



Strengthening Capacities for Management of Invasive Alien Species (SMIAS) in Indonesia

Part I: Project Information

GEF ID

10705

Project Type

FSP

Type of Trust Fund

GET

CBIT/NGI

CBIT **No**

NGI **No**

Project Title

Strengthening Capacities for Management of Invasive Alien Species (SMIAS) in Indonesia

Countries

Indonesia

Agency(ies)

FAO

Other Executing Partner(s)

Directorate General of Natural Resources and Ecosystem Conservation, Ministry of Environment and Forestry (MoEF)

Executing Partner Type

Government

GEF Focal Area

Biodiversity

Taxonomy

Focal Areas, Biodiversity, Species, Invasive Alien Species, Protected Areas and Landscapes, Community Based Natural Resource Mngt, Terrestrial Protected Areas, Influencing models, Strengthen institutional capacity and decision-making, Convene multi-stakeholder alliances, Transform policy and regulatory environments, Demonstrate innovative approaches, Stakeholders, Communications, Awareness Raising, Indigenous Peoples, Local Communities, Type of Engagement, Participation, Partnership, Beneficiaries, Gender Equality, Gender results areas, Participation and leadership, Access and control over natural resources, Capacity Development, Access to benefits and services, Knowledge Generation and Exchange, Gender Mainstreaming, Sex-disaggregated indicators, Gender-sensitive indicators, Capacity, Knowledge and Research, Knowledge Exchange, Field Visit, Knowledge Generation, Training, Workshop, Learning, Theory of change, Indicators to measure change, Adaptive management, Financial and Accounting, Payment for Ecosystem Services, Mainstreaming, Agriculture and agrobiodiversity, Tourism, Biomes, Tropical Rain Forests, Rivers, Tropical Dry Forests, Lakes, Wetlands, Productive Landscapes, Land Degradation, Sustainable Land Management, Community-Based Natural Resource Management, Ecosystem Approach, Restoration and Rehabilitation of Degraded Lands, Sustainable Livelihoods, Sustainable Agriculture, Forest, Forest and Landscape Restoration, Climate Change, Climate Change Adaptation, Climate resilience, Livelihoods, Consultation, Information Dissemination, Behavior change, Public Campaigns, Education, Civil Society, Community Based Organization, Academia, Non-Governmental Organization, Private Sector, Large corporations, Individuals/Entrepreneurs, Women groups, Innovation, Targeted Research

Sector

AFOLU

Rio Markers**Climate Change Mitigation**

Climate Change Mitigation 0

Climate Change Adaptation

Climate Change Adaptation 1

Submission Date

9/21/2020

Expected Implementation Start

11/1/2022

Expected Completion Date

10/31/2027

Duration

60In Months

Agency Fee(\$)

419,540.00

A. FOCAL/NON-FOCAL AREA ELEMENTS

| Objectives/Programs | Focal Area Outcomes | Trust Fund | GEF Amount(\$) | Co-Fin Amount(\$) |
|-------------------------------|---|-------------------|-----------------------|--------------------------|
| BD-2-6 | Address direct drivers to protect habitats and species through the prevention, control, and management of invasive alien species | GET | 3,500,000.00 | 28,840,768.00 |
| BD-2-7 | Address direct drivers to protect habitats and species and improve financial sustainability, effective management, and ecosystem coverage of the global protected area estate | GET | 916,210.00 | 7,393,995.00 |
| Total Project Cost(\$) | | | 4,416,210.00 | 36,234,763.00 |

B. Project description summary

Project Objective

To safeguard globally significant biodiversity and ecosystem services through improved management of invasive alien species (IAS) in Indonesia

| Project Comp onent | Finan cing Type | Expected Outcomes | Expected Outputs | Tr us t F u n d | GEF Project Financi ng(\$) | Confirm ed Co- Financi ng(\$) |
|--------------------------|-----------------------|-------------------|------------------|-----------------------------------|-------------------------------------|--|
|--------------------------|-----------------------|-------------------|------------------|-----------------------------------|-------------------------------------|--|

| Project Component | Financing Type | Expected Outcomes | Expected Outputs | Trust Fund | GEF Project Financing(\$) | Confirmed Co-Financing(\$) |
|--|----------------------|---|--|------------|---------------------------|----------------------------|
| 1. 1. Strengthened inclusive policy, regulatory, institutional and financing frameworks for IAS [1] management | Technical Assistance | <p><u>Outcome 1.1:</u></p> <p>Inclusive policy and regulatory frameworks enabling more effective and comprehensive IAS management</p> <p><i>Indicators:</i></p> <p>? Updated NISSAP with targets, budgets and timetables</p> <p>? IAS National Biosecurity Framework in place</p> <p><u>Outcome 1.2:</u></p> <p>Coordination for IAS management strengthened</p> <p><i>Indicators:</i></p> <p>? National Biosecurity Task Force within the Coordinating Ministry for Maritime and Investment Affairs (KEMENKO MARVES) established and operational</p> <p><u>Outcome 1.3:</u></p> <p>Increased financial resources and mechanisms for IAS management in Indonesia</p> <p><i>Indicators:</i></p> <p>? Cost-benefit analyses completed for IAS of highest concern</p> <p>? Increased government funding for IAS management</p> <p>? At least 2 PES programs (1 in each</p> | <p>Output 1.1.1:</p> <p>Inclusive national and subnational policies, plans and/or regulations for IAS management developed and/or updated</p> <p>Output 1.2.1:</p> <p>Improved IAS coordination</p> <p>Output 1.3.1:</p> <p>Financing mechanisms to support IAS management developed and tested</p> | GET | 1,191,553.00 | 5,795,077.00 |

| Project Component | Financing Type | Expected Outcomes | Expected Outputs | Trust Fund | GEF Project Financing(\$) | Confirmed Co-Financing(\$) |
|--|----------------|---|--|------------|---------------------------|----------------------------|
| 2. Demonstrated landscape-level approach to invasive alien plant species (IAPS) management | Investment | <p><u>Outcome 2.1:</u></p> <p>Existing and new management plans/mechanisms in place to enable landscape level management of IAPS in consideration of FPIC and <i>Masyarakat Adat</i> Plan[1] as outlined in Annex J</p> <p><i>Indicators:</i></p> <p>? 2 spatial maps completed for project landscapes</p> <p>? 2 landscape level IAPS management plans finalized and under implementation</p> <p>? Area of 4 priority IAPS reduced by 187.2 ha</p> <p>? BBNP[2]: 129 ha (terrestrial)</p> <p>? BTSNP[3]: 57 ha (terrestrial) and 1.2 ha (aquatic)</p> <p><u>Outcome 2.2:</u></p> <p>Diverse stakeholders within project landscapes with enhanced roles and capacities to engage in IAPS management</p> <p><i>Indicators:</i></p> <p>? Improved scores on GEF METT for 2 PA sites:</p> <p>? BBNP: Baseline (78); Target (82)</p> <p>? BTSNP: Baseline (74);</p> | <p>Output 2.1.1:</p> <p>Spatial planning and assessments of IAPS pathways completed in consideration of FPIC and Masyarakat Adat Plan as outlined in Annex J</p> <p>Output 2.1.2:</p> <p>Landscape-level management plans for IAPS created and under implementation respecting the FPIC and rights to self-determined development of the Masyarakat Adat (see Annex J)</p> <p>Output 2.1.3:</p> <p>IAPS management integrated into protected area management plans</p> <p>Output 2.2.1:</p> <p>Community and private participation in IAPS prevention / control approaches enhanced, and approaches integrated into existing forestry/agricultural production systems respecting the FPIC and rights to self-determined development of the Masyarakat Adat (see Annex J)</p> | GEET | 1,647,051.00 | 21,300,000.00 |

| Project Component | Financing Type | Expected Outcomes | Expected Outputs | Trust Fund | GEF Project Financing(\$) | Confirmed Co-Financing(\$) |
|---|----------------------|---|--|------------|---------------------------|----------------------------|
| 3. Strengthened knowledge and awareness of IAS issues among key stakeholders, and project monitoring and evaluation based on adaptive management principles | Technical Assistance | <p>Outcome 3.1: Understanding, awareness and capacity of IAS issues increased and supporting improved management in Indonesia</p> <p>Outcome 3.2: Project implementation is supported by an M&E strategy based on measurable and verifiable outcomes and adaptive management principles</p> | <p>Output 3.1.1: Awareness and understanding of IAS issues increased</p> <p>Output 3.1.2: Information and information management systems on IAS strengthened</p> <p>Output 3.1.3: Capacity of staff at various institutions to manage and prevent the spread of IAS in the landscape/seascape enhanced while respecting UNDRIP through FPIC and IPPs^[1] for Masyarakat Adat as outlined in Annex J</p> <p>Output 3.1.4: Development of training modules and curricula on IAS management for students, Masyarakat Adat, local forestry, and agricultural extension staff, PA and forestry managers, and policy makers</p> <p>Output 3.1.5: IAS management practices / lessons learned captured, documented and disseminated while respecting UNDRIP through FPIC and IPPs for Masyarakat Adat as outlined in Annex J</p> <p>Output 3.2.1: Project monitoring and evaluation strategy implemented</p> | GET | 1,367,311.00 | 7,442,559.00 |

[1] United Nations Declaration on the Rights

| Project Comp onent | Finan cing Type | Expected Outcomes | Expected Outputs | Tr us t F u n d | GEF Project Financi ng(\$) | Confirm ed Co- Financi ng(\$) |
|-------------------------------|-----------------------|-------------------|------------------|-----------------------------------|-------------------------------------|--|
| | | | | Sub Total (\$) | 4,205,915.00 | 34,537,636.00 |
| Project Management Cost (PMC) | | | | | | |
| GET | | 210,295.00 | | 1,697,127.00 | | |
| Sub Total(\$) | | 210,295.00 | | 1,697,127.00 | | |
| Total Project Cost(\$) | | 4,416,210.00 | | 36,234,763.00 | | |

Please provide justification

C. Sources of Co-financing for the Project by name and by type

| Sources of Co-financing | Name of Co-financier | Type of Co-financing | Investment Mobilized | Amount(\$) |
|--------------------------------|--|-----------------------------|-----------------------------|----------------------|
| Recipient Country Government | MoEF ? DG of Natural Resource Conservation and Ecosystem and all its technical units | Public Investment | Investment mobilized | 33,274,587.00 |
| Recipient Country Government | Coordinating Ministry for Maritime and Investment Affairs | In-kind | Recurrent expenditures | 208,725.00 |
| Recipient Country Government | National Research and Innovation Agency (BRIN) | In-kind | Recurrent expenditures | 2,085,374.00 |
| Other | SEAMEO BIOTROP | In-kind | Recurrent expenditures | 71,000.00 |
| GEF Agency | Food and Agriculture Organization (FAO) | In-kind | Recurrent expenditures | 100,000.00 |
| Recipient Country Government | Indonesian Agricultural Quarantine Agency | In-kind | Recurrent expenditures | 495,077.00 |
| Total Co-Financing(\$) | | | | 36,234,763.00 |

Describe how any "Investment Mobilized" was identified

The investment mobilized was identified during project identification in consultation with key project partners, as noted in Table C. It totals USD 33.27 million and includes public investments from government. In-kind co-financing from other partners is classified ?recurrent expenditure?. Exchange rate used was USD 1 equals to IDR 14,290 (UNORE currency rate, February 2022).

D. Trust Fund Resources Requested by Agency(ies), Country(ies), Focal Area and the Programming of Funds

| Agency | Trust Fund | Country | Focal Area | Programming of Funds | Amount(\$) | Fee(\$) | Total(\$) |
|----------------------------------|-------------------|----------------|-------------------|-----------------------------|---------------------|-------------------|---------------------|
| FAO | GET | Indonesia | Biodiversity | BD STAR Allocation | 4,416,210 | 419,540 | 4,835,750.00 |
| Total Grant Resources(\$) | | | | | 4,416,210.00 | 419,540.00 | 4,835,750.00 |

E. Non Grant Instrument

NON-GRANT INSTRUMENT at CEO Endorsement

Includes Non grant instruments? **No**

Includes reflow to GEF? **No**

F. Project Preparation Grant (PPG)
PPG Required **true**

PPG Amount (\$)
150,000

PPG Agency Fee (\$)
14,250

| Agenc y | Trus t Fun d | Countr y | Focal Area | Programmin g of Funds | Amount(\$) | Fee(\$) | Total(\$) |
|-------------------------|-----------------------|---------------|------------------|--------------------------|------------------------|-----------------------|------------------------|
| FAO | GET | Indonesi a | Biodiversit y | BD STAR Allocation | 150,000 | 14,250 | 164,250.0 0 |
| Total Project Costs(\$) | | | | | 150,000.0 0 | 14,250.0 0 | 164,250.0 0 |

Core Indicators

Indicator 1 Terrestrial protected areas created or under improved management for conservation and sustainable use

| Ha (Expected at PIF) | Ha (Expected at CEO Endorsement) | Ha (Achieved at MTR) | Ha (Achieved at TE) |
|----------------------|----------------------------------|----------------------|---------------------|
| 94,026.00 | 94,026.00 | 0.00 | 0.00 |

Indicator 1.1 Terrestrial Protected Areas Newly created

| Ha (Expected at PIF) | Ha (Expected at CEO Endorsement) | Total Ha (Achieved at MTR) | Total Ha (Achieved at TE) |
|----------------------|----------------------------------|----------------------------|---------------------------|
| 0.00 | 0.00 | 0.00 | 0.00 |

| Name of the Protected Area | WDP A ID | IUCN Category | Total Ha (Expected at PIF) | Total Ha (Expected at CEO Endorsement) | Total Ha (Achieved at MTR) | Total Ha (Achieved at TE) |
|----------------------------|----------|---------------|----------------------------|--|----------------------------|---------------------------|
|----------------------------|----------|---------------|----------------------------|--|----------------------------|---------------------------|

Indicator 1.2 Terrestrial Protected Areas Under improved Management effectiveness

| Ha (Expected at PIF) | Ha (Expected at CEO Endorsement) | Total Ha (Achieved at MTR) | Total Ha (Achieved at TE) |
|----------------------|----------------------------------|----------------------------|---------------------------|
| 94,026.00 | 94,026.00 | 0.00 | 0.00 |

| Name of the Protected Area | WDP A ID | IUCN Category | Ha (Expected at PIF) | Ha (Expected at CEO Endorsement) | Total Ha (Achieved at MTR) | Total Ha (Achieved at TE) | METT score (Baseline at CEO Endorsement) | METT score (Achieved at MTR) | METT score (Achieved at TE) |
|----------------------------|----------|---------------|----------------------|----------------------------------|----------------------------|---------------------------|--|------------------------------|-----------------------------|
|----------------------------|----------|---------------|----------------------|----------------------------------|----------------------------|---------------------------|--|------------------------------|-----------------------------|

| Name of the Protected Area | W DP A ID | IUC N Category | Ha (Expected at PIF) | Ha (Expected at CEO Endorsement) | Total Ha (Achieved at MTR) | Total Ha (Achieved at TE) | METT score (Baseline at CEO Endorsement) | MET T score (Achieved at MTR) | MET T score (Achieved at TE) |
|---|---------------------------|------------------------------|----------------------|----------------------------------|----------------------------|---------------------------|--|-------------------------------|------------------------------|
| Akula National Park Bantimurung Bulusa raung National Park (BBNP) | 125 689 317 261 | Selec t National Park | 43,750.00 | 43,750.00 | | | 78.00 | | |
| Akula National Park Bromo Tengger Semeru National Park (BTSNP) | 125 689 126 9 | Selec t National Park | 50,276.00 | 50,276.00 | | | 74.00 | | |

