmelina arborea*, and *Macaranga peltata*. Plant species found under forest stands include spikemoss (*Selaginella opaca*), bowgrass (*Cyrtococcum accrescens*), small-leaf climbing fern (*Lygodium circinnatum*), siamweed (*Chromolaena odorata*), giant swordfern (*Nephrolepis biserrata*), gale of the wind (*Phyllanthus niruri*), and cogon grass (*Imperata cylindrica*). Meanwhile, species found in High Conservation Value (HCV) areas are *Dipterocarpus elongatus*, *Hopea mengerawan*, *Shorea platycarpa*, and *Shorea balangeran*. *Shorea platycarpa* is classified as critically endangered under the IUCN Red List of Threatened Species.

### Estate crop plantations

Since the Dutch colonial era many plantations have been established in South Sumatra. Commodities grown in these plantations include rubber, oil palm, coffee, coconut, sugarcane, pepper, cacao, tea, clove, tobacco, candlenut, areca palm, cinnamon, sugar palm, gambier, kapok and vanilla. These plantations are managed either by companies or local communities.

Rubber plantations in South Sumatra consist of smallholder plantations (PR), large state-owned plantations (PBN), and large privately-owned plantations (PBS). Production was estimated at 29.83% of total national rubber production in 2016. The total area of rubber plantations was 812,586 ha in 2013, and estimated at 839,815 ha in 2016. Smallholder plantations are located in fifteen regencies: Lahat, Empat Lawang, Pagar Alam, Musi Banyuasin, Banyuasin, Musi Rawas, Lubuk Linggau, Ogan Komering Ulu, East Ogan Komering Ulu, South Ogan Komering Ulu, Ogan Komering Ilir, Ogan Ilir,

Muara Enim, Prabumulih and Palembang, with the largest area in Muara Enim regency. State-owned plantations are found in the two regencies of Lahat and Banyuasin, while, privately-owned plantations are located in seven regencies: Ogan Komering Ulu, Ogan Komering Ilir, Muara Enim, Lahat, Musi Rawas, Musi Banyuasin and Banyuasin, with largest area of plantations in Lahat regency.

Palm oil is one the prominent commodities in South Sumatra. In 2011, oil palm estates covered an area of 820,787 ha in the province, 49.51% of which were managed by private companies, 44.61% by smallholders, and only 5.88% by the government. By 2014, this area had increased to 923,002 ha, and estimated at 1,064,373 ha in 2016. Smallholder estates are found in seventeen regencies: Lahat, Empat Lawang, Pagar Alam, Musi Banyuasin, Banyuasin, Musi Rawas, North Musi Rawas, Lubuk Linggau, Ogan Komering Ulu, East Ogan Komering Ulu, South Ogan Komering Ulu, Ogan Komering Ilir, Ogan Ilir, Muara Enim, Penukal Abab Lematang Ilir, Prabumulih and Palembang. State-owned estates are located in five regencies: Lahat, Musi Banyuasin, Banyuasin, Muara Enim and Ogan Komering Ulu. Meanwhile, privately-owned estates are found in ten regencies: Lahat, Empat Lawang, Musi Banyuasin, Banyuasin, Musi Rawas, Ogan Komering Ulu, East Ogan Komering Ulu, Ogan Komering Ilir, Ogan Ilir and Muara Enim.

Coffee in South Sumatra is managed by communities in smallholder plantations (PR) growing Robusta. These plantations are located in thirteen regencies: Lahat, Empat Lawang, Pagar Alam, Musi Banyuasin, Banyuasin, Musi Rawas, Lubuk Linggau, Ogan Komering Ulu, East Ogan Komering Ulu, South Ogan Komering Ulu, Ogan Komering Ilir, Muara Enim and Prabumulih. Total coffee plantation area was 249,293 ha in 2013, and estimated at 250,172 ha in 2016. South Ogan Komering Ulu regency is the main centre for coffee production in South Sumatra with a total area of approximately 70,799 ha producing 33,491 tonnes of dried coffee beans in 2014. Total dried coffee bean production was estimated at 135,251 tonnes.

Coconut plantations in South Sumatra are also managed by community smallholders. These plantations are located in seventeen regencies: Musi Banyuasin, Ogan Ilir, Ogan Komering Ilir, Ogan Komering Ulu, East Ogan Komering Ulu, South Ogan Komering Ulu, Muara Enim, Lahat, Empat Lawang, Musi Rawas, Banyuasin, Pagar Alam, Prabumulih, Lubuk Linggau, Palembang, North Musi Rawas and Penukal Abab Lematang Ilir. Total coconut plantation area was approximately 65,308 hectares in 2013, and estimated at 70,364 ha in 2016. Estimates for total copra production in 2016 were 63,679 tonnes. Banyuasin regency is the centre of copra production in South Sumatra.

Sugarcane plantations in South Sumatra are managed by communities, state-owned and private companies. Community smallholder sugarcane plantations are found in Ogan Komering Ilir, Ogan Ilir and East Ogan Komering Ulu regencies. Meanwhile, large state-owned plantation (PBN) operates in Ogan Ilir regency and large private plantation (PBS) in East Ogan Komering Ulu regency. The total area of sugarcane plantations was approximately 21,593 ha in 2013, and estimated at 20,730 ha in 2016. Ogan Ilir and East Ogan Komering Ulu regencies are the centres for sugarcane production in South Sumatra, which supplied around 100,384 tonnes in 2014, or 3.88% of the 2,579,173 tonnes produced nationally that year.

Pepper plantations in South Sumatra are also managed by community smallholders, and are found in nine districts: Ogan Komering Ulu, Ogan Komering Ilir, South Ogan Komering Ulu, East Ogan Komering Ulu, Muara Enim, Lahat, Empat Lawang, Musi Banyuasin and Pagar Alam. The total area of pepper plantations was 10,350 ha in 2013, and estimated at 10,436 ha in 2016. South Ogan Komering Ulu regency is the centre for pepper production in South Sumatra with a plantation area of 3,778 ha and total dry pepper production of 3,781 tonnes in 2014. Dry pepper production was estimated at 9,291 tonnes in 2016.

Cacao plantations in South Sumatra are also managed by community smallholders, and are located in thirteen regencies: Lahat, Empat Lawang, Pagar Alam, Musi Banyuasin, Banyuasin, Musi Rawas, Lubuk Linggau, Ogan Komering Ulu, East Ogan Komering Ulu, South Ogan Komering Ulu, Ogan Komering Ilir, Muara Enim and North Musi Rawas. The total area of cacao plantations was approximately 10,218 ha in 2013, and estimated at 11,093 ha in 2016. Lahat regency is the centre for cacao production in South Sumatra with a total plantation area of 4,145 hectares producing 1,531 tonnes of dried cacao beans in 2014. Total dried cacao bean production was estimated at 3,485 tonnes in 2016.

Tea production in South Sumatra is managed by the state through a large state-owned estate. The estate, located in Pagar Alam regency, covered a total area of 1,429 ha in 2013, and estimated to cover 1,437 ha in 2016. Total dry tea production was 1,390 tonnes in 2013 and estimated at 3,032 tonnes in 2016, or 1.96% of the 154,688 tonnes of dried tea leaves produced nationally that year.

Clove plantations in South Sumatra are also managed by community smallholders, and are located in four regencies: Lahat, Pagar Alam, South Ogan Komering Ulu and Muara Enim. The total area of clove plantations was approximately 208 ha in 2013, and estimated at 269 ha in 2016. Total dried clove flower production was 51 tonnes in 2013, and estimated at 55 tonnes in 2016.