Indicator 4 Area of landscapes under improved practices (hectares; excluding protected areas)

| Ha (Expected at PIF) | Ha (Expected at CEO Endorsement) | Ha (Achieved at MTR) | Ha (Achieved at TE) |
|----------------------|----------------------------------|----------------------|---------------------|
| 27439072.00 | 27439072.00 | 0.00 | 0.00 |

Indicator 4.1 Area of landscapes under improved management to benefit biodiversity (hectares, qualitative assessment, non-certified)

| Ha (Expected at PIF) | Ha (Expected at CEO Endorsement) | Ha (Achieved at MTR) | Ha (Achieved at TE) |
|----------------------|----------------------------------|----------------------|---------------------|
| 27,335,974.00 | 27,335,974.00 | | |

Indicator 4.2 Area of landscapes that meets national or international third party certification that incorporates biodiversity considerations (hectares)

| Ha (Expected at PIF) | Ha (Expected at CEO Endorsement) | Ha (Achieved at MTR) | Ha (Achieved at TE) |
|----------------------|----------------------------------|----------------------|---------------------|
|----------------------|----------------------------------|----------------------|---------------------|

Type/Name of Third Party Certification

Indicator 4.3 Area of landscapes under sustainable land management in production systems

| Ha (Expected at PIF) | Ha (Expected at CEO Endorsement) | Ha (Achieved at MTR) | Ha (Achieved at TE) |
|----------------------|----------------------------------|----------------------|---------------------|
| 103,098.00 | 103,098.00 | | |

Indicator 4.4 Area of High Conservation Value Forest (HCVF) loss avoided

| Ha (Expected at PIF) | Ha (Expected at CEO Endorsement) | Ha (Achieved at MTR) | Ha (Achieved at TE) |
|----------------------|----------------------------------|----------------------|---------------------|
|----------------------|----------------------------------|----------------------|---------------------|

Documents (Please upload document(s) that justifies the HCVF)

| Title | Submitted |
|-------|-----------|
|-------|-----------|

Indicator 11 Number of direct beneficiaries disaggregated by gender as co-benefit of GEF investment

| | Number (Expected at PIF) | Number (Expected at CEO Endorsement) | Number (Achieved at MTR) | Number (Achieved at TE) |
|---------------|--------------------------|--------------------------------------|--------------------------|-------------------------|
| Female | 1,572 | 1,310 | | |
| Male | 1,048 | 1,310 | | |
| Total | 2620 | 2620 | 0 | 0 |

Provide additional explanation on targets, other methodologies used, and other focal area specifics (i.e., Aichi targets in BD) including justification where core indicator targets are not provided

Part II. Project Justification

1a. Project Description

(1) Global environmental and/or adaptation problems, root causes and barriers that need to be addressed (systems description)

Background and context

The 7th Conference of the Parties (COP7) to the Convention on Biological Diversity (CBD) issued the *Kuala Lumpur Declaration* in February 2004, expressing alarm that biological diversity is being lost at an unprecedented rate. Invasive Alien Species (IAS) pose the biggest threat to biodiversity after habitat destruction and in some ecosystems, particularly islands, they are the most important cause of biodiversity loss.^[1] COP 7 (Decision VII/20) thus invited the GEF and other funding institutions and development agencies to provide support to developing countries to assist with improved prevention, rapid response and management measures to address the threats of IAS. Target no. 9 of the CBD COP 10 in Nagoya, calls for 'increased attention, programming and funding for the identification, control and eradication, as well as management of pathways to prevent further new introductions and establishment of invasive species in member countries'.

Under the CBD, invasive alien species (IAS) are 'alien species whose introduction and/or spread threaten biological diversity'^[2]. Other definitions also address impacts to economic and human health sectors ^[3]. An alien species 'refers to a species, subspecies or lower taxon, introduced outside its natural past or present distribution, including any part, gametes, seeds, or propagules of such species that might survive and subsequently reproduce' CBD, (2002). These organisms are sometimes called 'exotic,' 'non-native,' or 'non-indigenous' species.

IAS (including plants, animals and other organisms) are a major threat to the vulnerable marine, freshwater and terrestrial biodiversity of Indonesia and to people depending on this biodiversity for their livelihoods. The Global Invasive Species Programme (GISP), an international partnership dedicated to addressing the global threat of invasive species^[4], supported countries in South and SE Asia in 2002 to summarize the threats and impacts of IAS in the region including recommended actions. Delegates of the *South and SE Asia Regional Workshop on the Prevention and Management of IAS: Forging Cooperation throughout South and SE Asia*, concluded that problems of IAS are causing significant ecological, economic, and social damage, and pose an ongoing threat to all countries within the region.

Indonesia's Biodiversity Strategy and Action Plans, over the last 20 years, state that one of the main threats to biodiversity are IAS because they can alter natural ecosystems, contribute to degradation, and cause habitat and species loss. This is supported in the 5th National Report to the CBD in which it is stated that the main threats to biodiversity are: (i) habitat change; (ii) IAS; (iii) pollution; (iv) over exploitation; and (v) climate change. In an analysis of average threats to national parks from 2004 to 2010 the only two issues that doubled in threat level were land-use conflicts and IAS (See Indonesia Biodiversity Strategy and Action Plan, 2015-2020). It is highly likely that the threat of IAS has increased significantly in the past decade.

There have been several attempts to develop IAS inventories for Indonesia. Based on work done by the Ministry of the Environment and SEAMEO BIOTROP in 2003, there were more than 1,619 alien plant species in Indonesia, of which 331 were invasive plant species. Tjitrosoedirdjo (2005)^[5] reported the presence of 1,936 alien plant species belonging to 87 families with Asteraceae (162) and Poaceae (120) being the most speciose families. Approximately one-third (651 species) of the total alien species listed are either naturalized or agricultural weeds. Tjitrosoedirdjo (2005) listed five species (e.g., *Pontederia crassipes*, *Salvinia molesta*) as important Invasive Alien Plant Species (IAPS) in aquatic habitats and 20 species (e.g., *Chromolaena odorata*, *Lantana camara*, *Mikania micrantha*) in terrestrial habitats. A review by Arida *et al.* (2014) found that there were 1,731 alien plant species, 350 of which were invasive, while the status of four species was unknown. More recently, Setyawati *et al.* (2015)^[6] listed 362 plant species from 73 families as invasive in Indonesia. Wargasasmita (2005)^[7] recorded 19 introduced fish species in Indonesian waters. Ten introduced fish species were reported in Aceh Province waters and included *Clarias gariepinus*, *C. carpio*, *Oreochromis mossambicus*, *O. niloticus*, *Xiphophorus helleri*, *X. maculatus*, *Pterygoplichthys pardalis*, *Aplocheilichthys panchax*, *Ctenopharyngodon idella*, and *A. spatula*. Surveys of fish on Mount Galunggung, West Java, resulted in the discovery of 24 species, 13 of which were introduced, including *Clarias gariepinus* and a few *Oreochromis* species^[8] (Haryono, 2020). The Asian common toad (*Duttaphrynus melanostictus*) is native to Sundaland but has been invading the Wallacea region over the last 50 years as a result of human activities and may pose a future threat to the globally threatened Komodo dragon. According to the IUCN Species Survival Commission Invasive Species Specialist Group (ISSG) (2015) *Indonesia has the highest number of IAS in SE Asia*, with 181 species recorded, compared to 148 in the Philippines and 145 in Malaysia. Based on other information these are clearly under-estimates, but an indication that Indonesia is the most invaded country in the region. According to Van Rintelen *et al.* (2017)^[9] the insular nature of Indonesia, along with its high number of endemic species versus a high number of threatened species and a high number of IAS makes the country more vulnerable to negative impacts than any other SE Asian country.

Responding to the need for additional action against invasive plant, animal and other species, FAO, in collaboration with national partners in Indonesia, has developed a proposal entitled, 'Strengthening Capacities for Management of Invasive Alien Species (SMIAS) in Indonesia' for funding by the Global Environment Facility (GEF). On November 9, 2020, financial support was granted by GEF to conduct the detailed design of the project through a Project Preparation Grant (PPG). A virtual Inception Meeting was held from 12-13 July 2021; virtual Prodoc Validation meetings were held 02 March (with MoEF and related departments), and 04 March 2022 and attended by representatives of all key stakeholders. This FSP Prodoc is the main output of these discussions and the PPG.

Global significance

Indonesia is the largest country in Southeast Asia, extending for 5,100 km from east to west and 1,800 km from north to south. It shares land borders with Malaysia and Papua New Guinea. Composed of more than 17,500 islands, of which 7,000 are uninhabited. This massive archipelago crossing the ecologically significant Wallace line (e.g., the transition zone between Asia and Australia) means that Indonesia encompasses highly diverse ecosystems and globally important habitats. The country ranges in elevation from sea level to Puncak Jaya at 4,884 meters above sea level (masl). Several habitat types can be found in Indonesia including lowland, montane, heath, tropical pine, deciduous, and peat swamp forests together with mangroves, savannah, and lowland and sub-alpine grasslands. This diversity of

habitat types means that Indonesia is home to roughly 11% of the world's flowering plants, 13% of its mammals ? including 46 primate species, 6% of its amphibians, 7% of its reptiles, 16% of its birds and 14% of its fish (including freshwater and saltwater species). In fact, Indonesia has the highest National Biodiversity Index (NBI) of all countries in SE Asia. The NBI estimates country richness and endemism in four terrestrial vertebrate classes and vascular plants.

Indonesia has 554 designated conservation areas spread throughout all provinces of the country, covering 5.3 million hectares of marine conservation areas and 22.1 million hectares of terrestrial conservation areas. The majority of this area (59.79 percent) is designated as National Parks. Some conservation areas have been recognized globally, with six World Heritage sites; 22 Biosphere Reserves; six ASEAN Heritage Parks, seven Ramsar sites, and four Global Geoparks. This global recognition is evidence of the significant value of Indonesia's forests to the world. Indonesia's conservation areas are comprised of 4.25 million hectares of Strict Nature Reserves (Cagar Alam, CA); 4.98 million hectares of Wildlife Sanctuaries (Suaka Margasatwa, SM); 306,060 hectares of Sanctuary Reserve Areas/Nature Conservation Areas (Kawasan Suaka Alam/Kawasan Pelestarian Alam, KSA/KPA); 16.23 million hectares of National Parks (Taman Nasional, TN), 825,000 hectares of Nature Recreation Park (Taman Wisata Alam, TWA); 171,250 hectares of Game Hunting Parks (Taman Buru, TB), and 371,120 hectares of Grand Forest Parks (Taman Hutan Raya, Tahura) (see Figure 1). The main issues affecting biodiversity within and adjacent to protected areas are habitat degradation and fragmentation, landscape changes, overexploitation, pollution, climate change, alien species, fires, and economic and political issues facing the country. These issues are posing a significant threat to biodiversity. IAS poses a significant threat to biodiversity within protected areas. Many IAS are already widely established in many of these protected areas including *Mimosa pigra* in Wasur National Park (NP) and Lembah Anai Nature Reserve; *Pontederia crassipes* in Wasur NP and Rawa Aopa Watomohae NP; *Chromolaena odorata* in Wasur NP, Ujung Kulon NP, Meru Betiri NP, Pulau Moyo Game Reserve, Kamojang Nature Reserve and Lembah Anai Nature Reserve; *Lantana camara* in Wasur NP, Gunung Gede Pangrango NP, Pangandaran Nature Reserve, Lembah Anai Nature Reserve, and Meru Betiri NP, and *Acacia nilotica* in Baluran NP. Padmanaba et al. (2017)^[10] found 67 IAPS in eight of the 12 NPs surveyed in Java, of which 33 occurred in only one park and two (*C. odorata* and *L. camara*) in all eight (Table 1). In fact, most protected areas throughout Indonesia have been invaded by one or more species, impacting negatively on biodiversity.

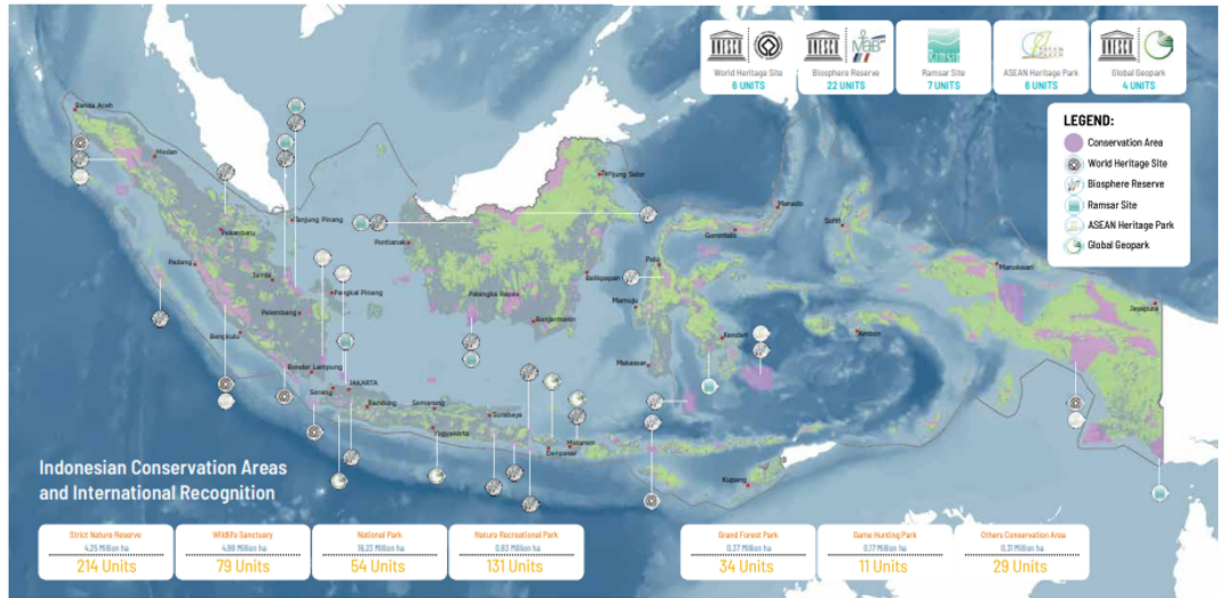


Figure 1: Conservation areas in Indonesia (Source: The State of Indonesia's Forest 2020)^[11]

Table 1: Invasive Alien Plant Species (IAPS) in eight National Parks in Java (Source: Padmanaba *et al.*, 2017)^[12]

| National Park | Total IAPS | Most common IAPS |
|-----------------------|------------|--|
| Ujung Kulon | 8 | <i>Hyptis capitata</i> , <i>Lantana camara</i> |
| Gunung Gede Pangrango | 14 | <i>Ageratina riparia</i> , <i>Brugmansia candida</i> , <i>Solanum americanum</i> , <i>Passiflora ligularis</i> |
| Gunung Merapi | 13 | <i>Ageratina riparia</i> , <i>Chromolaena odorata</i> , <i>Acacia decurrens</i> |
| Gunung Merbabu | 14 | <i>Ageratina riparia</i> , <i>Austroeupatorium inulaefolium</i> , <i>Acacia decurrens</i> |
| Bromo Tengger Semeru | 23 | <i>Ageratina riparia</i> , <i>Chromolaena odorata</i> , <i>Acacia decurrens</i> |
| Meru Betiri | 27 | <i>Eleutheranthera ruderalis</i> , <i>Mikania micrantha</i> , <i>Chromolaena odorata</i> |
| Alas Purwo | 8 | <i>Chromolaena odorata</i> , <i>Hyptis capitata</i> |
| Baluran | 24 | <i>Passiflora foetida</i> , <i>Acacia nilotica</i> , <i>Chromolaena odorata</i> |

One of the pilot sites of the proposed project is Bantimurung Bulusaraung NP (BBNP) in South Sulawesi. The park contains the Rammang-Rammang karst area, harbouring significant endemism, it is the second largest karst area known in the world. It is also home to the Sulawesi moor macaque (*Macaca maura*, EN), the red-knobbed hornbill (*Aceros cassidix*, VU), cuscus (*Strigocuscus celebensis*, NT), Sulawesi palm civet (*Macrogalidia musschenbroekii*, VU), and pot-bellied boar (*Sus scrofa vittatus*, LC). The NP is also well known for its abundance of butterflies with 103 species having been recorded there, including endemic species such as *Papilio blumei*, LC; *P. polytes*, LC; *P. satespes*, LC; and *Graphium androcles*, DD. Several IAS have been recorded in the NP, all of which are known to impact negatively on flora and fauna.