Tobacco plantations in South Sumatra are also managed by community smallholders, and are located in three regencies: East Ogan Komering Ulu, South Ogan Komering Ulu and Lubuk Linggau. The total area of tobacco plantations was approximately 53 ha in 2013, and estimated at 367 ha in 2016. Total dried tobacco leaf production was approximately 38 tonnes in 2013, and estimated at 306 tonnes in 2016.

Candlenut plantations in South Sumatra are also managed by community smallholders, and are located in eight regencies: Lahat, Empat Lawang, Pagar Alam, Musi Rawas, Lubuk Linggau, Muara Enim, East Ogan Komering Ulu and South Ogan Komering Ulu. The total area of candlenut plantations was 2,957 ha in 2012, and increased to 2,964 ha in 2014. Total dried candlenut seed production was 1,730 tonnes in 2012, increasing slightly to 1,737 tonnes in 2014.

Areca palm plantations in South Sumatra are also managed by community smallholders, and are located in nine regencies: Lahat, Musi Rawas, Ogan Komering Ilir, Ogan Komering Ulu, East Ogan Komering Ulu, South Ogan Komering Ulu, Ogan Ilir, Prabumulih and Palembang. The total area of areca palm plantations was 1,638 ha in 2012, and 1,535 ha in 2014. Total dried areca nut production was around 909 tonnes in 2012, falling to 792 tonnes in 2014.

Cinnamon plantations in South Sumatra are also managed by community smallholders, and are located in seven regencies: Ogan Komering Ulu, Lahat, Empat Lawang, Musi Rawas, South Ogan Komering Ulu, Muara Enim and Pagar Alam. The total area of cinnamon plantations was approximately 1,308 ha in 2012, and 1,211 ha in 2014. Total dried cinnamon bark production was 1,127 tonnes in 2012 and 1,066 tonnes in 2014.

Sugar palm plantations in South Sumatra are also managed by community smallholders, and are located in eight regencies: Lubuk Linggau, Musi Rawas, Ogan Ilir, Ogan Komering Ilir, Ogan Komering Ulu, East Ogan Komering Ulu, South Ogan Komering Ulu and Muara Enim. The total area of sugar palm plantations was 1,082 ha in 2012, and decreased to 961 ha in 2014. Total palm sugar production was 319 tonnes in 2012 and 314 tonnes in 2014.

Gambier plantations in South Sumatra are also managed by community smallholders, and are located in Banyuasin regency with a total area covering 566 ha in 2012, increasing slightly to 610 ha in 2014. Total dried gambier sap production was approximately 197 tonnes in 2012 and 389 tonnes in 2014.

Kapok plantations in South Sumatra are also managed by community smallholders, and are located in six regencies: Ogan Ilir, Ogan Komering Ilir, East Ogan Komering Ulu, South Ogan Komering Ulu, Muara Enim and Prabumulih. The total area of kapok plantations was 473 ha in 2012, falling to 447 ha in 2014. Total kapok fibre with seed production was approximately 125 tonnes in 2012 and 117 tonnes in 2014.

Vanilla plantations in South Sumatra are also managed by community smallholders, and are located in two regencies: Pagar Alam and South Ogan Komering Ulu. The total area of vanilla plantations was 33 ha in 2012 and 2014, with total dried vanilla pod production falling from 10 tonnes in 2012 to 9 tonnes in 2014.

## Agriculture and horticulture

The agriculture sector is one of the leading economic sectors in South Sumatra province with much of the population growing food crops such as rice and vegetables, and horticultural plants. Eighty-eight commodities are grown in South Sumatra. Wetland and dryland rice varieties are cultivated, while other predominant crops are corn, soybean, mung bean, ground nut, cassava and sweet potato. Types of horticultural plants cultivated include fruits, vegetables and medicinal plants. In 2010 and 2014, the total harvested area of rice, and food crops and horticultural plants was 1,463,868 ha and 1,242,652 ha respectively, while total production for the two years was 19,319,699 tonnes and 10,520,395 tonnes respectively.

## Rice fields

The total area of rice fields fluctuated in South Sumatra during the period 2009 to 2013. Statistical data show rice fields covering 611,072 ha in 2009, increasing to 629,355 ha in 2011, and then falling to 612,424 ha in 2013. The area of rice fields is expected to expand again over the next five years in line

with government programs to increase rice production through intensification and the establishment of new rice fields.

According to South Sumatra Central Statistics Agency (BPN) data, the average area of harvested rice fields was 658,676.7 ha in the decade from 2003–2012. Two types of land have development potential for food crops including local rice varieties. Local varieties in South Sumatra are those that are well established in certain areas and used locally as staple foods. Local rice varieties grown on land with different soil characteristics will have different characteristics themselves. Such differences can provide superior properties that can be developed further for future utilization.

### Dryland agriculture

Dryland agriculture has agricultural and plantation crop genetic resource potential in six regencies in South Sumatra: Ogan Komering Ulu, East Ogan Komering Ulu, South Ogan Komering Ulu, Muara Enim, Lahat and Musi Rawas. Drylands in South Sumatra are classified as acidic drylands with soil characteristics including pH levels below 5; low levels of organic matter; base saturation percentages below 50% (dystric); high levels of aluminium; and udic soil moisture regimes. Annual rainfall in excess of 2,000 mm, and the poor fertility and productivity of land necessitates high levels of inputs. Obstacles in utilizing acidic drylands are: a) water availability; b) high soil acidity (low pH); c) low levels of organic matter and shallow soil solum; d) extremely low nutrient levels; and e) rocky soil.

In addition to local rice varieties, these terrestrial ecosystems have genetic resources in fruits such as lansium, durian, mangosteen, jackfruit, banana and pineapple.

## DRIVERS, PRESSURES, STATES, IMPACTS AND RESPONSES

Drivers, Pressures, States, Impacts and Responses (DPSIR) analyses were used widely as a means for analysing biodiversity dynamics. During preparation of the SSBSAP these DPSIR were determined through a series of focus group discussions (FGDs). These FGDs identified the drivers and pressures (D and P) from human activities resulting in the states and impacts on biodiversity. Seven drivers were identified causing four secondary pressures (SP) and three primary pressures (PP) on the state of biodiversity. The seven **drivers** identified were: **biological characteristics**, **climate anomaly**, **government policy**, **weak law enforcement**, **benefits/economic value**, **socio-economic conditions of society**, and **condition of research and technology**. The four types of **secondary pressures** identified were: **logging/poaching**, **land occupation/conversion**, **human wildlife conflicts**, and **environmental pollution**. These four secondary pressures together with three **primary pressures** namely: **over exploitation**, **biophysical change/destruction**, and **forest and land fires** are the main pressures on the state of biodiversity in South Sumatra province (see Figure 3 below).

These drivers and pressures have all had adverse effects on the state of biodiversity in South Sumatra. Despite the central government through its research institutions and technical implementation units (UPTs) and local governments through their regional work units (SKPD) having development programs



with scope for addressing causes of the deteriorating state of biodiversity, these are limited and have yet to show any significant results. The continued existence of these drivers and pressures is threatening the sustainability of South Sumatra's biodiversity.