The second pilot site, Bromo Tengger Semeru NP (BTSNP), is in East Java, famous for being the only conservation area in Indonesia that has a "sand sea" which covers 5,250 ha at an altitude of about 2,100 meters. The NP also includes Mount Semeru (3,676 m), four lakes and 50 rivers. Several endangered plant species are found in the NP together with about 200 endemic orchid species. The NP is also home to about 137 species of birds, 22 species of mammals including the crab-eating macaque, marbled cat, Javan leopard, and four species of reptiles. The invasive alien plant species present in this NP include *Ageratina riparia*, *Acacia decurrens*, *Tithonia diversifolia*, and *Imperata cylindrica*, although the latter is considered to be a cosmopolitan species. Research has shown that invasions by *A. riparia* and *A. decurrens* inhibit the growth of other plant species.

Invasive alien species (IAS) in the target landscapes

1. Ranu Pani Lake in BTSNP has been severely impacted by giant salvinia (*Salvinia molesta*), a floating aquatic fern that thrives in slow-moving, nutrient-rich, warm freshwater. Invasions in this system have been facilitated by the flow of excess fertilizer into the lake from intensive agricultural practices in the uplands, forming dense mats on the lake that lower light penetration and oxygen levels, impacting negatively on the diversity of native freshwater species, including endemic fish and other aquatic plants. These invasions are compounded by heavy sedimentation levels due to high levels of soil erosion and grey water emanating from villages within the lake's catchment. As much as 50% of Ranu Pani Lake has been lost due to sedimentation and invasion by giant salvinia.

Other important IAPS in this landscape, among many others, include Brazilian vervain (*Verbena brasiliensis*), which has invaded 20 ha of the savanna ecosystem, and *Acacia decurrens*, *Calliandra calothyrsus*, and *Chromolaena odorata*, all of which have negative impacts on biodiversity, and water resources. During the PPG field visit in September 2021, Ranu Pani Lake also suffered from an invasion by an *Azolla* spp. The invasion of *Salvinia molesta* and *Azolla* spp. was perceived negatively by the local community as they made it difficult to catch fish in the lake. However, communities did not consider other IAPS such as Brazilian vervain, chromolaena, and *Acacia decurrens* as nuisance plants. The community considers chromolaena as a source of fuelwood and green manure; Acacia is the primary fuel source for the community; and vervain an ornamental plant.

2. In addition to being a national park, the BBNP is also classified as a Conservation Forest Management Unit (FMU) and is classified as a Key Biodiversity Area and an ASEAN Heritage Park. The BBNP is divided into three main ecosystem types, forest ecosystems on limestone (karst ecosystems; the BBNP has the second largest karst ecosystem globally), non-Dipterocarpaceae rainforest ecosystems, and lower mountain forest ecosystems. The BBNP is a catchment area for several large rivers in South Sulawesi.

There are 48 villages within the NP, together with agricultural lands which extend beyond the park boundaries. The landscape surrounding the BBNP includes one Production FMU (a combination of plantation forests, natural forests, and some areas of cultivation - cocoa, coffee, shifting cultivation); one Protection FMU of 51,406 ha, and 5,329 ha of timber production forest, 5,681 ha of production forest for non-wood products, 6,341 ha of production forest managed by Masyarakat Adat and local communities, and 10,000 ha of agricultural lands; there are also approximately 2,500 ha used for community infrastructure and other uses. As most of the landscape surrounding the BBNP is forested, residents rely heavily on forest resources, including local production of honey and mushrooms that is managed by Forest Farmer Groups (with support from FMUs), which set their own regulations on harvesting and allocate a part of their revenue to support forest rehabilitation activities. Tourism is also highly important, with almost 60% of the local population involved in one way or another in this sector, which includes attractions such as a butterfly park, waterfalls and cave systems.

Within the BBNP, a preliminary risk analysis process/inventory carried out by park management in 2017 identified 18 invasive alien plant species, of which two ? African tulip tree (*Spathodea campanulata*) and chromolaena pose the biggest threats to biodiversity and ecosystem services within the park. Tulip tree, which has spread widely within the park, covering 438 ha, has greatly reduced the habitat for several native and endemic species, including the Sulawesi ebony (*Dyospyros celebica*), palms (*Livingstonia sinensis*), and several native orchids (*Acocentrum miniatum*, *Dendrobium macrophyllum*, and *Palaenopsis amboinensis*). Chromolaena has invaded an additional 100 ha within the park. Furthermore, PA managers believe that the loss of native plants is causing a decline in the populations of some endemic wildlife species that feed on these plants, including the Sulawesi Monkey (*Macaca maura*), Sulawesi Tarsier (*Tarsius fuscus*) and the Sulawesi bear cuscus (*Ailurops ursinus*). *M. maura* is protected under Indonesian law and has critically endangered status under IUCN. The origin of tulip tree within the park is unknown, though it is suspected that the plant was intentionally introduced to improve flood and erosion control, or that it was dispersed by animals or by wind. This information remains valid during PPG's field visit in October 2021.

Threats due to IAS and their root causes

Impacts on water resources: Parts of Indonesia are already facing severe water shortages, exacerbated by climate change. Almost 10% of Indonesia is expected to experience water crisis by 2045, while Java is already considered to be 'under pressure'^[13]. With longer and drier dry seasons, and shorter but wetter wet seasons, the climate crisis will create havoc for water supplies and rice and livestock production. East Java is facing a serious water shortage with at least 23,000 ha of rice fields under threat. As such the protection of water towers will become more important. For example, BTSNP is an important water tower in East Java, being the source of many rivers supplying towns and cities in the lowlands. Invasions by woody weeds such as *A. decurrens* and *A. riparia* will exacerbate water shortages. Research in South Africa has demonstrated the negative impacts of woody weeds on water resources. For example, removal of dense stands of pines and wattles (*Acacia mearnsii*) from riverbanks in one study area resulted in a 120% increase in stream-flows^[14]. Losses in water runoff in South Africa, attributed to invasions of *A. mearnsii*, amount to an estimated 577 million m³ of water annually^[15]. Clearing of all the invasions in the study catchment was likely to increase water availability by 17 million m³/yr^[16]. Aquatic weeds such as water hyacinth (*Pontederia crassipes*) and giant salvinia (*Salvinia molesta*) are also known to exacerbate water loss through evapo-transpiration. For example, Brezny et al. (1973)^[17] found that that evapotranspiration of water hyacinth was 130-150% higher than evaporation from an uninvaded water surface under equivalent conditions.

Loss of species at higher trophic levels (iconic species): According to Vil? et al. (2011)^[18], IAPS decrease species diversity and abundance by ca. 51% and ca. 44%, respectively, also reducing fitness and growth of native plant species by ca. 42 and 22%, respectively. By reducing native species diversity, abundance, fitness, and distribution and by altering community structure alien invasive plant species have a significant impact on ecosystem services (Hulme, 2006^[19]; Gabbard and Fowler, 2007^[20]; Hickman et al., 2010^[21]). The loss of plant species or changes in vegetation structure, because of plant invasions, may have cascading trophic effects^[22], especially on other species at higher trophic levels. For example, alien plant species have been reported to decrease animal fitness and abundance both by ca. 17% (Vil? et al., 2011). By altering community structure IAPS may also act as ecosystem engineers or transformers^[23], affecting a multitude of other organisms^[24].

Perre et al. (2011)^[25] found that exotic species supported a small subset of the herbivore assemblage found on native plants. In a study in forests in the Azores, species richness of plants and insects declined in invaded areas with a dramatic decrease in insect biomass^[26]. A meta-analysis of 56 studies found that invaded habitats had 29% fewer arthropods and 17% lower diversity as compared to uninvaded habitats^[27]. Riparian sites in the United Kingdom, invaded by Japanese knotweed, supported fewer plant species and had lower abundance, morphospecific richness and biomass of invertebrates, as compared to native grassland or shrub-dominated plots^[28]. Also, in the United Kingdom, the foliage community of plots invaded by Himalayan balsam had 64 and 58% less beetle (Coleoptera) and true bug (Heteroptera) species than uninvaded plots, respectively^[29]. Many of these impacts on invertebrates are not necessarily as a result of invasive plants being unsuitable as a food source for a host of native organisms, but also because they bring about changes in the composition and structure of the vegetation.

A reduction in insect quality and quantity can have significant consequences for those taxa at higher trophic levels such as predatory invertebrates, amphibians, reptiles, birds and mammals^[30]. Maerz et al. (2005)^[31] found that green frogs (*Lithobates clamitans*) gained less mass along transects from areas of native vegetation into areas invaded by Japanese knotweed given a decrease in insect abundance because of the plant invasion. The black legless lizard (*Anniella pulchra nigra*) is now threatened, partly due to a decrease in its natural prey base, mainly insects, because of the invasion by the invasive succulent [*Carpobrotus edulis*] on sand dunes in the USA^[32]. Amphibian species richness and evenness were lower in forest plots with high densities of the invasive shrub Amur honeysuckle (*Lonicera maackii*). This was probably as a result of the fact that mean daily maximum and mean temperatures were lower in invaded plots, demonstrating how changes in vegetation structure can influence microclimate, resulting in knock-on impacts on other species. Field observations of reptiles in a habitat invaded by rubber vine (*Cryptostegia grandiflora*) in Australia recorded only a single lizard as compared with 131 lizards in nearby native vegetation^[33]. Fewer reptiles were also recorded in areas invaded by *Mimosa pigra*^[34] while fewer insects, reptiles and birds were found in areas dominated by Athel pine (*Tamarix aphylla*) in Australia^[35].

Mimosa pigra invasions contribute to steep declines, both in the numbers of species of native plants and animals and in their population sizes. Although no impact studies have been undertaken in Indonesia, where this species is also invasive, in the Tram Chim National Park, Vietnam, declining densities of native plant species in infested habitats are threatening the sarus crane (Triet and Dung, 2001), which is listed as vulnerable. *M. pigra* thickets in Australia have been found to support fewer birds and lizards, less herbaceous vegetation, and fewer tree seedlings than native vegetation^[36].

In Africa, various bird guilds were also negatively impacted by the invasive shrub/tree honey mesquite (*Prosopis glandulosa*). Dense *Prosopis* species woodlands had less herbaceous understorey cover than the uninvaded *Acacia* woodlands, while the latter was also botanically more diverse^[37]. Bird communities in native woodlands were also consistently more species-rich and more diverse with fewer frugivores and insectivores recorded in areas dominated by *Prosopis* species^[38]. Negative impacts on birds may be because of changes in vegetation structure or decreases in the number of insects associated with the introduced species.

In South Africa, invasions of chromolaena (*Chromolaena odorata*), which is also highly invasive in Indonesia, are impacting negatively on the breeding biology of the Nile crocodile^[39], while in Cameroon it is displacing native species in the family Zingiberaceae, a major food source for the endangered western lowland gorilla^[40]. In the Hluhluwe-Imfolozi Park in South Africa *C. odorata* invasions significantly affected habitat selection by buffalo, wildebeest, giraffe, zebra, and warthog^[41]. By transforming habitats and eliminating pasture species, *P. juliflora* is threatening the survival of Gr?vy's zebra (*Equus grevyi*) and other wildlife in invaded areas^[42]. In Australia, Turner and Downey (2010)^[43] identified 275 native plant species and 24 native animal species that were threatened by *L. camara* and it was also found to have a negative impact on habitat use by elephants in Mudumalai Tiger Reserve in southern India (Wilson et al., 2013). *Mikania micrantha* invasions in Chitwan National Park, Nepal, threaten the survival of the one-horned rhino (*Rhinoceros unicornis*). Mikania is also known to be invasive in Indonesia.

Reduction in pollinators: Farming communities living within or adjacent to the target PAs are dependent on bees and other pollinators such as flies, beetles, moths, butterflies, wasps, ants, birds, and bats, among others. Wild pollinators other than honeybees recently have been recognized for their role in increasing and stabilizing crop-pollination services. Wild bees are known to improve seed set, quality, shelf life, and commercial value of a variety of crops. Increasingly, studies indicate that insect pollinators other than bees, are equally if not more important for the production of some crops^[44]. Although non-bees are less effective pollinators than bees per flower visit, they make more visits; thus these two factors compensate for each other, resulting in pollination services rendered by non-bees that are similar to those provided by bees. In the subset of studies that measured fruit set, fruit set increased with non-bee insect visits independently of bee visitation rates, indicating that non-bee insects provide a unique benefit that is not provided by bees^[45]. Crops such as coffee, potatoes, pigeon peas, tomatoes, sunflower, and others, are all pollinated by bees, and other species, some of which are grown in areas in or adjacent to our project sites, BTSNP and BBNP.

It is well recognized that native bee communities are strongly dependent on the proportion of natural habitat within any given area. In addition, access to a rich diversity of flowering plants is very important for the development of honeybee colonies. Displacement of a variety of native species by invasive plants leads to the development of large monospecific stands of a single invasive plant, to the detriment of pollinator populations. The displacement of food plants for moths by invasive plants may also lead to declines in crop pollination. For example, Darke and Tallamy (2014) found significantly more butterfly and moth larvae in suburban gardens dominated by native plants as compared to gardens of predominantly introduced plants.

Decrease in natural pest control capacity: In agricultural systems, pest control problems may be exacerbated by biodiversity loss. Habitat conversion results in the reduction or loss of the natural enemies of pests. This loss of natural enemies can be significant in farming communities that may not have access to other costlier pest control interventions. In agricultural systems, pest control problems may be exacerbated by biodiversity loss^[46]. For example, in agro-forestry landscapes in Indonesia, both diversity of natural enemies and parasitism rates of trap-nesting hymenopteran brood declined with distance from forest^[47]. In coffee growing areas in Mexico, ant richness declines markedly with distance from forest fragments, especially in less diverse agro-ecosystems leading to less diversity of predatory species further from forest fragments^[48]. Predation rates may also decrease with increased distance from non-crop habitats at field margins. Parasitism rates declined, likely because parasitoids (and predators) are more susceptible to habitat fragmentation than herbivores^[49]. Thus, landscapes with a greater diversity of habitats, and especially with smaller habitat patches may be preferable for increasing natural enemy function. It is well known that plant invasions reduce the diversity and abundance of native plant species which results in a reduction in the diversity and abundance of natural enemies of pests. Managing IAS, and in so doing retaining biodiversity can therefore contribute to the natural control of some crop pests and reduce the use of pesticides, which can have negative impacts on human and animal health.

Contributing to land degradation and poverty: Unsustainable agricultural practices such as the cultivation of steep slopes without implementation of any conservation measures, poor ridge alignment, stream bank cultivation, short return periods of shifting cultivation, mono-cropping and continuous

growing of the same crops all lead to accelerated soil loss and declining soil fertility. Food production is further curtailed by the presence of several invasive plants and introduced crop pests leading many smallholder farmers, who struggle to make a living off the land, to turn to protected areas to make ends meet. These activities may include poaching and deforestation. People living in or near the protected areas (PAs) supplement their meagre income by harvesting and selling forest products including honey, fruit, wild vegetables, medicinal plants, mushrooms and some wildlife. Extraction of wood for fuel and charcoal production is also common.