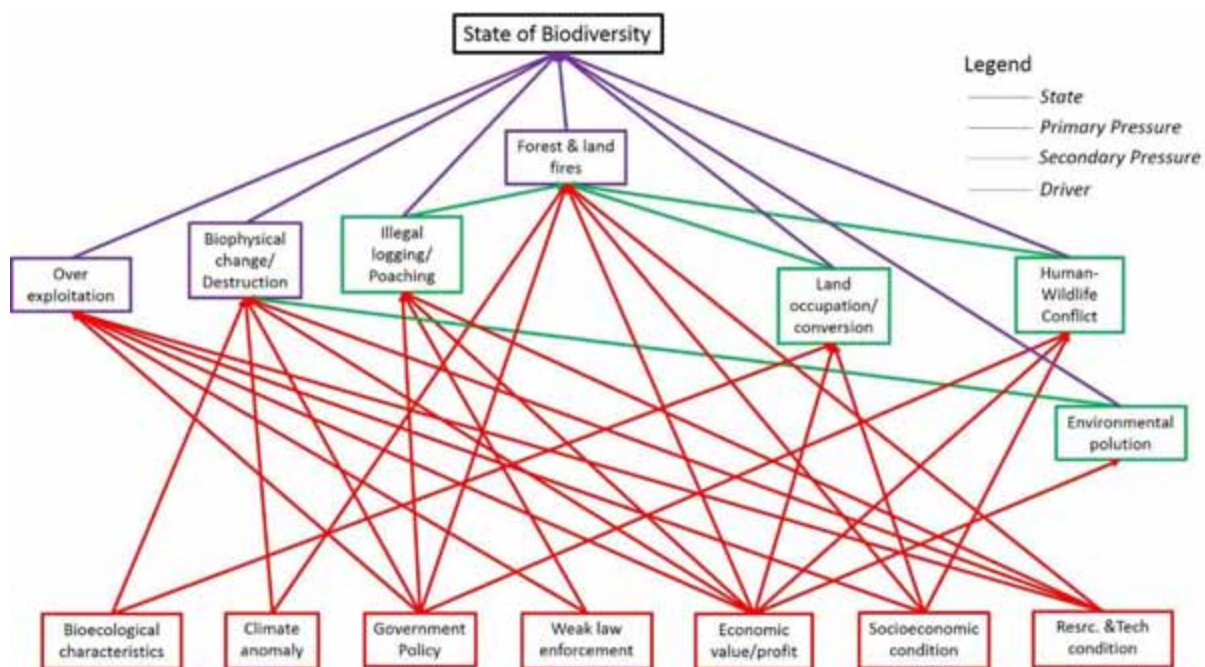


Figure 3. Drivers, pressures and states of biodiversity in South Sumatra (Source: SSBSAP preparation FGDs, 2016)

## PROGRAMS AND ACTION PLANS

### Managing the indirect causes (drivers) and direct causes (pressures) of ecosystem degradation and biodiversity loss

#### Addressing and preventing forest and land fires

Empirical data shows an increasing trend in forest and land fires in South Sumatra. Although forest and land fires have occurred in all regencies in the province, fire pattern distribution shows the most frequent and extensive forest and land fires occurring in Ogan Komering Ilir regency. The regency has peat swamps and peatlands that are highly flammable during the dry season, and communities in the area practice a slash and burn system specific to Ogan Komering Ilir known locally as '*sonor*'. Accordingly, programs and action plans are aimed at increasing public awareness and concern about forest and land fires, and include: (a) providing extensions on forest and land fires to farmers practicing the *sonor* system; (b) introducing tidal agriculture technologies through '*wana mina tani*' agro-silvo-fishery demonstration plots; (c) establishing '*masyarakat peduli api*' (MPA) fire care communities; and (d) increasing forest security patrols. These programs and action plans will be carried out in priority areas

determined from the results of fire prone area mapping. In cases of forest and land fires being caused by companies the law must be enforced more strictly.

Some of these programs are being implemented by regional and national government through technical implementation units (UPTs), and are expected to be coordinated and synchronised with relevant stakeholders' programs in order to provide more effective results in efforts to address and prevent forest and land fires.

### Addressing illegal logging and poaching

Illegal logging is taking place in production forest, protection forest and conservation forest estates. In South Sumatra, illegal logging and land occupation are being carried out in Sembilang National Park, Kerinci Seblat National Park, Bentayan Wildlife Reserve, Dangku Wildlife Reserve, Gumai Pasemah Wildlife Reserve, Gunung Raya Wildlife Reserve, Isau-Isau Pasemah Wildlife Reserve, Padang Sugihan Wildlife Reserve, and the PT Reki and PT GAL work areas. The Natural Resources Conservation Agency (BKSDA) and local governments have taken various measures to address issues, but none have been aimed specifically at addressing illegal logging and poaching. Consequently, their programs have failed to produce effective outcomes.

Illegal logging and poaching are the result of economic motives and poor quality law enforcement with light sentences and insufficient numbers of civil service investigators (PPNS) to handle cases effectively. Forest monitoring should be carried out more effectively as a preventative measure. Poaching is also a result of a lack of public awareness regarding the value of wildlife conservation. Local government responses for addressing these issues remain insignificant.

Programs and action plans for addressing illegal logging and poaching include increasing the frequency of security patrols, rigorous law enforcement, extensions for communities on the importance of biodiversity, increasing the number of PPNS personnel, and providing capacity development training for investigators. These programs and action plans are expected to reduce illegal logging and poaching offenses in priority locations including protected and conservation areas.

### Animal-human conflict resolution

Estate crop, agriculture and transmigration settlement expansion, whether planned properly by the government or carried out sporadically by communities, is causing the conversion of natural wildlife habitats. This can lead to animal-human conflicts when their paths cross. Such conflicts often cause damage to homes, farms and plantations, and even result in animals and villagers being killed. The government (BKSDA) and NGOs have tried implementing various responses, none of which have been particularly effective. Community and company capacity for dealing with conflicts, and awareness of the importance of biodiversity should be improved through training and extensions activities for villages and companies located in elephant and tiger home ranges and corridors. The government needs to increase patrol officer numbers and patrol frequency, and establish task forces or rapid response units for handling animal-human conflicts.

### Addressing excessive utilization/exploitation and illegal trafficking/trading of plants and wildlife

Potential high profits have encouraged groups of people in South Sumatra to act against conservation principles through excessive harvesting/utilization and illegal trafficking/trading of flora and fauna species. Actions required to address these problems include regulating the use of plants and wildlife; and restocking and replanting both protected and unprotected fauna and flora species with critically endangered status and economic value. These action plans and programs are expected to increase the populations of these species in the wild, and need to be supported through research and breeding programs for protected and unprotected species classified as being critically endangered and having economic value. More forest security patrols and rigorous law enforcement are needed for addressing the illegal utilization and trading of plants and wildlife.

### Addressing illegal encroachment/occupation and land conversion

Habitat destruction is occurring in production and conservation forest areas such as Sembilang National Park, Kerinci Seblat National Park, Bentayan Wildlife Reserve, Dangku Wildlife Reserve, Gumai Pasemah Wildlife Reserve, Gunung Raya Wildlife Reserve, Isau-Isau Pasemah Wildlife Reserve, Padang Sugihan Wildlife Reserve, and the PT Reki and PT GAL work areas. These habitats are being destroyed by illegal logging, encroachment/expansion of agricultural land and forest fires, which have triggered extinctions and require priority handling.

Programs required for taking preventative measures include more extensive and intensive patrolling involving companies, governments and NGOs. Numbers of personnel and monitoring facilities need to be increased in order to improve patrol performance, and vigorous law enforcement is necessary when new cases of illegal encroachment are discovered. In cases where land has already been occupied for many years, careful mediation will be necessary in order to achieve the best solution. These programs are expected to reduce the number of cases of illegal occupation and tenurial conflict.

## Improving biodiversity status, and preserving essential ecosystems and genetic resource diversity

### Rehabilitation/restoration of important ecosystems

South Sumatra is rich in essential and important ecosystem types, including marine ecosystems, coastal ecosystems, peat ecosystems, '*lebak lebung*' swamp ecosystems, mangrove ecosystems, riparian ecosystems, lowland dry forest ecosystems and upland forest ecosystems. These ecosystems host a rich variety of biodiversity including flora, non-primate mammals, primates, reptiles, amphibians, birds, and aquatic biota, which have conservation statuses ranging from unprotected to threatened (critically endangered (CR), endangered (EN) and vulnerable (VU).

All of these ecosystem types have experienced pressures in recent decades as a result of forest cover loss or degradation. The conservation of species living in these ecosystems is under threat, so

programs and action plans need to be implemented to preserve their habitats. Degraded forests need to be rehabilitated or restored in order to improve habitat conditions and increase carrying capacity. Swamp ecosystems contain *lebak lebung* or places where various fish species congregate during the dry season. These *lebak lebung* are vital in ecological terms, but at present there is no information on their numbers, total area and distribution, or the fish species they host. Local people have harvested fish from *lebak lebung* for generations, but now there are concerns over the scarcity of fish species due to excessive harvesting and an absence of breeding efforts and rules governing harvests.

### Conservation of critically endangered, endangered, vulnerable and high economic value species

We noted from the FGD process that data and information on critically endangered, endangered, vulnerable and high economic value species was extremely limited despite such data and information forming an essential basis for habitat and population management. Consequently, programs and action plans are needed for the identification, inventorying and spatial mapping of various species in the different ecosystem types. On the basis of such data, *in-situ* and *ex-situ* conservation efforts should be planned and carried out for priority species identified in the FGDs, including non-primate mammals (elephant, tiger, tapir, mouse-deer, sun bear and pangolin), birds (hornbills, eagles, kingfishers and migratory birds), and herpetofauna (false gharial, estuarine crocodile and terrapins).

In addition to the species above, others that are not protected but have high economic value also tend to be overexploited, which threatens their sustainability. Consequently, conservation efforts will be required for these species as well. High economic value species also requiring conservation efforts include: sambar deer (*Rusa unicolor*), Indian muntjac (*Muntiacus muntjak*), wallago catfish, giant featherback, gray eel-catfish, horseshoe crab and lobsters. For plants, conservation priorities are for local rice varieties (*selebur rimbe*, *karat kaleng*, *dahat*, *beram*, *pulut*, *tambuna*, *henika*, *dayang rindu* and *gilas madu*), and native South Sumatran fruit species such as lansium and mangosteen.

## Promoting and developing efforts to utilize and increase the economic value of biodiversity in a sustainable manner and enhance the roles of science and technology

### Ecotourism development

South Sumatra province has potential for tourism with its beautiful and diverse landscapes (forests, lakes, coastal regions and wildlife attractions) as well as important historical artefacts from the days of the Sriwijaya kingdom. This potential has yet to be optimized fully, and despite their enormous potential there are no integrated programs linking biodiversity and ecotourism. Ecotourism development programs are expected to increase local revenues and community earnings, and consequently reduce the pressures on and exploitation of natural resources. Action plans involve conducting studies of ecotourism potential in South Sumatra, building facilities and infrastructure, and providing training and guidance for communities on ecotourism development and promotion.

### Protection and breeding of flagship biodiversity

South Sumatra province is also famous for lansium and mangosteen. These fruits are generally harvested from old plantations that have been passed down for generations. Until now, there have been no rehabilitation efforts involving the implementation of improved cultivation techniques. Revitalization of lansium and mangosteen trees is essential for improving productivity and maintaining quality. Basic research on cultivation is necessary to ensure the taste of lansium remains unchanged.

In addition to lansium and mangosteen, the province has various local rice varieties cultivated for generations. Despite data showing a steady decline in the diversity of local rice varieties, no programs aimed at addressing this problem have been implemented. Given the potential of rice biodiversity for breeding rice varieties it is necessary to facilitate farmers and collect germplasm.

### Development of traditional wisdom

Some regions of South Sumatra province still practice cultural and traditional wisdom, such as the '*sonor*' system, *lebak lebung*, and the cultivation of lansium and mangosteen. However, these forms of traditional wisdom can risk damaging habitats and lead to biodiversity extinction if not practiced correctly. For example, the '*sonor*' system can cause forest and land fires, while *lebak lebung*, lansium and mangosteen harvesting systems can cause certain fish species, lansium and mangosteen scarcities. Therefore, communities still practicing the '*sonor*' system need guidance to increase land productivity sustainably without causing land and forest fires. Lansium and mangosteen tree revitalization and incentives for lansium and mangosteen growers are also necessary in order to preserve lansium and mangosteen biodiversity.

### Improving institutional capacity, biodiversity regulation and law enforcement

Problems relating to biodiversity conservation are caused by pressures that may well be a result of legislation running contrary to the principles of biodiversity conservation. So far there have been no documents or reports studying this issue. Therefore, it is vital to carry out a policy analysis to identify any provincial- and regency-level regulations that conflict with biodiversity conservation principles in South Sumatra. Any regulations found to run contrary to biodiversity conservation principles can be put forward for revocation. It will also be necessary to develop regulations that provide incentives for communities, companies and institutions to support conservation.

Poor biodiversity management and community and private sector non-compliance with existing regulations are often the result of poor quality law enforcement due to the absence of judges, prosecutors and investigators with any understanding of environmental, conservation or biodiversity issues. No programs or activities have been designed to address this problem, so training programs aimed specifically at improving their understanding of the environment and biodiversity should help improve environmental/biodiversity conservation performance.

### **Increasing public participation in program implementation through participatory and collaborative efforts**

The sheer size of the area requiring supervision, and the limited personnel, facilities and means available for conducting forest security patrols have made biodiversity conservation ineffective. Funding limitations make it impossible to increase numbers of personnel immediately, so appropriate solutions must be sought. One solution is to invite the public and the private sector to protect the environment and biodiversity by providing them with advocacy and involving them in biodiversity management. Therefore, programs and action plans designed for increasing public and private sector awareness and participation must be structured and sustainable.

Table 1. Programs and action plans for achieving Goal 1: Managing the indirect causes (drivers) and direct causes (pressures) of ecosystem degradation and biodiversity loss

No.	Programs	Action Plans	Deadline (Year to-...)					Locations	Achievement Indicators	Leading Institution/Relevant Stakeholders
			1	2	3	4	5			
1	Addressing and preventing forest and land fires	Mapping fire prone areas					Ogan Komerang Ilir, Banyuasin and Musi Banyuasin regencies	Fire prone areas mapped	<b>Leading Institution:</b> Forestry Office  <b>Relevant Stakeholder:</b> PPI&KHL, BPBD, Estate Crops Office, Natural Resources Conservation Agency (BKSDA), National Park Office, Army, police, district courts, civil service investigators (PPNS), private companies, NGOs, communities	
		Extensions on forest and land fires for farmers practicing the 'sonor' system						Number of forest fires declines		
		Establishing a fire care village and preventative strategy model						Increased number of fire care villages		
		Establishing/coordinating a system for countering forest fires						System established		
		Introducing tidal agriculture technologies through agro-silvo-fishery demonstration plots						Number of farmers adopting this technology increases		
		Establishing 'masyarakat peduli api' (MPA) fire care communities						Number of MPAs increases		
		Increasing forest security patrols						Increased numbers of forest and land fire patrol officers and patrol frequency		
		Law enforcement						Prosecutions over forest and land fire cases		
		Increasing forest security patrols (integrated)						Number of cases declines		
		Monitoring log movement and circulation						Logs movement and circulation identified		
2	Addressing illegal logging	Law enforcement					Prosecutions over illegal logging/poaching cases	<b>Lead Institution:</b> Conservation Areas (National Park Office & BKSDA)  Outside of Conservation Areas (Forestry Office)  <b>Relevant Stakeholder:</b> Forest Management Unit (FMU), Forest Concessions, Estate Crops, NGOs, communities		
		Extensions to communities on the importance of biodiversity					Number of poaching cases declines			
		Increasing numbers of civil service investigators (PPNS)					Increased numbers of PPNS officers			
		Training for civil service investigators (PPNS)					PPNS capacity to handle environmental cases enhanced			