Unsustainable utilization of resources in these PAs is contributing to land degradation, driving plant invasions. These invasions will not only result in a reduction in the availability of non-timber forest products but also reduce the abundance of pollinators and natural enemies of crop pests, leading to a further decrease in yields and an associated increase in pesticide use. A reduction in available grazing outside of PAs because of invasive plants may also force farmers to seek forage elsewhere, often within PAs. This often drives human-wildlife conflict, especially if there are predators within the PA. Increasing encroachment of PAs will lead to a reduction in the ecosystem goods and services they provide, especially the provision of water, leading to serious negative downstream impacts.

Loss of tourism revenue: BTSNP and BBNP receive thousands of tourists every year, generating significant income for the protected area and adjacent communities. Invasions will impact on plants and the myriad of iconic species that depend on them for survival. Invasions are also known to detract from the aesthetic appeal of landscapes. For example, *Mimosa pigra* invasions in Lochinvar NP, Zambia, reduced the number of bird species by almost 50%, with only 24 species recorded in invaded compared to 46 in uninvaded floodplains^[50]. The number of birds seen was reduced by more than 95% from 19,265 in open floodplains to 314 in invaded areas. This contributed to a significant reduction in tourism, with some lodges closing, resulting in a loss of jobs and associated community benefits. It is also assumed that the invasion of *Acacia nilotica* in Baluran NP in East Java Province, which has contributed to a decline in the endangered banteng (*Bos javanicus*) population, has had a negative impact on tourism. In 1989/1990, the NP received 12,455 visitors, declining to 6,384 in 2000, a 48% decrease, followed by further reductions in tourism numbers in subsequent years. A study in South Africa found that tourists were willing to contribute financially to the management of an invasive succulent, *Opuntia stricta*, in Pilansberg NP, due to its aesthetic and recreational impacts^[51] (Nikodinoska et al., 2014).

These threats posed by invasive alien species to biodiversity conservation, agriculture, and food security, as well as various other sectors like tourism and water services, are a result of a number of root causes:

Root causes

Increased pathway activities: The IAS threatening the unique biodiversity of Indonesia are being introduced at an increasing rate through trade, travel (tourism) and transport ? the infamous ?three Ts?, the major drivers of biological invasion. The risk of such introductions, intentional or accidental, is growing rapidly as a result of globalization. Vil? and Pujadas (2001)^[52] found that the level of imports and human developments were the only variables associated with the density of exotic plant

species. In other words, as countries become more industrialized, the importation of new cultivars increases, raising the probability of biological invasions. The introduction of plants for agriculture, silviculture, soil improvement and amenity, including gardening, is increasing, as is the intentional importation of fish for aquaculture, including the aquarium and pet trade. For example, Indonesia imported 9,604,045 living plants (ornamentals) from Korea, the Netherlands, Japan, and USA in 2005. In 2015, Indonesia imported from various countries around the world live trees and other plants; bulbs; roots and similar; cut flowers; and ornamental foliage to the value of US\$ 2,419,462. This increased to US\$9,341,589 in 2019^[53]. There has been a significant increase in the import of many other commodities which could harbour IAS in the last 10 years.

The region has one of the fastest growing economies with recorded annual growth rates of up to 8% and massive trade volumes passing its harbours, marine corridors and vastly expanding system of roads. The establishment of the ASEAN free trade area (AFTA) in 1992, has facilitated the movement of goods and services between the ten-member countries, but has also increased the movement of invasive species. An invasive animal or plant species introduced into a single country within the SE Asian region is likely to spread beyond national boundaries and invade neighbouring states. For example, countries neighbouring Indonesia such as Papua New Guinea, Brunei, East Timor, and Malaysia could easily be a source as well as pathway for new IAS invasions into Indonesia through their connected ecosystems, cross border trade and human migration, since hundreds of IAS are already present elsewhere in SE Asia.

The introduction of IAS from outside the region is also high because the region is a hub of economic activity with significant maritime traffic. The Strait of Malacca, a 805 km long stretch of water between the Malay Peninsula and the Indonesian island of Sumatra, is one of the most important shipping lanes in the world. It is the main shipping channel between the Indian and Pacific Oceans linking such major Asian economies as India, China, Japan and South Korea. Over 50,000 vessels pass through the strait every year, carrying about 25% of the world's traded goods including oil, Chinese products, Malaysian CPO (crude palm oil) and Indonesian coffee and logs, to name but a few. This volume of trade exacerbates the vulnerability of Indonesia to IAS from around the globe. It is particular risk in terms of hull fouling and ballast water.

Tourism is one of the main foreign exchange earners for Indonesia. According to recent statistics, of the 450 million international trips undertaken worldwide, 7% were to and within SE Asia. Of interest there were 7.65 million international visitors to Indonesia in 2011, increasing to 16.11 million in 2019, prior to the onset of the COVID-19 pandemic. With millions of tourists visiting Indonesia every year and a lack of adequate information services and screening procedures at airports and harbours, the risk of both accidental and intentional introductions is significant.

International air travel is a pathway for the spread of insects^[54], plant and human diseases^[55] and diseased meat products^[56]. Pathogenic fungi have been found on clothing and baggage of passengers at airports^[57]. Rust spores on passenger clothing was implicated in the introduction of yellow stripe rust, a serious pathogen on wheat, into Australia^[58]. Researchers at Honolulu International Airport, Hawaii, found 65 species of fungi on 17 shoes^[59]. Used tents have been found to harbour plant and animal debris and live insects^[60]. Researchers at Auckland and Christchurch International airports, New Zealand, examined 157 pairs of soiled footwear carried in luggage and found a range of bacteria, fungi,

seeds and nematodes (McNeill et al., unpublished data). Seeds were present on over 50% of footwear examined, and 73% of all seeds recovered were found to be viable^[61].

Increased disturbance: A literature review found that plant species (86%) were significantly more dependent on disturbance for establishment than were animals (12%)^[62]. However, animals and plants that were dependent on disturbance for establishment were equally dependent (58 versus 68%) on it for range expansion. Establishment of exotic animals was associated with ballast water discharge, intentional releases, and residential developments whereas exotic plant establishment and spread was facilitated by animal activities (e.g., grazing, seed introduction), soil disturbance, forestry, fire, agriculture, and human activities^[63].

In 2018 it was estimated that 14.06 million hectares of land in Indonesia was degraded. During the period of 2015 to 2019, the Government set a target to reduce the extent of severely degraded land by 5.5 million hectares. This was spread across 34 provinces, which are managed through 34 Watershed and Protection Forest Area Management Offices (Balai Pengelolaan Daerah Aliran Sungai dan Hutan Lindung, BPDASHL).^[64] Practices that lead to landscape degradation in Indonesia include deforestation, removal of natural vegetation, and urban sprawl; unsustainable agricultural land use management practices, such as over-use of fertilizers, pesticides, and heavy machinery; and overgrazing, improper crop rotation, and poor irrigation practices. One very *strong factor in the spread of IAS in Indonesia is the conversion of forested habitats to other uses*. For example, from 2002 to 2020, Indonesia lost 9.75 million hectares of humid primary forest, making up 36% of its total tree cover loss in the same period. To mitigate against this loss there have been initiatives to afforest areas, often with exotic species, many invasive, exacerbating biodiversity loss.^[65]

Climate change: *Climate change is also a major driver of invasions*. Indonesia is predicted to experience temperature increases of approximately 0.8°C by 2030 with an associated change in rainfall patterns, with the rainy season ending earlier and the length of the rainy season becoming shorter. A reduction in rainfall may result in more frequent droughts. For example, extensive fires in West Africa in the 1980s during extremely dry years contributed to the proliferation of invasive species such as paper mulberry (*Broussonetia papyrifera*) which took advantage of an increase in the size of forest gaps and reduced competition from native species. In 1982-1983 more than 3.7 million ha of land, including forests, burned on the island of Borneo while more than 2 million ha of forest and scrubland burned during 1997-1998, both due to prolonged droughts. Extensive fires in 2015 were linked to a prolonged drought. Some invasive plants such as *Chromolaena odorata*, which is common in Indonesia, have high levels of oil in the dry pithy stems and leaves and as a result rapidly spread fire. The ability of chromolaena to invade forest edges and gaps results in fires being carried well into relatively undisturbed forests and woodlands, further depleting native biodiversity. Seed germination of several invasive species present in Indonesia, such as *Acacia decurrens*, is enhanced by fires.

It is also predicted that climate change will contribute to an increase in extreme weather events, which will contribute to increased land degradation/disturbance. Natural disasters in Indonesia from 1998-2018 were dominated by flooding (39%), heavy wind/storms (26%), landslides (22%), and drought (8%). In 2019, Indonesia experienced 3,622 natural disasters ? about 90% were caused by hydro-meteorological phenomena like tornadoes, flooding and landslides^[66]. These severe weather events will create conditions suitable for the establishment and subsequent spread of invasive species. Increased disturbance will reduce resistance in recipient communities and create enemy-free sites for

the establishment of invasive plants. The spectacular success of *Miconia calvescens* in Tahiti is often attributed to the six hurricanes that hit the Society Islands between December 1982 and April 1983. Reports suggested that the cyclones explained the 'demographic explosion of miconia', and that 'the speed of the invasion then became astonishing'. Similarly, invasive species in rainforests in Queensland, Australia capitalized to a greater extent than native species on the disturbance created by Cyclone Larry; and after the major tsunami in SE Asia in 2004, Sri Lanka witnessed a significant expansion of cactus (*Opuntia stricta*), mesquite (*Prosopis juliflora*), lantana (*Lantana camara*) and chromolaena in degraded coastal areas, as well as of water hyacinth (*Pontederia crassipes*) and cattails (*Typha angustifolia*) in lagoons and estuaries.

Changes in weather patterns and increasing temperatures may also enable species to expand their current ranges. For example, studies have shown that the root biomass of the invasive tree *P. juliflora* increases significantly in areas with a higher mean annual temperature. Increased temperatures may also improve germination rates of a host of invasive plant species. Invasive species may be able to expand their range to higher altitudes, areas that are often the last refuges for endangered and threatened species because these areas have been less affected by human activities in the past.

Some invasive plant species will also benefit from higher carbon dioxide levels and temperatures^[67]. For example, the invasive shrub *Acacia nilotica*, in Australia, is likely to benefit from increases in water-use efficiency as a result of increased CO₂ concentrations, allowing it to invade drier sites, while increased temperatures will allow it to complete its reproductive life cycle in areas which are currently too cool to sustain populations^[68]. *Acacia nilotica* invasions currently dominate Baluran National Park in Indonesia. In laboratory trials chromolaena, which is one of the worst weeds in Indonesia, benefitted significantly from increased CO₂. Under doubled atmospheric CO₂ concentrations (700 µmol /mol) total biomass, height, stem diameter, branch number and total leaf area were increased by 92%, 41%, 60%, 325%, and 148%, respectively. Of interest native congeners do not demonstrate the same changes in growth or reproductive output under elevated CO₂ levels.

Strong winds, currents and wave action can facilitate the movement of invasive species at regional and global scales. For example, the red palm mite (*Raoiella indica*), a major pest of fruit-producing palm trees and other ornamental plants, has spread throughout the Caribbean most likely due to a combination of major storms and hurricanes as well as on infested plants and seeds. Cyclone Demoina is thought to have blown seeds of the noxious weed *Parthenium hysterophorus* from Eswatini into South Africa in 2004.

In conclusion, *global climate change will thus exacerbate the already serious levels of habitat degradation resulting in further loss of ecosystem services and species*. Degraded landscapes are more amenable to IAS invasions, which means that climate change will facilitate the expansion of areas suitable for the spread and proliferation of non-native species. Climate change will have direct and indirect impacts on non-native species:

1. Competition and range shift (direct);
2. Facilitated movements (direct);
3. Native vs. non-native invasive species (direct);
4. Sequestration impacts (direct);
5. Disturbance events (indirect);

6. Changes in species composition and ecosystem function (indirect);
7. Social interactions and response (indirect).

Extreme vulnerability of Indonesia: Indonesia is the largest archipelago in the world consisting of five major islands and about 30 smaller groups ? there are 17,508 islands of which about 6,000 are inhabited. At the CBD 8th Conferences of the Parties (COP8) in 2006 the vulnerability and fragility of biodiversity on small islands to invasive species and other perturbations was again stressed. Some key reasons for this are:

- a) Relatively low buffer capacity of small islands to severe environmental fluctuations and events;
- b) Species often become concentrated in small and fragmented areas. At these marginal breeding sites they are subject to various natural and anthropogenic pressures that endanger their survival;
- c) Species that have evolved on islands have done so free from competition with large numbers of other species and therefore lack adequate defences and are susceptible to invasions by alien species;
- d) Some endangered species have below critical mass breeding populations. Their interchange is further restricted by habitat fragmentation.

Islands are particularly vulnerable to plant and animal invasions. Since the year 1600 39% of animal extinctions arose mainly from the introduction of alien species, 36% from habitat destruction, and 23% from hunting or deliberate extermination. It is well documented that most of these extinctions occurred on islands, mainly as a result of IAS, with 80-90% of all reptile extinctions; 80-93% of all bird extinctions; and 50-81% of all mammal extinctions. Islands have suffered 64% of IUCN-listed extinctions and have 45% of IUCN-listed critically endangered species. In the past 500 years, IAS have contributed to the extinction of nearly half of global bird extinctions: 67% of globally threatened birds inhabiting oceanic islands are affected by IAS compared to 30% of globally threatened birds on continents. Most species (95%) are affected by introduced predators and are frequently subject to multiple impacts from a range of invasives. Predation by introduced dogs, pigs and mongooses, and habitat destruction by sheep, rabbits and goats, have been implicated in some cases. However, predation by introduced rats and cats, and diseases caused by introduced pathogens, are now recognised as the deadliest cause. For example, over half of the endemic birds of the Hawaiian Islands are now extinct, due to habitat loss, introduced predators and disease.

The number of plant invaders per island group can be predicted by a combination of human development (measured by the Gross Domestic Product (GDP) per capita), habitat diversity (number of habitat types), island age, and oceanic region (87% of variation explained). Island area, latitude, isolation from continents, number of non-native species present with a known invasion history, and native species richness were not considered to be significant factors. Multiple biome regions and temperate agricultural or urban sites are among the most invaded biomes, and deserts and savannahs among the least. In addition, communities richer in native species tend to have more, not fewer, exotic plant species. Indonesia is therefore extremely vulnerable to invasive plant species

Indonesia currently has the 4th largest global population (over 276 million people) growing at just over 1% per annum. It is the 14th largest country by land area with population densities of 144.18 people per

km². Rapid population growth coupled with high economic growth has contributed to the rapid depletion of natural resources, making Indonesia very vulnerable to environmental perturbations. Over the next couple of decades, the region's consumption rates are expected to increase even further with both rapid industrialization and urbanization. Much of the region's growth is dependent on natural resources, particularly forestry, putting considerable pressure on the environment and ecosystems which are also particularly susceptible to climate change. The impacts of climate change will be dire for Indonesia, largely driven by its unique economic and social characteristics, long coast lines, and mostly tropical climate

Insufficient baseline data: Current knowledge of invasive species for almost all countries in SE Asia is largely based on anecdotal evidence. Peh (2010)^[69] states: "The current research effort in invasion biology from SE Asia is not according to international standards in comparison to other regions, and the absence of recent international journal articles on invasive plant species reveals the biases in biological invasion related research. The lack of research capacity and financial support from governments, and the inability to disseminate scholarly data in international journals are the possible reasons for the dearth of research literature on biological invasions from the region." None of the research papers on biological invasions in SE Asia published in 2006-2008 had invasive plants as their subject, even though invasive plant species in the whole of SE Asia make up more than one third of the known total invasive biota. Peh (2010)^[70] concludes, "Given the lack of supporting baseline information, the applicability of invasive species management strategies formulated elsewhere to the spatially-challenging landscapes in SE Asia remains an open question."