No.	Programs	Action Plans	Deadline (Year to-...)					Locations	Achievement Indicators	Leading Institution/Relevant Stakeholders
			1	2	3	4	5			
3	Animal-human conflict resolution	Creating alternative incomes for forest-dwelling communities						Alternative income(s) available	<b>Lead Institution:</b> Conservation Areas (National Park Office & BKSDA)  Outside of Conservation Areas (Forestry Office)  <b>Relevant Stakeholder:</b> BPPHLHK Sumatra Region, Police, NGOs, communities, Estate Crops Company, Mining Company  <b>Lead Institution:</b> Conservation Areas (National Park Office & BKSDA)  Outside of Conservation Areas (Forestry Office)  <b>Relevant Stakeholder:</b> Local government, BPPHLHK Sumatra Region, Marine & Fisheries Office, Estate Crop Office, Agriculture Office, Customs Office, Quarantine Agency, Police, PPNS, BKSDA, NGOs, communities	
		Increasing forest security patrols					South Ogan Komerang Ulu, Banyuasin, North Musi Rawas, Pagar Alam and Muara Enim regencies	Increased numbers of forest patrol officers and patrol frequency		
		Establishing task forces/rapid response units for handling animal-human conflicts						Task forces/rapid response units established in each regency		
		Training and extensions for companies in elephant and tiger home ranges/corridors						Increased number of participating companies		
		Extensions for communities on the importance of biodiversity and handling animal conflicts						Community understanding of biodiversity and handling animal conflicts enhanced		
4	Addressing excessive utilization/exploitation and illegal trafficking/trading of plants and wildlife	Monitoring flora and fauna trading						Illegal trading distribution systems identified		
		Increasing forest security patrols						Increased numbers of forest patrol officers and patrol frequency on illegal trafficking/trading of plants and wildlife		
		Law enforcement						Prosecutions over cases of excessive utilization/exploitation and illegal trafficking/trading of plants and wildlife		
		Regulating the use of plants and wildlife						Regulations/local policies issued on the use of plants and wildlife from forest and non-forest areas		
		Research/breeding programs for protected and unprotected species classified as critically endangered/economically valuable						- Increased breeding of protected and unprotected species classified as critically endangered/economically valuable		



No.	Programs	Action Plans	Deadline (Year to-...)					Locations	Achievement Indicators	Leading Institution/Relevant Stakeholders
			1	2	3	4	5			
5	Addressing illegal encroachment /occupation and land conversion	Restocking protected and unprotected wildlife species for species classified as critically endangered/economically valuable						- Increased numbers of species bred successfully Increased restocking of protected and unprotected species classified as critically endangered/economically valuable	Lead Institution: Conservation Areas (National Park Office & BKSDA)  Outside of Conservation Areas (Forestry Office)  <b>Relevant Stakeholder:</b> BPPHLHK Sumatra Region, Police, Regency Court, PPNS, NGOs, forest concessions	
		Replanting protected and unprotected flora species classified as critically endangered/economically valuable						Increased replanting of protected and unprotected flora species classified as critically endangered/economically valuable		
		Awareness to communities on the importance of biodiversity						Number of communities received socialisation		
		Mediating tenurial conflicts through PIAPS and TORA schemes						Increased number of tenurial conflicts mediated/resolved		
		Indicative mapping of the prone areas to illegal logging and Encroachment								
		Increasing forest security patrols					Increased numbers of patrol officers and illegal logging patrol frequency			
		Law enforcement					Prosecutions over cases of tenurial conflict declines			
							National Park, Wildlife Reserves, Nature Reserves, Nature Tourism Park, protection forests, production forests, special purpose forest estates (KHDTK), forest concessions			

Table 2. Programs and action plans for achieving Goal 2: Improving biodiversity status, and preserving essential ecosystems and genetic resource diversity

No.	Programs	Action Plans	Deadline (Year to-...)					Locations	Achievement Indicators	Leading Institution/Relevant Stakeholders
			1	2	3	4	5			
<b>1</b>	<b>ECOSYSTEM</b>									
<b>a</b>	Marine ecosystem conservation	Identifying and inventorying aquatic biota and coral reef status					Banyuasin and Ogan Komering Ilir regencies	Availability of lists on aquatic biota species and coral reefs	<b>Lead Institution:</b> Conservation Areas (National Park Office & BKSDA)	
<b>b</b>	Mangrove conservation	Identifying species, levels of degradation, distribution and total area of mangroves					Banyuasin regency, Berbak & Sembilang National Park	Availability of mangrove species list Availability of data on the distribution and total area of mangroves Availability of data on mangrove degradation	Outside of Conservation Areas (Forestry Office, Marine and Fisheries Office)	
<b>c</b>	Coastal forest	Rehabilitation/restoration of mangroves					Berbak & Sembilang National Park, Air Telang Protection Forest, Sungai Lumpur Protection Forest	Quality and quantity of mangrove forest increased	<b>Relevant Stakeholder:</b> NGOs, plantation, mining and oil companies, universities, Watershed Forum, BRG/TRG	
<b>d</b>	Riparian conservation	Identifying and inventorying riparian status					Banyuasin and Ogan Komering Ilir regencies, Berbak & Sembilang National Park	Availability of lists on coastal forest species and distribution Quality and quantity of coastal forest increased		
		Rehabilitation of riparian areas					All regencies	Availability of data on distribution and total area of riparian zones Availability of data on riparian zone species Availability of data on riparian zone degradation based on its function Increased forest cover in riparian zones		

No.	Programs	Action Plans	Deadline (Year to...)					Locations	Achievement Indicators	Leading Institution/Relevant Stakeholders
			1	2	3	4	5			
e	Peat restoration and rehabilitation	Inventoried and mapping peat area distribution and depth Restoration/rehabilitation					Musi Banyuasin, Banyuasin, Ogan Komering Ilir and Musi Rawas reGENCY	Availability of maps and data on total area, distribution and depth of peat areas Peat ecosystems recovering Availability of data on total area and distribution of <i>lebak lebung</i>		
f	<i>Lebak Lebung</i> swamp	Inventoried distribution and total area								
2	<b>FLORA</b>									
a	Control of invasive alien flora species threats	Identifying the distribution of invasive alien species Mapping spatial distribution of invasive alien species Habitat eradication and restoration					National Park, Wildlife Reserves, Nature Reserves, Nature Tourism Park, protection forests, production forests, special purpose forest estates (KHDTK), forest concessions	Availability of a list of invasive alien species Availability of data on spatial distribution of invasive alien species No invasive alien species inside the conservation area Availability of data on populations of species classified by the IUCN as having critically endangered, endangered, vulnerable and high economic value status Availability of data on flora classified as having critical, endangered, vulnerable and high economic value status	<b>Lead Institution:</b> Conservation Areas (National Park Office & BKSDA)  Outside of Conservation Areas (Forestry Office)  <b>Relevant Stakeholder:</b> Plantation, forestry, mining and oil companies	
b	Conservation of critically endangered, endangered, vulnerable and high economic value species	Inventoried populations of critically endangered, endangered, vulnerable and high economic value species Mapping condition and distribution of habitats for critically endangered, endangered, vulnerable and high economic value species Increasing <i>ex-situ</i> conservation by developing botanical gardens, arboretum, city forest					All reGENCIES	Increased number of botanical gardens/ <i>ex situ</i> conservation and species collection	<b>Lead Institution:</b> Baliitbangnovda  <b>Relevant Stakeholder:</b> LIPI, Forestry Office, City Planning Office, Public Works Office, Environment Office, BPTP, University	

No.	Programs	Action Plans	Deadline (Year to...)					Locations	Achievement Indicators	Leading Institution/Relevant Stakeholders
			1	2	3	4	5			
3	<b>NON-PRIMATE MAMMALS</b> Conservation of critically endangered, endangered, vulnerable and high economic value species, particularly: elephant, tiger, tapir, mouse-deer, sun bear, pangolin	Mapping and inventorying of habitat pockets Mapping of home ranges Population and distribution surveys Habitat rehabilitation/restoration Developing habitat corridors in collaboration with key stakeholders Increasing <i>in-situ</i> and <i>ex-situ</i> conservation						All regencies, national park, wildlife reserve, nature reserve, nature tourism park, production forest, forest concession, estate crop	Availability of habitat pocket distribution maps Availability of information on areas overlapping home ranges/corridors Availability of data on populations and distribution Habitats recovering Wildlife corridors established Increased numbers of <i>in-situ</i> and <i>ex-situ</i> conservation activities	<b>Lead Institution:</b> Conservation Areas (National Park Office & BKSDA) Outside of Conservation Areas (Forestry Office) <b>Relevant Stakeholder:</b> Estate crop office, forest concession, estate crop, mining companies, Indonesian Elephant Conservation Forum, Forum Harimau Kita
4	<b>BIRDS</b> Conservation of critically endangered, endangered, vulnerable and high economic value species, particularly: hornbills, eagles, kingfishers, migratory birds	Mapping of habitat distribution Population and distribution surveys Habitat rehabilitation/restoration Increasing <i>in-situ</i> and <i>ex-situ</i> conservation Extensions and regulations on illegal bird keeping						All regencies, national park, wildlife reserve, nature reserve, nature tourism park, production forest, KHDTK, forest concession, estate crop	Availability of habitat distribution maps Availability of data on species populations and distribution Habitats recovering Increased numbers of <i>in-situ</i> and <i>ex-situ</i> conservation activities Illegal bird keeping declines	<b>Lead Institution:</b> Conservation Areas (National Park Office & BKSDA) Outside of Conservation Areas (Forestry Office) <b>Relevant Stakeholder:</b> Estate crop office, forest concessions, plantation companies, oil mining companies, oil and gas companies

No.	Programs	Action Plans	Deadline (Year to...)					Locations	Achievement Indicators	Leading Institution/Relevant Stakeholders
			1	2	3	4	5			
5	<b>PRIMATES</b> Conservation of critically endangered, endangered, vulnerable and high economic value species, particularly: siamang, gibbons	Population and distribution surveys Mapping of habitat distribution Inventorying vegetation and food Habitat rehabilitation/restoration Increasing <i>in-situ</i> and <i>ex-situ</i> conservation						national park, wildlife reserve, nature reserve, nature tourism park, production forest, KHDTK, forest concession	Availability of data on populations and distribution Availability of habitat distribution maps Availability of data on vegetation and foods in siamang habitats Siamang habitat recovering Increased numbers of <i>in-situ</i> and <i>ex-situ</i> conservation activities	<b>Lead Institution:</b> Conservation Areas (National Park Office & BKSDA)  Outside of Conservation Areas (Forestry Office)  <b>Relevant Stakeholder:</b> Estate crop office, BP DASHL, forest concessions, plantation companies, mining companies, oil and gas companies
6	<b>REPTILES</b> Conservation of critically endangered, endangered, vulnerable and	Population and distribution surveys Mapping of habitat distribution Habitat rehabilitation/restoration						national park, wildlife reserve, nature reserve, nature tourism park,	Availability of data on populations and distribution Availability of habitat distribution maps Habitats recovering	<b>Lead Institution:</b> Conservation Areas (National Park Office & BKSDA)

No.	Programs	Action Plans	Deadline (Year to...)					Locations	Achievement Indicators	Leading Institution/Relevant Stakeholders
			1	2	3	4	5			
	high economic value species, particularly: false gharial, estuarine crocodile, terrapins	Increasing <i>in-situ</i> and <i>ex-situ</i> conservation						production forest, KHDTK, forest concession	Increased numbers of <i>in-situ</i> and <i>ex-situ</i> conservation activities	Outside of Conservation Areas (Forestry Office)  <b>Relevant Stakeholder:</b> Marine & Fisheries, BPDASHL, forest concessions
7	<b>Conservation and utilization of genetic resources</b> Sambar ( <i>Rusa unicorn</i> ), Indian muntjac ( <i>Muntiacus muntjak</i> )									
	Wallago catfish, giant featherback, gray eel-catfish, horseshoe crab, and lobsters	Ex-situ conservation through the establishment of breeding businesses by regional government-owned enterprises (BUMD), communities and the private sector  Research on populations and distribution Research on numbers harvested Research on domestication/ <i>ex-situ</i> breeding						All regencies	Increased number of legal breeders  Availability of data on populations and distribution Availability of data on annual harvest numbers Availability of domestication technologies	<b>Lead Institution:</b> BKSDA South Sumatra  <b>Relevant Stakeholder:</b> Forestry Office, NGOs, Private sector, communities, universities  <b>Lead Institution:</b> BPPPU South Sumatra  <b>Relevant Stakeholder:</b> Marine & Fisheries Office, Balitbangnovda, universities

No.	Programs	Action Plans	Deadline (Year to...)					Locations	Achievement Indicators	Leading Institution/Relevant Stakeholders
			1	2	3	4	5			
	Rice ( <i>selebur rimbe, karat kaleng, dahat, beram, pulut, tambuna, henika, dayang rindu, gilas madu</i> , etc.)	Establishing <i>in-situ</i> and <i>ex-situ</i> conservation Establishing a gene bank for rice varieties Breeding programs to create high yield tidal rice varieties						Ogan Komerling Ilir: Batu Kampar, Kijang Ulu, Kayuagung, Pematang Beluran, Jejawi  Ogan Ilir: Tanjung Alai, Tanjung	Increased numbers of <i>in-situ</i> and <i>ex-situ</i> conservation areas South Sumatran rice variety germplasm collected and stored Increased number of rice varieties released to the public	<b>Lead Institution:</b> BPTP South Sumatra  <b>Relevant Stakeholder:</b> Agriculture & horticulture Office, universities
	Fruits (lansium, mangosteen) and latex (gambir)	<i>In-situ</i> and <i>ex-situ</i> conservation Research on plant cultivation and multiplication techniques Plant breeding Promotion for foreign markets (export)						Mangosteen: Palembang city, Indralaya (Ogan Ilir), Lukis Rejo village (Lubuk Batang, Ogan Komerling Ulu Timur), Kayu Ara (Muba), Sembawa (Banyuasin), Muara Dua village (Semendo Darat Laut, Muara Enim), Jiwa Baru village (Lubai, Muara Enim), Tanjung Raja (Ogan Komerling Ilir), Lawang Agung	Increased numbers of <i>in-situ</i> and <i>ex-situ</i> conservation areas Availability of plant cultivation and multiplication techniques Varieties released Foreign markets opened for lansium, mangosteen and gambir commodities	<b>Lead Institution:</b> Agriculture & horticulture Office, Estate Crop Office  <b>Relevant Stakeholder:</b> Baliitbangnovda, BPTP, BPDASHL, Industry Office, Trading Office