Information resources on IAS are rather limited in Indonesia. Indonesia has comprehensive lists of native mammals and birds, and there has been a marked improvement in terms of developing a comprehensive database or list of IAS, especially IAPS, but there is virtually no information on their distribution and impacts. For the most part, *knowledge of IAS distribution is based on anecdotal evidence or unpublished reports, and the understanding of IAS impacts is limited by a lack of technical information, as well as a failure to understand the potential damage to ecosystem services and functioning caused by IAS, and the consequent economic losses and possible hazards to human health.* For example, in Indonesia the focus of discussions on IAS during the last 20 years has largely been about the presence of *Acacia nilotica* in Baluran National Park; the invasion of the native sugar palm (*Arenga obtusifolia*) in the Ujung Kulon NP; and *Merremia peltata* invasions elsewhere. There have also been reports, many anecdotal, on the presence and impacts of the giant sensitive plant (*Mimosa pigra*), water hyacinth (*Pontederia crassipes*), Siam weed (*Chromolaena odorata*), and other widespread IAS but little information on their distribution or management. However, IAS have been recently recorded in many national parks and agricultural areas as well as production and protection forests, though there is a lack of available accurate status reports.

Introduced species can benefit communities but at the same time they frequently threaten ecosystem services and functions as well as the economic activities of other communities/stakeholders. Indonesia has undertaken almost no analyses of the costs associated with the negative impacts of IAS, especially "conflict" species, and the benefits that accrue from their use. To date it has always been assumed that their benefits outweigh their costs, with no scientific assessment being undertaken. This applies

specifically to species that have been intentionally introduced for nitrogen fixation, animal fodder and fuelwood in agricultural systems. Furthermore, without clear information on the economic and human costs of IAS, it is not possible to prioritize species for action or to develop and implement national management strategies, especially regarding early detection and rapid response. Other results of this lack of knowledge include unwillingness among policy makers to interfere in the commerce and trade of exotic species, especially if they are reaping financial benefits from this trade; and the failure of PA managers to prevent and control IAS in the areas they manage although this aspect has improved significantly in the last six years despite limited funds.

Despite past efforts to strengthen the policy and institutional environment for IAS management in Indonesia it remains relatively weak, which means that critical information needed for informed decision-making is not widely shared among national stakeholders and therefore does not inform decision-making. Few of the senior managers responsible for PA system planning and management have extensive knowledge of IAS, and as a result, protected areas in general have demonstrated little willingness to act in dealing effectively with IAS threats and impacts. Although many people in Indonesia, including the inhabitants of agricultural areas adjoining PAs, have been impacted by several IAS and recognize the threat they pose, they don't have the knowledge or means to manage them effectively and sustainably. In many cases this leads to the over-use of chemicals to the detriment of biodiversity and human health.

Insufficient stakeholder involvement and coordination: The multisectoral nature of IAS issues demands the involvement of cross-government and non-governmental agencies, as well as a broad range of stakeholders from the private sector and public. This requires superior communication and coordination, and the establishment of platforms for this dialogue and planning to occur. In a synthesis of eight regional workshops on invasive species held around the world, including SE Asia, by the Global Invasive Species Programme (GISP) and three of its partners, every region identified six major gaps in common, namely: technical capacity, institutional coordination, political will, public awareness, policy and legal frameworks, and financial resources.

Representatives from South and SE Asia at the regional workshop organized by GISP in 2003 identified the following priority actions to improve coordination:

- a) Provide greater co-ordination between national institutions to permit consensus on IAS management;
- b) Establish or strengthen IAS focal points at all levels;
- c) Identify and define the roles of existing national and regional institutions;
- d) Identify lead agencies and prioritize programmes;
- e) Establish regional coordination mechanisms.

Although this workshop took place almost 20 years ago, many of these issues still haven't been resolved, including in Indonesia.

Despite numerous interventions since this GISP workshop coordination between all interested and affected partners remains a challenge in Indonesia. This can largely be attributed to the fact that

funding is largely sector-based, which hampers coordination. Pooling of resources to managed shared problems remains a challenge, an issue which will be addressed in this project.

Low IAS management capacity: Effective IAS management requires institutional, human and physical resources that are often unavailable in Indonesia. The physical infrastructure in Indonesia is barely sufficient for the agricultural sanitary and phytosanitary (SPS) and quarantine measures for which it was procured. At a regional workshop organized by GISP (2003) it became clear that additional resources were required, including human resource development, especially in taxonomy and information technology. The workshop also determined that there was a lack of capacity in terms of identifying and monitoring pathways. This is a challenge which remains today, especially regarding the identification and management of pathways.

Another ubiquitous problem in Indonesia is that many of the most competent professionals are required to take on multiple responsibilities, with substantial commitments to two or more jobs. As IAS are not yet a high priority for politicians and other national decision makers, they are rarely an operational priority for technical staff, particularly those species still absent from the national territory. Thus, preventative measures, the most cost-effective IAS management approach, are de-prioritised and under-utilised in developing countries, including those in Indonesia. This is especially still an issue for IAPS.

Another cost-effective management option, biological control, is also under-utilised, due mainly to a lack of knowledge and understanding of plant-insect/mite/pathogen interactions. This is despite the method being widely used in many developed countries as an important component of an integrated management strategy: it has been demonstrated that host-specific and damaging agents provide the most cost-effective, safe, and sustainable solution to IAS management and it is especially suited to countries that do not have significant resources for chemical and physical control. Indonesia has not released any agents for the biological control of invasive alien plants in 25 years. Previous biological control projects were also supported by international donors and not the Indonesian Government. This creates sustainability issues.

Insufficient resources: There are insufficient resources to effectively manage IAS. Although the situation regarding funding has improved over the last decade funds are still insufficient. According to Setyawati et al. (2021) data from three national parks suggested that the available funds for managing IAS are far from sufficient. There is no specific budget for IAS management and as such funding is usually sourced from more general projects such as the Ecosystem Conservation Program. On average, the IAS budget is only a small portion (3.5%) of the total budget for NP management (Setyawati *et al.*, 2021). The availability of these funds is also not guaranteed. Emergency funding for eradication of newly established species is also not available. The main driver of this is due to the very limited regulations addressing IAS threats (Setyawati *et al.*, 2021).

Gaps and Barriers

Analysis by the project design team shows that there are major gaps at national and subnational level in the following areas with regard to the management of IAS in Indonesia:

- ? Indonesia has a NISSAP, but it is outdated, with no targets, budgets and timelines;
- ? There is little coordination among all relevant sectors regarding IAS management. This may be resolved with the recent designation of the Coordinating Ministry for Maritime and Investment Affairs (KEMENKO MARVES) as the coordinating institution for IAS activities;
- ? Relatively weak institutional framework to deal with a cross-cutting issue;
- ? No integrated management plans and/or planning across all relevant sectors to prevent or reduce the introduction of IAS to Indonesia;
- ? Lack of adequate government support for research to determine the negative impacts of IAS in Indonesia including ways to mitigate their impacts;
- ? Very little information on IAS, especially that pertaining to impacts and control methodologies;
- ? Very little support for biological control;
- ? Little to know information on the economic costs of IAS, especially that pertaining to the costs and benefits of management interventions;
- ? Mixed messaging regarding costs and benefits of IAS;
- ? Very little awareness of IAS issues amongst all sectors of society;
- ? Most government authorities, particularly in the forestry sector, perceive IAS as less important than other forestry programmes such as rehabilitation, restoration and sustainable forest management;
- ? Lack of government awareness of the potential negative impact of IAS, resulting in very limited budget allocation for management.

These gaps are related to the needs expressed by the Indonesian government and research officials in 2003 (GISP). Although more than 18 years old they are still relevant as highlighted in more recent documents:

- 1) Conduct applied research to find alternative control methods;
- 2) Develop strategies and guidelines to control and eradicate IAS;
- 3) Establish national legislation on prevention and control of IAS;
- 4) Involve Masyarakat Adat and local people around national parks and managed forests to mitigate the impacts of IAS.

A paper presented by the Indonesian delegation to COP-9 in Bonn, Germany, in 2008, proposed the following ? see below. Some of these were addressed in a previous GEF-funded project, the regional United Nations Environment Programme GEF-4 *Removing Barriers to Invasive Species Management Program in Production and Protection Forest in SE Asia* (called FORIS in Indonesia) but need consolidation:

- An inter-agency coordinating committee, national strategy, defined agency roles and responsibilities linked to regional organizations/institutions;
- National strategy action plans, identification of initial management priorities and main threats (species and pathways), and initiation of regulatory gap analysis;
- Preliminary national surveys, official reference lists, continuing development of national and exotic invasive species databases;
- Training needs assessment and implementation of training for government officials, extension agents in agriculture, forestry, fisheries, and environment;

- Engagement of regional governmental institutions, stakeholders and trading partners in formulating coordinated strategies and frameworks, planning interventions, and raising public awareness to mitigate the threats posed by IAS to livelihoods, economies and biodiversity;
- A comprehensive regulatory framework, integration of international standards, risk assessment guidance and methodologies, strengthening of research/diagnostic capacity, larger scale eradication and management activities, and provision of protocols for clean exports;
- Provision of quarantine measures, monitoring and information systems, and training infrastructure, import screening and listing approaches, country/regional specific prevention measures, involvement in and promotion of regional and international standards;
- Improved early detection and rapid response capacity to mobilize small scale eradications; monitoring and warning systems to inform key agencies and stakeholders.

In line with the above, the following barriers to addressing the root causes have been identified.

Barrier 1: Weak policy and regulatory frameworks, and insufficient institutional capacities, resources and collaboration prevent collaborative management of IAS across sectors and institutions (addressed by Component 1)

Evolving national policy and institutional frameworks that still need to be strengthened: The first known quarantine regulation in Indonesia was promulgated in December 1877 (Law no. 262). Since then, it has largely been the responsibility of the Quarantine Department in the Ministry of Agriculture to develop and implement various regulations with respect to preventing the introduction of pests into Indonesia. The fact that the onus for this activity has fallen on agriculture has meant that the focus of prevention has largely fallen on those species that pose a threat to crop production. This is largely exemplified by the available Plant Quarantine Pest Lists. A list which was made available in September 2015 includes 235 insect species, 23 mites, 30 slugs and snails, 62 nematodes, 39 plants, 120 fungi, 55 bacteria, 11 phytoplasma and 117 viruses. It is interesting to note that the 39 species of plants listed are dominated by parasitic plants such as species in the genera *Cuscuta*, *Orobanche*, and *Striga*. Although *Parthenium hysterophorus*, a serious environmental weed, is included in the list, the main reason for its inclusion is the fact that it can significantly reduce crop yields through allelopathy. An updated (2020) list has two categories, A1 (quarantine pests that are not yet present in Indonesia), and A2 (regulated pests that are present in Indonesia but limited in distribution or being controlled). The quarantine pest list includes 229 species of insects, 23 mites, 29 slugs and snails, 66 nematodes, 31 parasitic plant species, seven non-parasitic plant species, 127 pathogens, 56 bacterial, 12 phytoplasma, and 131 viruses. In terms of regulated pests, 45 insect species, seven mites, two snails, 10 nematodes, two non-parasitic plant species (*Asystasia gangetica* and *Rivina humilis*), 28 fungi, 12 bacteria and 12 viruses have been listed. Despite there being many IAPS, which are not yet present in Indonesia, and pose a significant potential threat to biodiversity, only those that pose a threat to crop production are listed. No environmental weeds are included in the list of regulated pests. The Quarantine Pest List only focuses on those species that impact on crop production, and pests that may impact on the commercial forestry sector. The focus on agriculture, especially regarding quarantine, is also exemplified in the various legislations that the Ministry of Agriculture has passed since 1961 (see Table 5) to improve Indonesia's ability to manage IAS, with a focus on protecting the agricultural sector.

The focus on agriculture and commercial forestry has been of concern for some time. The NBSAP (2003) acknowledged that the introduction of exotic species has often been done with little consideration for the potential ecological implications and negative impacts on local species: 'Consequently their competition with local species often led to the loss of the latter.' Despite this reference to IAS the NBSAP only refers in any detail to the problem of *Acacia nilotica* in Baluran National Park. In the 4th National Report to the CBD (2009), the introduction of alien species is seen as one of the main threats to biodiversity. According to this report there are approximately 339 invasive alien plant species in Indonesia. Progress regarding the management of IAS by 2010 indicates that inspections for potential IAS are undertaken at ports in accordance with the IPPC and that lists of some invasive alien plants and animals have been produced, but that there are still no plans in place to effectively manage IAS, a programme which was supposed to be initiated in 2003. A related target was to have invasive species under control in Baluran, Wasur and Yosefa Strait. Water hyacinth and giant sensitive plant are still problematic in Wasur NP, while *Acacia nilotica* is still a serious problem in Baluran NP, despite the development of a management strategy during the FORIS project.

In the 5th National Report to the CBD (2014) IAS are again listed as one of the main threats to biodiversity and should be eliminated 'through executable action plans and strategy.' The report goes on to state that there is 'no data of species loss due to influx of alien species.' However, the report states that progress has been made with the drafting of regulations banning the importation of 296 IAS into Indonesia. National targets also include the prevention and eradication of IAS. One of the targets in the report was to develop an IAS Inventory and a Strategy.

The Indonesian Biodiversity Strategy and Action Plan (2015-2020) highlights 'the threats to the preservation of biodiversity is the presence of IAS. The IAS influence to a very large ecosystem because it can alter the natural ecosystem and cause degradation and loss of a species, even their habitat.' The Strategy has outlined several activities that need to be undertaken including 'IAS control through mapping of distribution, regulation, implementation and eradication.' Listed indicators include (i) Number of invasive alien species (IAS) prohibited in Indonesia; (ii) Number of regulations supporting IAS prevention in Indonesia; (iii) IAS distribution map in Indonesia; and (iv) Number of IAS prioritized for eradication. These tasks are supposed to be undertaken by the MoEF, MMAF, MoA, and the National Research and Innovation Agency (BRIN). There was also a call to build capacity in IAS management.

To address the bias in terms of IAS targeted for management, the Indonesian Government has enacted several new regulations in the past five years to support IAS management. For example, Ministerial Decree of Environment and Forestry No. 94/2016 contains a list of identified invasive plants and animals, as well as technical guidelines and training documents on IAS management, while the Quarantine Act (Act No 21, 2019) requires the monitoring of IAS and expands the scope of monitoring responsibilities of the Quarantine Agencies (Indonesian Agricultural Quarantine Agency, Agency of Agricultural Quarantine, Fish, and Quality Control (BLIPM) and relevant technical units). However, these regulations are not comprehensive and numerous gaps remain. For example, regulation P.94 focuses on protected landscapes and does not view abutting production landscapes; the Quarantine Act requires the monitoring of IAS but makes no provisions for control; and regulations controlling the movement of IAS only apply to points of entry into Indonesia, and not the movement of IAS within the country.

With regard to legislation on IAS, three sectors of fishery, agriculture and forestry have issued a number of regulations although they still need to be synergised. In addition, the list of 'invasive alien species' from the P.94/2016 was added to the mandate of the Indonesian Agricultural Quarantine Agency (IAQA) in 2016; this list requires update as the work of the IAQA is to prevent the movement of plants and diseases across the national borders and at major ports. Despite some advances, it is widely recognized that the existing applicable regulations still need to be improved to sufficiently prevent the entry of IAS into the Indonesia territory, including the development of regulation to control the movement of IAS between islands. Stronger policy and regulatory framework and sufficient institutional capacities, resources and cross-sectoral collaboration would likely to support the IAS prevention and control program.