No.	Programs	Action Plans	Deadline (Year to-...)					Locations	Achievement Indicators	Leading Institution/Relevant Stakeholders
			1	2	3	4	5			
							village (Kota Agung, Lahat)  Lansium: Muara Enim, Ogan Komering Ilir, Ogan Komering Ulu, Ogan Komering Ulu Timur, Musi Banyuasin, Musi Rawas, OKU Selatan, Lahat, Palembang  Gambir: Babat Toman (Musi Banyuasin)			

Table 3. Programs and action plans for achieving Goals 3, 4 and 5: Promoting and developing efforts to utilize and increase the economic value of biodiversity in a sustainable manner and enhance the roles of science and technology

No.	Programs	Action Plans	Deadline (Year to-...)					Locations	Achievement Indicators	Leading Institution/Relevant Stakeholders
			1	2	3	4	5			
1	Ecotourism	Studying ecotourism potential  Improving facilities and infrastructure  Training on ecotourism development					All regencies in South Sumatra, national park, wildlife reserve, nature reserve, nature tourism park, production forest, KHDTK, forest concessions	List of potential ecotourism sites available  Increased number of tourists  Availability of human resources with an understanding of ecotourism	<b>Lead Institution:</b> South Sumatra Tourism and Culture office  <b>Relevant Stakeholder:</b>	



No.	Programs	Action Plans	Deadline (Year to-...)					Locations	Achievement Indicators	Leading Institution/Relevant Stakeholders
			1	2	3	4	5			
2	Breeding flagship biodiversity species (rice, lansium, mangosteen)	Promoting ecotourism						Availability of media promoting ecotourism	Forestry Office, Natural Resources Conservation Agency (BKSDA), national parks, tourism agencies, NGOs, private sector, forest concessions	
		Breeding program to create high yield tidal rice varieties					Batu Ampar, Kijang Ulu, Kayuagung, Pematang Beluran and Jejawi villages in Ogan Komering Ilir regency  Tanjung Alai, Tanjung Menang, Muaro Baru, Lebak Laut, Sakatiga, Talang Balai Baru, Sukapindah, Muara Penimbung and Ulak Kerbau villages in Ogan Ilir regency	Increased number of rice varieties released to the public	<b>Lead Institution:</b> BPTP South Sumatra  <b>Relevant Stakeholder:</b> Food Crop, Agriculture and Horticulture and Forestry Office, Balitbangnovda, BPTH, universities, Social Affairs Office, NGOs and communities	
		Breeding programs for high-yield, high-quality lansium and mangosteen varieties Revitalizing lansium and mangosteen trees					Mangosteen: Palembang city, Indralaya (Ogan Ilir), Lukis Rejo village (Lubuk Batang, Ogan Komering Ulu Timur), Kayu Ara (Muba), Sembawa (Banyuasin), Muara Dua village (Semendo Darat Laut, Muara Enim), Jiwa Baru village (Lubai, Muara Enim), Tanjung Raja (Ogan Komering Ilir), Lawang Agung village (Kota Agung, Lahat)  Lansium:	Increased numbers of high-yield, high-quality lansium and mangosteen varieties Increased numbers of old lansium and mangosteen trees revitalized		

No.	Programs	Action Plans	Deadline (Year to-...)					Locations	Achievement Indicators	Leading Institution/Relevant Stakeholders
			1	2	3	4	5			
3	Protection of genetic resources	Establishing a gene bank						South Sumatra province	South Sumatra gene bank established	<b>Lead Institution:</b> BPTP (Non Forestry) BPTH (Forestry)  <b>Relevant Stakeholder:</b> Food Crop, Agriculture and Horticulture Office, Forestry Office, Balitbangnovda, Estate Crop Office
4	Development of traditional wisdom (traditional swamp rice, lebak lebung, and lansium and mangosteen growing)	Guiding communities practicing swamp rice in sustainable manner  Community development that has a culture to harvest lebak lebung to consider aspects of species sustainability  Incentivizing lansium and mangosteen growers					Ogan Komering Ilir regency  Ogan Komering Ilir: Pampangan, Keman and Kayu Agung  Ogan Komering Ulu, Ogan Ilir, Banyuasin, Musi Banyuasin and Muara Enim  Mangosteen: Palembang city, Indralaya (Ogan Ilir), Lukis Rejo village (Lubuk Batang, Ogan Komering Ulu Timur), Kayu Ara (Muba), Sembawa (Banyuasin), Muara Dua village (Semendo Darat Laut, Muara Enim), Jiwa Baru	Environmentally friendly cultivation techniques applied  Community awareness to harvest sustainably  Availability of instruments providing incentives for lansium and mangosteen growers	<b>Lead Institution:</b> Food Crop, Agriculture and Horticulture Office  <b>Relevant Stakeholder:</b> BPTP, BPTH, Estate Crop office, Balitbangnovda, BPDAS HL and universities	

No.	Programs	Action Plans	Deadline (Year to-...)					Locations	Achievement Indicators	Leading Institution/Relevant Stakeholders
			1	2	3	4	5			
							village (Lubai, Muara Enim), Tanjung Raja (Ogan Komerling Ilir), Lawang Agung village (Kota Agung, Lahat)  Lansium: Muara Enim, Ogan Komerling Ilir, Ogan Komerling Ulu, Ogan Komerling Ulu Timur, Musi Banyuasin, Musi Rawas, OKU Selatan, Lahat, Palembang			

Table 4. Programs and action plans for achieving Goal 6: Improving institutional capacity, biodiversity regulation and law enforcement

No.	Programs	Action Plans	Deadline (Year to-..)					Locations	Achievement Indicators	Leading Institution/Relevant Stakeholders
			1	2	3	4	5			
1	Policy analysis	Biodiversity database management						Biodiversity database at Data Center (SSBIN) available	Universities  <b>Relevant Stakeholder:</b> Development Planning Agencies and government offices in South Sumatra Province, Natural Resources Conservation Agency (BKSDA), national parks, private estate crop, forestry, mining	

No.	Programs	Action Plans	Deadline (Year to-..)					Locations	Achievement Indicators	Leading Institution/Relevant Stakeholders
			1	2	3	4	5			
									and oil companies, and NGOs	
		Analysing conflicts with conservation policies Drafting regulations providing incentives for individuals who are pro biodiversity conservation						Availability of information on policies that conflict with conservation principles Regulations issued as a basis for providing incentives for individuals who are pro biodiversity conservation	<b>Lead Institution:</b> Provincial Development Planning Agencies  <b>Relevant Stakeholder:</b> All government offices in South Sumatra Province, Natural Resources Conservation Agency (BKSDA), national parks, private estate crop, forestry, mining and oil companies, and NGOs	
2	Human resource capacity development in law enforcement	Training on environmental issues for civil servant investigators (PPNS), judges and prosecutors  Increasing private sector roles in biodiversity conservation					All regencies in South Sumatra	Increased understanding of the importance of biodiversity among judges, prosecutors and civil service investigators (PPNS)  Increased private sector involvement in biodiversity conservation	<b>Lead Institution:</b> Forestry Office  <b>Relevant Stakeholder:</b> BPPHLHK Sumatra Region, Attorney, Police, Judiciary  <b>Lead Institution:</b> Forestry office  <b>Relevant Stakeholder:</b> Natural Resources Conservation Agency (BKSDA), national parks, private estate	