Indonesia's planning frameworks for IAS are similarly constrained. The NISSAP was developed in 2015 and identifies a suite of activities for IAS management in the country; however, the NISSAP has no specific targets, timetables or budgets to enable implementation and thus functions only as a general policy document. Furthermore, although the NISSAP identifies specific institutions to carry out IAS management activities, there are no policies or directives that require the relevant ministries and institutions to work together to implement the plan. Combined with a lack of clarity regarding institutional responsibilities and the absence of any inter-institutional coordinating or information sharing mechanisms on IAS, the result is that existing IAS management by various ministries continues to be done independently of each other. To give one example, neither the Ministry of Trade nor the Ministry of Tourism and Creative Economy participate at all in biosecurity initiatives. Given the cross-cutting nature of IAS impacts, which can simultaneously affect biodiversity, water resources, crop, pasture and forest production, human and animal health, local livelihoods, etc., the failure of Indonesia to implement cross-sectorial approaches is a significant barrier to effective IAS management.

The policy environment of Indonesia regarding IAS management is largely fragmented and sometimes weak, largely because IAS management activities are still sector based and as such are there to support the mandate of that particular sector. There are several laws and policies relevant to IAS management in Indonesia (see Table 6 in the following section). The most important and relevant policy instruments are the NISSAP, developed during the FORIS Project, and Indonesia's NBSAP 2015 – 2020. The legal framework for IAS includes Law Number 21 (2019) on Animal, Fish and Plant Quarantine, which is the primary legal instrument covering prevention and quarantine. Decree Number P.94/Menlhk/Setjen/Kum.1/12/2016 on invasive species includes control measures for invasive species and mentions eradication (but does not provide specific guidance on procedures for IAS eradication). Efforts are also underway to update the list of invasive species attached to Decree Number P.94/Menlhk/Setjen/Kum.1/12/2016 and to formulate a regulation for Invasive Wildlife Species Risk Analysis (involving both MoEF and MoA). The Directorate General of Nature Reserve and Ecosystem Conservation Decree Number 4/KSDAE/SET/KSA.2/11/2019 on Procedures for Risk Analysis of Invasive Plants in Sanctuary Reserve Areas, Nature Reserve Areas, and Hunting Areas, which covers early detection/rapid response as well as control measures (in protected landscapes); Ministerial Decree of Marine and Fisheries No. 41 / 2014 on the prohibition of dangerous fish species entering Indonesia's territory; and Law 16/1992 Concerning Animal, Fish, and Plant Quarantine, which is the basic law regulating the introduction and spread of exotic species detrimental to agriculture and fisheries.

National capacity and institutional support: Taxonomy is the basic precondition for conservation and the sustainable use of our biotic environment. Taxonomic capacity building is thus essential to

secure biodiversity-related knowledge for future generations. In Indonesia the precise number and identity of introduced species is unknown and data on their distribution, rate of spread and other information is scarce. As a first step to providing data, an IAS inventory is required in collaboration with taxonomists and local expertise. This not only records the taxa present but acts as an identification tool, allowing others to record more detailed information on a variety of taxa. According to various country reports the major constraints to taxonomy in general are inadequate human resources, lack of interest by newly developed 'corps', and 'poor job opportunities in this field.' The lack of capacity in the identification of invasive and potentially invasive species is a major impediment to the effective management of IAS in Indonesia, including prevention, Early Detection and Rapid Response (EDRR) and even control. It is also a major barrier in determining the impacts of IAS on biodiversity, if knowledge on native species is poor.

It has to be mentioned that traditional and Masyarakat Adat knowledge associated with the management and use of native species developed and transmitted through generations of women and men, mostly Masyarakat Adat remains poorly documented. This culturally specific knowledge is threatened by cultural change and out-migration especially of younger generations from rural areas in search of education and job opportunities. There is a need for inclusive and culturally sensitive programmes placing Masyarakat Adat at the centre of the management and in respect of the Free Prior and Informed Consent, to favour the consideration of Masyarakat Adat Knowledge in the country. The number of unique and culturally distinctive Food systems practiced by Masyarakat Adat in Indonesia is unknown and requires further intercultural research. The evidence from the profiles undertaken by different actors is that the richness and variety of edibles wild, semidomesticated and domesticated utilized by Masyarakat Adat is much larger than those utilized in others agri-food systems. These findings coincide with similar evidence from the research undertaken since 2008 by FAO with Bioversity and McGill in different Indigenous Peoples' food systems across the world.^[71] FAO has specifically worked with Masyarakat Adat in one of the two project areas in order to profile their unique Masyarakat Adat food system.

IAS research capacity in Low- and Middle-Income Countries (LMIC) is generally very limited. The absence of well-established scientific communities with expertise in IAS management, who can produce basic and applied information, train biologists, and influence government policies is a serious impediment (Lawton, 2007). According to Nuñez and Pauchard (2009) 'an additional problem is that even if there is an emergent scientific community, there is little influence on policy-making.' A rapid assessment of articles on IAPS in Indonesia provides some interesting insights with more papers being published in the last 5 years, than in the previous 10. Most publications were on IAPS present in particular localities, especially protected areas, with very few papers on impacts and even fewer on management. Where the senior authors were Indonesian, affiliations were mainly with the Indonesian Institute of Sciences (LIPI) and 'Institut Pertanian Bogor' (IPB). Some senior Indonesian authors were based at universities in Australia or China. The scarcity of publications could be due to a lack of funding for ecological research, or the absence of expertise with regard to IAPS at tertiary institutions. That said the absence of information regarding IAS impacts is still lacking, even at a global level. According to Lawler et al. (2006) 'studies of invasive species are still lacking; despite the magnitude of the threat, they pose to global biodiversity.'

The dearth of publications on IAS management could be attributed to the fact that there are few IAS control interventions in Indonesia. The Directorate General of Natural Resources and Ecosystem

Conservation (previously the Directorate General of Forest Protection and Nature Conservation), in cooperation with FORDA (now the Agency for Research and Innovation, BRIN), has conducted some trials on IAS control in a few protected areas (Baluran N.P. and Bukit Barisan N.P.). Research on best management practices for *Acacia nilotica* and *Merremia peltata* in these two PAs were initiated during the FORIS Project. There have also been some trials to evaluate the effectiveness of stem injections using glyphosate versus manual control of *Arenga obtusifolia* in Ujung Kulon National Park. These trials were undertaken by the Yayasan Badak Indonesia (YABI) and NP staff. Master et al. (2021) evaluated the benefits of controlling (hand pulling) *Melastoma malabatricum* in Way Kambas NP in terms of benefits to prey populations of the Sumatra tiger. Although there has been some management of IAS in other areas there is no information as to if these interventions were based on any prior research to determine best management practices, or if control interventions were based on research done elsewhere. For example, there have been a number of interventions to control *Salvinia molesta* on Ranu Pani Lake in BTSNP (physical control); *Spathodea campanulata* in BBNP (stem injection); *Passiflora suberosa* in Gunung Gede Pangrango NP; and *Chromolaena odorata* and *Lantana camara* in Meru Betiri NP.

A review of the Plant Protection Profile for Indonesia (2006)^[72] makes for interesting reading, especially when compared to that for China (Table 3). There is no recent data, and it would appear that the figures of Indonesia are an estimate, since all provided figures are identical. In Indonesia, there are 3,000 designated staff members responsible for surveillance and control of field pests and migratory and periodically occurring pests, whereas it appears that there has been little or no work on surveys and eradication of invasive species, since there are no figures for staffing for this activity; numbers are either unknown or insignificant. There are also no figures for China in terms of eradication of invasive species, but this country has significantly more staff involved in surveillance and control of this group. This could be an indication that invasive species, especially invasive plants, are often neglected in Indonesia in favour of crop pests and diseases. However, the data is open to conjecture, and not only needs to be updated but also verified.

In 2005 Indonesia and China had 356 and 30,000 plant quarantine officers authorized to inspect/certify, respectively, compared to 600 in New Zealand in 2011 (Table 4). In 2005 Indonesia and China had 17 and 200 qualified personnel to undertake plant Pest Risk Assessments (PRA's), respectively, compared to only eight in NZ in 2011. In 2005 (Plant Protection Profile, 2006), Indonesia issued more than 120 import permits, undertook more than 43,726 import inspections, and issued more than 58,935 conventional phytosanitary certificates. Indonesia is also implementing its ISPM international measures, with only six of 27 measures not being implemented by 2005. According to the Plant Protection Profile the main constraint to full implementation is the number of different institutions involved, which means that harmonization takes time.

Table 3: Staff available in China and Indonesia (both in 2006) to undertake quarantine-related activities

| Staff activities | Numbers | |
|---|-----------|--------|
| | Indonesia | China |
| Number of designated staff for surveillance of field pests of national importance | 3,000 | 15,351 |
| Number of designated staff for surveillance of migratory and periodically occurring pests | 3,000 | 15,351 |

| | | |
|--|-------|--------|
| Number of designated staff for surveillance of invasive species | - | 8,692 |
| Number of designated staff for control of field pests of national importance | 3,000 | 29,512 |
| Number of designated staff for control of migratory and periodically occurring pests | 3,000 | 29,512 |
| Number of designated staff for eradication of invasive species | - | - |

Table 4: Available quarantine infrastructure in Indonesia and China (both 2006) and New Zealand (2011) (no recent data available)

| Infrastructure | Numbers | | |
|--|-----------|--------|-------------|
| | Indonesia | China | New Zealand |
| Number of plant quarantine officers authorized to inspect/certify | 356 | 30,000 | 600 |
| Total qualified personnel for plant PRA | 17 | 200 | 8 |
| Number of quarantine offices/stations | 43 | 5,557 | |
| Entry points | >200 | 598 | 21 |
| Post-entry plant quarantine containment facilities | 5 | 10 | |
| Number of quarantine service diagnosis laboratories | 6 | 63 | 2 |
| In-country recognized pest diagnostics capabilities (incl. universities, etc.) | | | |
| Number of laboratories for insect/mite arthropod samples | 45 | many | 2 |
| Number of laboratories for bacteria samples | 15 | many | 2 |
| Number of laboratories for virus samples | 4 | many | 2 |
| Number of laboratories for fungus samples | 15 | many | 2 |
| Number of laboratories for mycoplasma samples | 1 | many | 2 |
| Number of laboratories for nematode samples | 15 | many | 2 |
| Number of laboratories for plant/weed samples | 45 | many | 2 |
| Number of laboratories for other pests (snail, slug, rodents, etc.) | 1 | many | 2 |

Barrier 2: Limited knowledge, experience and capacities constrain the ability of resource managers, Masyarakat Adat, and local communities to manage IAS at the landscape level (addressed by Component 2)

Modest experience in IAS control and management: Limited knowledge, experience and capacities constrain the ability of resource managers, Masyarakat Adat, and local communities to manage IAS at the landscape level. Local stakeholders, including managers of protected areas and productive forest management units, local government officials, and local community members, have extremely limited experience with, understanding of, or capacities and tools to effectively manage IAS in the landscape. For example, Indonesia's protected areas managers and staff know very little about IAS pathways into PAs and the threat they pose to biodiversity, or about techniques and practices to prevent new IAS introductions or to manage IAS already present within PAs. Other local resource managers, extension officers and officials have even less experience, and in many cases probably are not even familiar with the concept of IAS. Moreover, most local officials, resource managers and extension staff frequently already have a wide range of responsibilities for which they are inadequately trained and equipped.

There are also few demonstrated models/approaches for managing IAS in Indonesia, and even where they have been tested (e.g., bio-control agents to control rice pests and some invasive alien plant species), there has been little to no monitoring and evaluation of the success or failure of these interventions. For example, there has been no monitoring of the impact of the biological control agent *Cecidochares connexa* on chromolaena. The lack of data has fuelled rumours that the agent is ineffective, increasing resistance to the introduction of agents. Furthermore, even though IAS spread across administrative boundaries, IAS management activities that do take place in the landscape are generally done by individual agencies with little to no participation from other agencies, Masyarakat Adat, or local communities. As a result, there is little experience and few mechanisms to address IAS threats with a landscape level approach that can prevent IAS impacts from spreading from one area to another. There is also no common understanding in the country of invasion pathways or even which species are invasive, especially plants, and as a result approaches to IAS management differ widely. For example, forestry and agricultural production units often promote the use of invasive species, frequently without understanding that these species have an ability to escape cultivation and spread widely through a landscape. Most Protected Area Management Plans do not address IAS, and in cases where PAs have tested IAS management activities, any lessons learned are rarely shared with other PA units in the country.

That said there have been several experimental interventions to control invasive plants in Indonesia with a number of projects focusing on the introduction of host-specific biocontrol agents (see Table 7 in the following section). There have also been activities in the past to control invasive species in Baluran NP and Bukit Barisan Selatan NP. Moreover, there has been ongoing management of sugar palm (*Arenga obtusifolia*) in Ujung Kulon NP by the Rhino Foundation of Indonesia (YABI) and other stakeholders. There have also been attempts to control *Spathodea campanulata* in BBNP and *Salvinia molesta* in BTSNP. More recently KEMENKO MARVES supported the management of water hyacinth on several water bodies in Indonesia, outcomes of which are still to be determined. However, many of these interventions have been ad hoc with no attempts to manage targeted IAS at a broader landscape or national level. Interventions are initiated without a well-defined plan, especially regarding follow-up work and associated budgets. A major impediment is the absence of a national IAS management strategy.

Barrier 3: Lack of awareness and understanding of the negative ecological and socio-economic impacts of IAS (addressed by Component 3)

A low but growing level of awareness: According to the Indonesia Biodiversity Strategy and Action Plan (2015-2020), one of the factors leading to biodiversity degradation is the low level of awareness and understanding of biodiversity in Indonesia. According to Parker (2018) there is a 'general lack of awareness and knowledge of the natural environment and of the impact of humans on the natural world among the Indonesian population.' According to the World Bank (2014), 'Environmental values are not deeply embedded in society, leading to undervaluation of natural resources and environmental services.' There is a lack of capacity and environmental understanding among government officials (Parker, 2018). As such, one can assume that there is little awareness as to the presence and impacts of IAS, especially those impacting on biodiversity.

In order to acquire some baseline data on IAS awareness levels in Indonesia during the PPG of the FORIS Project, local community members and park staff, in five national parks, were asked questions

pertaining to IAS. Park staff knew considerably more about IAS than the local community. For example, 55% of park staff compared to only 5% of respondents in communities understood/knew the difference between native weeds and introduced invasive plants. More than 60% of staff in the five parks were able to give an example of an IAS compared to only 10% in neighbouring communities. Most park staff received information on IAS from park communiqu?s, with the internet being the second most common source of information, whereas 60% of those living in the community heard about IAS from neighbours or friends. However, despite the development and implementation of a Communication Strategy during the FORIS project it was obvious that many respondents were still unclear as to the definition of IAS. In fact, many were confused with the messaging, an indication that the majority of people still struggle with the definition of IAS, their impacts and management. There is also limited inclusion of IAS issues in school and university curricula, which would contribute to raising awareness and understanding on IAS.

The negative impacts of IAS on our ecosystems are well established and these are in large part due to limited information disseminated to the public. Until presently, the impact of IAS on ecosystems is still not well understood by the public. Even at the decision-making level, IAS threats have not yet become a priority. There are several obstacles faced besides the lack of scientific data and information related to these negative impacts. In the restoration program, there have been many promotions using local native species, but for the rehabilitation of degraded land outside the conservation areas, the use of exotic species is still recommended considering their fast growth. In addition, most of the local plant species, especially those that are endemic, are slow-growth species, such as meranti (*Shorea sp.*) which is a local species in Kalimantan and Sumatra compared to the fast-growing *Acacia sp.* from Africa and Australia. In 2021, the government has encouraged the improvement of the quality and quantity of agricultural and fishery products in order to strengthen food security and improve the welfare of farmers and fishermen.