No.	Programs	Action Plans	Deadline (Year to-..)					Locations	Achievement Indicators	Leading Institution/Relevant Stakeholders
			1	2	3	4	5			
3	Capacity development for civil service investigators (PPNS), companies and communities in handling animal conflicts	<p>Training for tiger/elephant task forces</p> <p>Providing extensions on the importance of biodiversity</p> <p>Training on handling animal-human conflicts for civil servant investigators (PPNS)</p> <p>Training on handling animal-human conflicts for companies</p> <p>Training on handling animal-human conflicts for communities</p>						<p>Increased capacity of task forces to handle animal conflicts</p> <p>Increased community awareness of the importance of biodiversity</p> <p>Increased number of civil service investigators (PPNS) trained and able to resolve animal-human conflicts</p> <p>Increased number of companies trained and able to resolve animal-human conflicts</p> <p>Increased number of community groups trained and able to resolve animal-human conflicts</p>	<p>crop, forestry, mining and oil companies</p> <p><b>Lead Institution:</b> BKSDA South Sumatra</p> <p><b>Relevant Stakeholder:</b> Forestry office, BPPHLHK Sumatra Region, national parks, private estate crop, forestry, mining and oil companies, NGOs and communities</p>	

Table 5. Programs and action plans for achieving Goal 7: Increasing public participation in program implementation through participatory and collaborative efforts

No.	Programs	Action Plans	Deadline (Year to-)					Locations	Achievement Indicators	Leading Institution/Relevant Stakeholders
			1	2	3	4	5			
1	Enhancement of community awareness on the importance of biodiversity	Providing extensions on the importance of biodiversity						All regions in South Sumatra	Increased numbers of conservation cadres, nature lover groups, and self-help/occupational groups	<b>Lead Institution:</b> BKSDA South Sumatra <b>Relevant Stakeholder:</b> Forestry office, national parks, private estate crop, forestry, mining and oil companies, universities, and NGOs
2	Enhancement of community participation in biodiversity conservation	Developing means of communication (user interface) enabling communities to report cases relating to biodiversity conservation							An Android-based user interface developed for reporting cases relating to biodiversity	
3	Enhancement of private sector participation in biodiversity conservation	Facilitating private and community businesses to meet environmental requirement standards for certification, such as SVLK, HCV(F), ISPO, RSPO, Proper, FSC, etc.							Increased number of companies involved in environmental initiatives such as SVLK, HCV(F), ISPO, RSPO, Proper, FSC, etc.	
4	Development of awareness media in biodiversity	Develop leaflet, booklet, movie, comic, etc.						All regions in South Sumatra	Number of awareness media developed	<b>Lead Institution:</b> BKSDA South Sumatra (conservation areas) Forestry Office (outside of conservation areas) <b>Relevant Stakeholder:</b> Education office, national parks, private estate crop, forestry, mining and oil companies, universities and NGOs

## **BIODIVERSITY CONSERVATION STRATEGY AND ACTION PLAN IMPLEMENTATION**

Implementation strategies are essential, particularly in light of the large number of biodiversity conservation programs and action plans outlined above. Five strategies for achieving specific goals in implementing biodiversity conservation programs and action plans for South Sumatra province are outlined briefly in the sections below.

### **Achieving consensus on the 2017-2020 SSBSAP becoming the reference for biodiversity conservation policies in South Sumatra province**

Implementing conservation programs and action plans with limited human resources and funds will require considerable effort to harmonize activities and avoid overlap so they may be carried out effectively and efficiently. The 2017-2020 SSBSAP was prepared in a participatory manner and summarizes the status of and changing trends in ecosystems and key species in South Sumatra. As it is meant to constitute a reference for all regional government work units (SKPDs) in preparing institutional programs and action plans, consensus is vital for their implementation. Efforts to harmonize program and action plan implementation could be realized through governor decrees or regulations for all SKPDs. Such legislation would also be a barometer of provincial government attention to biodiversity conservation.

### **Mainstreaming biodiversity conservation into everyday life and development processes in South Sumatra province**

Mainstreaming biodiversity conservation could ensure that all attitudes and actions consider the impacts of policies, programs and projects on biodiversity. This would not be limited only to companies, but also to community groups and individuals, and to governments. For example, infrastructure development could be carried out with minimum risk to habitats and species if biodiversity were taken into consideration. In this regard Strategic Environmental Assessments (SEAs) and Environmental Impact Assessments (EIAs) could be used as control instruments.

Mainstreaming biodiversity conservation into public life can change attitudes and make people more pro environment and pro biodiversity. Instruments used for mainstreaming include advocacy through the mass media, training, and local primary and secondary school curricula. Changes in society's collective mindset will have a significant impact on conservation efforts since ignorance of the importance of biodiversity is at the root of serious biodiversity-related problems such as poaching, illegal logging, and encroachment.

Mainstreaming biodiversity conservation into government processes basically involves incorporating biodiversity conservation into all long-term, medium-term, and particularly short-term development plans. Development must be environment and conservation oriented if it is to prevent the habitat loss and degradation and species extinctions that frequently constitute unseen outcomes of development programs. Mainstreaming should not only be incorporated into provincial RPJMP and regency RPJMD development planning documents, but should also be geared towards all regional government work units (SKPDs) and local government officials. Furthermore, mainstreaming should also be reflected in

funding for biodiversity conservation oriented development programs. For example, employees use paper in carrying out their daily tasks, but with conservation oriented development, paper consumption is reduced to a minimum by using electronic mail rather than printed paper for correspondence, form filling and other administration-related activities. Funds for such programs are used for procuring technological devices, while reducing paper, ink, and printer purchases. By implementing these programs, local governments can reduce paper consumption, which means reducing paper purchases, reducing the number of trees being cut down and ultimately reducing deforestation and forest degradation.

### **Determining biodiversity management priorities**

On the one hand biodiversity issues in South Sumatra are extremely complex and involve large areas, and not all biodiversity has been fully identified; while on the other, human and financial resources are limited. Therefore, it is vital to determine which priority issues to overcome. Priorities can be determined using the following criteria: (a) level of urgency; (b) impacts; and (c) risks to people's lives and livelihoods. In this instance, urgency means the degree of urgency involved in solving the issue; impacts are the environmental problems arising if the biodiversity/environment-related issue is not immediately addressed; and risks are the potential losses to government/society the issue may lead to. Sub-section 6.4 summarizes biodiversity conservation priorities for South Sumatra province.

### **Partnerships and collaboration**

Programs and action plans should be implemented in the spirit of partnership and collaboration, because the government cannot implement them alone. Reasons for this are important animal and plant species are not only found in the forest estate, but also on mining, estate crop and community land, and species with extensive home ranges move across regency and/or provincial borders.

### **Awards and law enforcement**

Strict law enforcement is vital for addressing problems relating to biodiversity, but providing awards and showing appreciation will encourage people to act positively towards it.





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