The data presented from the press release of the Coordinating Ministry of Economy in 2021 stated that the agricultural sector remained resilient during the COVID-19 pandemic with the contribution of export value reaching USD 0.4 billion or 3% of Indonesia's total exports. However, it is also necessary to think about understanding the relationship between economic health, ecosystems, supply of goods and services, and the productivity of other sectors besides agriculture and fisheries. We need to be concerned about the impact of IAS, specifically on crop and livestock production. This is partly due to the impact of IAS, in particular the financial costs associated with plant and animal invasions, and this is still poorly understood and studied. Meanwhile, several types of animals and plants from abroad were introduced in Indonesia, including requests from collectors of exotic species. Exotic plant species are also introduced for industrial forest plantations and rehabilitation without considering the potential to be invasive, and the possible impact on the ecological function of the forest ecosystem. The precautionary principle still needs to be improved so that the impact can be minimised and even prevented through the application of the proper risk analysis.

(2) Baseline scenario and any associated baseline projects

National policies and plans

Several national regulations and policies address biodiversity management and mention IAS in particular, including those on horticultural regulation, animal quarantine, conservation of natural

resources and environmental impact assessments. A list of key legislation and regulations can be found in Table 5. A summary of other policies and plans related to IAS and PA management more broadly relevant to the Project can be found in Table 6 below. These all have relevance to the project, especially Component 1, which addresses issues related to prevention and the role of quarantine. Most of these have focused on preventing the introduction of crop pests, with little attention to those species which may impact on biodiversity. These will be further reviewed early in Project implementation under Output 1.1.1.

Table 5: List of Key Legislation/Regulations/Rules related to Quarantine and Agriculture^[73]

| Date | Legislation |
|------|---|
| 1961 | Exportation from the Territory of the Republic of Indonesia of Plant Propagating Materials on Regulation of the Minister of Agriculture No. 6/PMP/1961. |
| 1984 | Importation into the Territory of the Republic of Indonesia of Plant Growing Media on DOMOA No. 797/Kpts/TP.830/10/1984. |
| 1985 | Plant Quarantine Requirements for the Importation of Plant Propagating Materials of Coconut, Oil Palm, Cocoa, Rubber, Coffee, Tea, Sugarcane, and Tobacco on DOMOA No. 559/Kpts/KB.630/8/1985. |
| 1985 | Domestic Plant Quarantine on DOMOA No. 809/Kpts/LB.710/12/1985. |
| 1989 | Prevention on the Introduction into the Territory of the Republic of Indonesia of South American Leaf Blight of Hevea on DOMOA No. 861/Kpts/LB.720/12/1989. |
| 1989 | Eradication for Khapra Beetle (<i>Trogoderma granarium</i> Everts) on DOMOA No. 799/Kpts/LB.710/10/1989. |
| 1990 | Plant Quarantine Requirements and Actions in relation to the Importation into the Territory of the Republic of Indonesia of Plants and Plant Propagating Materials on DOMOA No. 38/Kpts/HK.310/1/1990. |
| 1994 | Law 5/1994 on the Ratification of the Convention on Biological Diversity (CBD), which includes a mandate for IAS management. |
| 1995 | Importation into the Territory of the Republic of Indonesia of Biological Agents on DOMOA No. 411/Kpts/TP.120/6/1995. |
| 1995 | Formation of Biological Agent Commission on DOMOA No. 412/Kpts/KP.150/6/1995. |
| 2001 | Actions and conditions of quarantine plant for the entry of plant and seedling into the territory of the Republic of Indonesia, lastly amended by the decree of the Ministry of Agriculture Number: 211/Kpts/HK.310/2001 on DOMOA No. 469/Kpts/HK.310/8/200. |
| 2002 | Government Regulation of the Republic Indonesia No. 14 of 2002, concerning Plant Quarantine. |
| 2006 | Concerning requirements and guideline for Quarantine Installation Establishment for Private on DOMOA No. 05/Permentan/HK.060/3/2006. |
| 2006 | Concerning requirements and guidelines for the Implementation of Plant Quarantine action by third party on DOMOA No. 271/Kpts/HK.310/4/2006. |
| 2006 | Concerning the Implementation of Plant Quarantine action conducted import and exit points on DOMOA No. 18/Permentan/OT.160/5/2006. |
| 2006 | Concerning addition requirements on DOMOA No. 52/Permentan/OT.140/10/2006. |
| 2019 | Act No. 21/2019 ? Animal, Fish and Plant Quarantine Establishes the requirements for protecting animals, fish and plants by preventing the entry and exit, and spread of deleterious organisms and as such has direct reference to IAS. It also aims to control and supervise the following sectors: food safety/quality, animal feed safety/quality, genetically engineered species, genetic resources, biological control agents, alien species, wild plants and animals, and endangered animals in Indonesia. |

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|------|--|
| 2020 | Decree of MoA No 25 of 2020 concerning Plant Pest Quarantine |
|------|--|

Table 6: Summary of applicable or related IAS and PA policies in Indonesia apart from those listed above.

| Policies | Relevance |
|--|---|
| National Invasive Species Strategy and Action Plan (2015) ^[74] | Plan to identify invasive species and priority actions to address their threats to the environment, economy and livelihood of people. |
| National Biodiversity Strategy and Action Plan (NBSAP, 2015-2020) | Plan to protect biodiversity from various threats including IAS. |
| Act No. 5/1990 ? Conservation of natural resources and ecosystems | Deals with all issues related to the conservation of biodiversity and as such has relevance to IAS. |
| Act No.12/1992 ? Legislation on the cultivation systems of plants | Refers to the management of pests in crop production systems which would include IAS |
| Government Regulation No. 28/2011 jo Government Regulation No. 108/2015 ? Management of Nature Reserve Areas and Nature Conservation Areas | Deals with the proclamation and management of protected areas Conservation Area. This Regulation is issued to determine nature reserve and conservation areas with the management consequences. It may be in-line with the environmental protection from invasion of IAS. But there is an anomaly where most of National Parks in Indonesia (one of conservation areas) are invaded by invasive alien plant species. Let alone the production forests, or villages where people are usually found invasive alien plant species. |
| Government Regulation No. 7/1999 ? Preservation of plants and wildlife | Conservation, sustainable use, and fair sharing of benefits arising from the utilization of biodiversity. |
| Government Regulation No. 8/1999 and its derivative through Decree of the Minister of Forestry No 447/2003 | Deals with the harvest, capture and dissemination of wild plant and animal species including CITES |
| Government Regulation No. 27/1999 - Environmental Impact Assessments | Mainly deals with the need to undertake EIA's |
| Act No. 41/1999 ? Forestry | Conservation of forests, including restoration/rehabilitation. Also refers to the management of pests and diseases |
| Act No. 19/2004 ? Substitution to Act No. 41/1999 | Amendment of above Act |
| Government Regulation No. 45/2004 ? Protection of forest | Reduce damage to forests due to illegal logging, fuelwood extraction, landslides, pests and diseases, wildfire, etc. |
| Government Regulation No. 6/2007 ? Management of Forest | Forest arrangement, including utilization. |
| Government Regulation No. 3/2008 ? Substitution to Act No 6/2007 | Amendment of above Act. This Act alludes to the fact that invasive alien plant species cannot be removed from protected forests. |

| | |
|--|---|
| Law No. 32/2009 on Environmental Protection and Management | Conservation and sustainable utilization of natural resources, including the need to undertake environmental impact assessments (EIAs) and prevent loss of biodiversity |
| Ministerial Decree No. 94/2016 | Lists, for management, some invasive alien species in Indonesia. |
| Regulation of the Minister of Environment and Forestry No. P.85/Menhut-II/2014 jo. Regulation of the Minister of Environment and Forestry P.44/Menlhk/Setjen/Kum. 1/6/2017 | Procedures for Cooperation in the Implementation of Nature Reserve Areas (KSA) and Nature Conservation Areas (KPA) |
| DG of NRCE Regulation Number P.6/KSDAE/SET/Kum.I/6/2018 | Technical guidance of conservation partnerships in conservation areas (nature reserve, NP, etc.) |
| Regulation of the Director-General of Natural Resources and Ecosystem Conservation no. P4/Ksdae/Set/Ksa.2/11/2019 | Procedures for Risk Analysis of Invasive Plant Species in Nature Reserve Areas, Nature Conservation Areas, and Hunt Parks |

Additionally, the Government of Indonesia issued Government Regulation 29 of 2021 (GR 29/2021) in early 2021, an implementing regulation to the Omnibus Law and which makes changes on issues of trade, particularly in areas such as the distribution of goods, exports, and imports, and the activities of foreign investment companies in the retail sector, among others.

The government also introduced several implementing regulations to GR 29/2021, in the form of Ministry of Trade Regulation 24 of 2021 (MOT Reg 24/2021) and Ministry of Trade Regulation 17 of 2021 (MOT Reg 17/2021) which sets out the framework for the distribution of goods and the facilitation of import and export activities.

Previous and ongoing programmes and initiatives on IAS in Indonesia

Table 7 includes a summary of previous IAS interventions in Indonesia. The proposed Project builds closely on the experiences and knowledge gained from these interventions.

Table 7: Summary table of past IAS interventions/projects in Indonesia

| Interventions/Projects | Date and location | Content | Key implementing agencies |
|--|--|---|---|
| Biological control of <i>Chromolaena odorata</i> in Indonesia and the Philippines, funded by the Australian Centre for International Agricultural Research (ACIAR) | 1993-1996, Sumatra, Java, Timor | Rearing, host specificity testing, and release of biocontrol agent <i>Pareuchaetes pseudoinsulata</i> | Indonesian Oil Palm Central Research, SEAMEO BIOTROP, Gajah Mada Univ., Nusa Cendana Univ. |
| Biological control of <i>C. odorata</i> in Indonesia and Papua New Guinea, funded by ACIAR | 1996-1999 Sumatra, Java, Timor, Kalimantan, Sulawesi, West Papua | Rearing, host specificity testing, and release of biocontrol agent <i>Cecidochares connexa</i> | International Oil Palm Research Institute, SEAMEO BIOTROP, Gajah Mada Univ., Nusa Cendana Univ. |

| | | | |
|---|---|--|---|
| Biological control of <i>Mimosa pigra</i> in SE Asia funded by ACIAR, and partly by the Indonesian Government | 1993-1998, Sumatra, Java Kalimantan | Rearing, host specificity testing, and release of <i>Carmentis mimosa</i> , <i>Acanthoscelides quadridentatus</i> and <i>A. puniceus</i> | SEAMEO BIOTROP |
| Taxonomy, ecology, and biological control of <i>M. pigra</i> | 1998 | Studies on the taxonomy, ecology, and biological control of <i>M. pigra</i> | Biological Research and Development Centre, Indonesian Institute of Sciences (LIPI) |
| Biological control of <i>Pontederia crassipes</i> in Indonesia, funded by ACIAR and partly by the Indonesian Government | 1993-1998, West Java, Sumatra, Kalimantan | Rearing, host specificity testing and release of <i>Neochetina bruchii</i> | SEAMEO BIOTROP |
| Biological control of <i>Salvinia molesta</i> , funded by the Indonesian Government | 1993-1998, West Java, Sumatra | Rearing, host specificity testing, and release of <i>Cytobagous salviniae</i> | SEAMEO BIOTROP |
| Biological control of <i>Mimosa diplotricha</i> , funded by Kelian Equatorial Mining Co. and BIOTROP | 2000-2003, West Java, Lampung (southern part of Sumatra) Kalimantan | Rearing, host specificity testing of <i>Heteropsylla spinulosa</i> | SEAMEO BIOTROP |
| Biological control of <i>S. molesta</i> , funded by the Indonesian Government | 2003-2004 | Rearing and host specificity testing of <i>Cytobagous salviniae</i> | Bogor Agricultural University, SEAMEO BIOTROP |
| Ecological impact of biocontrol agents introduced in West Java, funded by the Indonesian Government | 2001-2003 | The impact of <i>Neochetina eichorniae</i> , <i>N. bruchii</i> and <i>Cecidochara connexa</i> on arthropod populations in West Java. | Bogor Agricultural University (IPB), SEAMEO BIOTROP |
| Biological control of <i>Leucaena leucocephala</i> pest, <i>Heteropsylla cubana</i> in Indonesia | 1995-1997, nationwide | Introduction of parasitoids of <i>H. cubana</i> | Ministry of Agriculture |
| Corporate Social Responsibility (CSR) project | 2007-2008, Lampung | Controlling <i>Merremia peltata</i> and restoration of 2,000 ha | PT Arta Graha |
| IAS management and control | 2010-2011, Bukit Barisan Selatan NP | Control and management of IAS (study on <i>Merremia peltata</i> in TNBBS) | Research Centre for Conservation and Rehabilitation |

| | | | |
|--|--|---|--|
| Management of <i>Merremia peltata</i> , funded by GEF (FORIS Project) | 2011-2015, Bukit Barisan Selatan NP | Development and implementation of best management practices for <i>M. peltata</i> . | FORDA and BBSNP |
| National Park management | 2007-2009, East Java | Management of <i>Acacia nilotica</i> and habitat/ savannah restoration | Baluran NP |
| Management of <i>Acacia nilotica</i> , funded by GEF (FORIS Project) | 2011-2015, Baluran NP | Development and implementation of best management practices for <i>A. nilotica</i> | FORDA and BNP |
| National Park management | 2007, Ende District, Flores Island, NTT Province | Identification and effective control of weeds <i>Vaccinium varingaefolium</i> and <i>Rhododendron renchiarorum</i> | Kelimutu NP |
| Strengthening Quarantine Control System for IAS (FAO Project: TCP /INS/3203) | 2009-2011, nationwide | Establish policy and regulations regarding IAS management, conducted training on increasing awareness of IAS | Indonesian Agricultural Quarantine Agency, MoA |
| National Park management, funded by Rhino Foundation | 2008-2009, Ujung Kulon NP, Banten | Technique for habitat management implementation to delay langkap invasion (<i>Arenga obtusifolia</i>) in Ujung Kulon NP (2004) Optimalization of Javan rhino habitat through <i>A. obtusifolia</i> control (Ujung Kulon NP) (2008-2009) <i>A. obtusifolia</i> control and management (Ujung Kulon NP) (2009-2010) | Ujung Kulon NP, Rhino Foundation |

| | | | |
|---|---|---|---|
| National Park management | 2009-2010, West Java | Inventory of IAS in TNGGP Control of IAS Control/eradication of IAS Monitoring and mapping of IAS Establishment of strategic plan for IAS management in TNGGP | Gunung Gede Pangrango NP |
| Implementation of national conservation strategy | 2009-2011, many sites | Action plan for IAS management | Directorate of Biodiversity Conservation (MoF) |
| Management of <i>Salvinia molesta</i> , funded by JICA | 2015-2020, Bromo Tengger Semeru NP | Removal of <i>S. molesta</i> from Lake Ranu Pani | Japan International Cooperation Agency (JICA), in cooperation with the Biology Division at the School of Mathematics and Sciences of Brawijaya University, the Forestry Ministry, and the Bromo Tengger Semeru NP. |
| Management of <i>Spathodea campanulata</i> | 2015-2020, Bantimurung Bulusaraung NP | Control of <i>S. campanulata</i> using stem injection | BBNP |
| Control of <i>Arapaima gigas</i> | 2018, Brantas River watershed, East Java. | Raising awareness about threat and encouraging capture and termination | Office of Fish Quarantine and Quality Control (BKIPM) together with the MoEF. |

Previous FAO Technical Cooperation Program (TCP) Project and UNEP GEF-4 FORIS Project

In 2009 the Indonesian government received funding from FAO to execute the project entitled *Strengthening Quarantine Control Systems on Invasive Alien Species (IAS)* (TCP/INS/3203). The Minister of Agriculture was appointed as the implementing agency and delegated the execution of the project to the Indonesian Agricultural Quarantine Agency (IAQA). A training course on the Risk Analysis of imported plants was given by an expert from FAO, conducted at BIOTROP, Bogor, Indonesia. The concept of the invasive alien species was inclusive covering not only plants, but also animals and fishes. References were listed covering (1) class: Mollusca, Fish, Insect, Mammals, Amphibian, Aves, Reptile, Microorganism.

In 2011 the Indonesian government received another GEF grant (GEF-4) under the United Nations Environment Programme entitled: *Removing Barriers to Invasive Species Management in Production and Protection Forest in SE Asia* (GEF ID 3957). The project executing organization was the Centre for Agriculture and Bioscience International (CABI) and the participating countries in the Southeast Asia Region were Cambodia, Indonesia, Philippines, and Vietnam. The project was aimed at enhancing the capacity of four pilot countries to manage IAS, particularly in forest ecosystems, by strengthening

existing national frameworks for the management of IAS. The Project was informally known as FORIS.

The FORIS project has supported and facilitated the Government of Indonesia in the development of: (1) Ministerial Decree no P.94/MENLHK/SETJEN/KUM.1/12/2016 issued by the Minister of Environment and Forestry, on the Invasive Alien Species management, (2) Regulation issued by the Director General of Natural Resource and Ecosystem Conservation of Ministry of Environment and Forestry Number P.4/K.SDAE/SET/KSA.2/11/2019 on the management of invasive plant species in protected forest areas, and the accompanying (3) Guidance for Invasive Alien Plant Species surveying, (4) the Early Detection & Rapid Response Procedure for Invasive Alien Plant Species, and (5) the National Strategy and Action Plan for the Management of Invasive Alien Plant Species in Indonesia (NISSAP).

The NISSAP in Indonesia was published by the National Development Planning Agency and supported by the Ministry of Environment and Forestry, Ministry of Agriculture and Ministry of Marine and Fisheries in 2015. The book contains the Management Policy of Invasive Alien Plant Species of Indonesian Government, the corresponding Institutions, and coordinated works among Institutions to implement the policy. However, these coordinative works could not be implemented, because of lack of funds.

The Policy on Invasive Alien Plant Species published in 2015, also known as the NISSAP, consisted of 7 points; (1) Prevention, (2) Early Detection and Rapid Response Systems, (3) Control of Invasive Alien Species and Mitigation, (4) Restoration, (5) Capacity Building, (6) Information management, and (7) Cooperation among the institutions nationally, regionally and internationally.

Global and regional initiatives

Several regional and international institutions have contributed to IAS management in Indonesia and continue to do so. The ASEAN Centre for Biodiversity (ACB) was established in 2005 in recognition of the need to create a regional centre of excellence to strengthen the capacity of ASEAN Member States to formulate and coordinate biodiversity related policy, strategy and action; to fulfil treaty obligations; and to promote and advance common positions on matters related to biodiversity conservation, and the management and sustainable use of natural resources. Since its establishment it has been involved in the field of policy coordination and capacity building, including regional workshops on urban biodiversity, climate change and biodiversity, transboundary cooperation, the enforcement of bio-safety regulations, the preparation of biodiversity indicators, a gap analysis on marine protected areas, and many others. These activities have been conducted in different locations across the ASEAN region. It responds to the needs of the ASEAN Member States in the areas of access and benefits sharing, agro-biodiversity and biosafety, biodiversity information management, business and biodiversity, climate change and biodiversity, ecotourism and biodiversity conservation, global taxonomic initiative, invasive alien species, payment for ecosystems services, peatland management and biodiversity, protected area management, and wildlife enforcement. The ACB has been involved in awareness creation and capacity building on IAS and was one of the organizers of a regional workshop on IAS in SE Asia in 2008. The ACB website hosts significant awareness material on IAS, including videos and other resources^[75]. The SMIAS project will coordinate and exchange closely with the activities implemented by ACB.

SEAMEO-BIOTROP (Southeast Asian Ministers of Education Organization - Southeast Asian Regional Centre for Tropical Biology) is based in Bogor, Indonesia, and is one of 15 centres under SEAMEO under the mandate of its Governing Board. SEAMEO-BIOTROP activities emphasize the empowerment of human resources in SE Asia. The activities cover research, training, networking, personnel exchange and information dissemination in tropical biology, including issues related to IAS. It has on-going programs and research on IAS pathways, biological characteristics and control measures, facilities for testing the introduction of biological control agents into the country, as well as capacity building programs on IAS management. SEAMEO BIOTROP can play a key role in (i) facilitating the introduction of host specific and damaging biocontrol agents to manage IAS and (ii) identifying invasive alien plants and animals that should be subject to a ban. SEAMEO BIOTROP can also share its experience with IAS management in Gede Pangrango NP and elsewhere.

FAO has published several technical papers on Invasive Alien Species including their impact on forests and forestry[76], fisheries and aquaculture[77], and crops. From 2009-2011, FAO implemented a Technical Cooperation Program (TCP) Project in Indonesia, *Strengthening Quarantine Control System for IAS* (TCP /INS/3203). FAO and the CBD Secretariat signed a Memorandum of Cooperation for the International Plant Protection Convention (IPPC) and CBD Secretariats in 2004. A joint work programme for the two Secretariats has been agreed in developing guidance on how IAS, which are also quarantine pests of plants, should be regulated under the IPPC framework. FAO also developed a Guide to implementation of phytosanitary standards in forestry (2011).[78] The SMIAS project will build on the technical expertise and global standards developed by FAO. Additionally, in 2022-2023, FAO's Forestry Division will implement Forest Health and Protection activities at the global level funded by the USDA Forest Service, which will benefit the SMIAS project in Indonesia. The planned activities include: (i) strengthening of the Regional Forest Invasive Species Networks; (ii) organization of technical training workshops covering general forest pest (insect, disease and weeds) concepts; and (iii) the development of a guide for biosecurity measures for forest pests.

The Asian-Pacific Forest Invasive Species Network (APFISN) was established in 2003 in response to the immense costs and dangers posed by invasive species to the sustainable management of forests in the Asia-Pacific region. It is a cooperative alliance of the 34-member countries in the Asia-Pacific Forestry Commission (APFC) ? a statutory body of the FAO. The network focuses on inter-country cooperation that helps to detect, prevent, monitor, eradicate and/or control forest invasive species in the Asia-Pacific region. Recent activities include the development of a regional strategy for implementing activities of the network and assistance to countries with the preparation of reports on forest invasive species. Other activities include the 2008 workshop in Kuala Lumpur on 'Forest Health in a Changing World' organized with IUFRO. APFISN also hosted a training workshop on forest invasive pests, which was held in Haikou, Hainan, China in 2016. The SMIAS project will work closely with APFISN, especially with regard to the dissemination of information on best IAS practices.[79]

CABI, IUCN and TNC were founding members of the Global Invasive Species Programme (GISP) which has subsequently been subsumed by CABI. Much of the material developed by GISP now resides with CABI and IUCN and can be made available to various stakeholders involved in IAS management in Indonesia. In fact, the International Ocean Institute Southern Africa in partnership with CABI have re-launched the GISP Website (www.GISP.org) where relevant material such as 'Deadly Drivers of Change: Invasive Species and Climate Change Coming to an Ecosystem Near You' and 'Mainstreaming gender into prevention and management of invasive species' can be downloaded.

GISP developed the Global Strategy on IAS, jointly with the Scientific Committee on Problems of the Environment (SCOPE) in 2001. The SMIAS project will build on the materials and knowledge developed by GISP.

National programmes and initiatives

Three government agencies, namely the i) Ministry of Environment and Forestry, ii) Ministry of Agriculture, and iii) Ministry of Marine Affairs and Fisheries are responsible for environmental issues notably including management of IAS.

The current lack of national coordination between the Ministries and regarding IAS is apparent. Despite the development and endorsement of a NISSAP implementation thereof has been hampered by the absence of an effective coordination unit. Indonesia has tried to address this lack of coordination through the Coordinating Ministry for Maritime and Investment Affairs (KEMENKO MARVES). The Ministry has formed a new Deputy for Coordination of Environment and Forestry (under Presidential Decree No 92/2019 and Ministerial Decree No 2, 2020), which has plans to establish a National Biosecurity Task Force. KEMENKO MARVES is already coordinating some IAS management activities by leading a national effort among several technical line ministries to collaboratively address the significant threat posed by water hyacinth (*Pontederia crassipes*) in 40 priority lakes throughout the country. However, there is still uncertainty as to how IAS activities in general, including enforcement of regulations will be coordinated and funded.

The Ministry of Environment and Forestry (MoEF) is the focal point for the CBD in Indonesia. The Ministry undertakes programmes on biodiversity conservation planning, including taking a lead in developing national strategies for IAS and action plans in collaboration with other relevant government agencies. The Directorate of Biodiversity Conservation on Species and Genetic of the Directorate General of Nature Resources and Ecosystem Conservation (DG KSDAE) within MoEF has a budget of USD 78,975 / year specifically for policy and technical work on IAS prevention and management at the national level and in ten national park sites. In addition, MoEF has allocated USD 7.7 million/year for ecosystem restoration (enrichment planting of trees) within the national park system; the proposed project will work with MoEF to expand the scope of this program to include IAS management activities. The Directorate for Conservation Areas Management within DG KSDAE is responsible for managing most of the country's protected area system (excluding most marine protected areas). Within MoEF, capacity building has been provided to the Agency for Forestry Human Resource Development and Extension and the Directorate of Biodiversity Conservation on Species and Genetic to identify IAS, carry out Risk Assessments, and conduct inventories / mapping of IAS in all conservation areas. Although protected area management plans are supposed to include an assessment of IAS threats and propose responsive management measures, at present most PA management plans pay little attention to IAS, and KSDAE is currently reviewing Ministerial Regulation Number 48 (2014) on Guidelines of Ecosystem Restoration in Nature Reserves and Nature Conservation Areas to better integrate IAS issues. In addition, the Biodiversity Conservation on Species and Genetic Directorate under DG KSDAE takes the lead in conservation programs focusing on keystone species; including several dozen large, long-term programmes to conserve keystone species. In cases where the target keystone species are threatened by IAS, activities to mitigate their impact and restore habitats are supposed to be undertaken. MoEF has an existing technical training centre within the Agency for Extension and Human Resource Development, which has experience drafting technical guidelines and training

materials on IAS prevention and risk analysis and will be further capacitated to continue to play a key role in the development of training materials under Component 3. The Ministry of Agriculture (MoA) is involved in agricultural issues related to food stocks and security, horticulture, quarantine, livestock and veterinary issues, agricultural products and processing, community empowerment and agricultural extension, infrastructure, and research and development in agricultural commodities. The institution within the MoA involved in the management of IAS is the IAQA, which has mandates to develop technical guidance, planning and programmes for plant and animal quarantine, including natural resource protection and monitoring; implementation of plant and animal quarantine and monitoring natural resource security; monitoring, evaluation and reporting of the programme implementation and administrative procedures. There are two centres that are directly involved in the management of IAS: the Center for Plant Quarantine and Plant Biosafety and the Center of Animal Quarantine and Biosafety. The Center for Diagnostic Standard of Agricultural Quarantine, the Applied Research Institute of Agriculture Quarantine, and all Regional Agricultural Quarantine Services have a mandate from the IAQA to implement policies and regulations issued by the IAQA.

The IAQA has 52 offices throughout the country, and their actions make a significant contribution to the management of IAS in Indonesia. The IAQA is responsible for preventing the entry, exit, and spread of animal quarantine diseases (for animal) and quarantine pests and diseases (for plant) at the border. If an invasive plant or animal has been introduced and established in Indonesia, the Regional Agricultural Quarantine Services under the IAQA coordinates with the local government and the regional services under the Directorate General of Conservation of Natural Resources (BKSDA) that have the responsibility to control the introduction or the establishment of IAS in Indonesia. These regional agencies are established across the country at the Provincial level, and in some cases also at the district level. The IAQA has trained its staff in surveillance and risk analysis on IAS; established an updated list of IAS in Indonesia to improve surveillance at pre-border and entry points; and created an IAS information management system in collaboration with the FAO project *Strengthening Quarantine Control System on Invasive Alien Species*.

The Indonesian Ministry of Marine Affairs and Fisheries has two directorates that deal directly and indirectly with the management of IAS: (i) The Agency for Fish Quarantine, Quality Control and Fishery Product Security has as its mandate, amongst others, the protection and development of aquatic resources and quality control, including quarantine services. This Agency has a technical division namely the Fish Quarantine Institute which operates and implements quarantine programmes at two international airports. Under this agency, there are also Fish Quarantine Stations which are located at every port in Indonesia where fish is handled. These agencies meet on a regular basis to evaluate the status of the national and international fish trade and its role in the movement and introduction of pests and diseases; and (ii) The Agency for Aquaculture Research and Development has a mandate to implement research related to IAS in aquaculture. Under this research agency, there is the Centre for Aquaculture Research and Development which is largely responsible for research on, amongst others, pests and diseases of fresh water, swamp and oceanic fisheries. The Aquaculture Research and Development Institute is mandated to undertake strategic research on product processing and biotechnology, food security, instrumental engineering and application of research results based on the technical policy produced by the Research and Development Agency for Aquaculture.

The National Research and Innovation Agency (BRIN) is also an important partner in this proposed project. The functions of BRIN target: 1) implementation and preparation of plans, programs, budgets,

and Resources of Science and Technology in the fields of Research, Development, Assessment, and Application; 2) formulation and determination of policies in terms of quality standard setting for research institutions, human resources, and strengthening innovation, research and technology development, technological transfer, technological audits, and protection of Intellectual Property Rights; 3) coordination and implementation of the National System of Science and Technology; 4) preparation of the Science and Technology Master Plan; 5) facilitation of Intellectual Property protection and its utilization as a result of national Inventions and Innovations in accordance with the provisions of laws and regulations; 6) mandatory delivery and retention of all primary data and outputs of research, development, study, and application results; 7) facilitating determination of professional qualifications of researchers, engineers, and human resources in Science and Technology; 8) facilitating exchange of Science and Technology information between Knowledge and Technology Institutions; 9) managing of the national Science and Technology information system; 10) fostering the implementation of Science and Technology; 11) licensing for implementation of Research, Development, Assessment, and Application activities as well as Inventions and Innovations that are high risk and dangerous by taking into account national standards and provisions that apply internationally; 12) supervising the planning and implementation of Science and Technology in accordance with the master plan for the advancement of Science and Technology; 13) coordinating and synchronizing of policy implementation in the field of institutions, resources, strengthening research and development, as well as strengthening innovation in science and technology; 14) granting written permission for research and development related activities carried out by foreign universities, foreign research and development institutions, foreign business entities, and foreigners in territory of the Republic of Indonesia; 15) granting written permission for research and development activities of applied science and technology that are high risk and dangerous in accordance with the provisions of laws and regulations; 16) coordinating the implementation of tasks, coaching, and providing administrative support to all organizational elements within BRIN; 17) managing of state property/wealth which is the responsibility of BRIN; and 18) supervising implementation of duties within BRIN. Several BRIN student researchers and staff have undertaken research on IAS and will be key in generating knowledge on the presence, distribution, impact and management of IAS in this project.

Other relevant programmes and initiatives in Indonesia

Bogor Agriculture Institute (IPB) is a state university which undertakes research on IAS ecology and biology and their impacts. In fact, it is the only state university focusing on tropical agriculture and life sciences in a broad sense. Several students and staff have published papers on IAS. The university has expressed interest in participating in the project by encouraging students to conduct IAS-related work.

There are several international donor programmes and local NGOs which work in collaboration with the government and local communities on a range of environmental issues including management, biodiversity conservation, community awareness, and conservation training and education and that should also include Masyarakat Adat. Although none of them appear to be working directly on IAS, many are involved in restoring and protecting forests. The SMIAS project will collaborate closely with these NGOs and engage them in awareness raising and capacity building on IAS management. These include but are not limited to:

- ? WCS-Indonesia (Wildlife Conservation Society) has as its mission to identify critical conservation issues, find science-based solutions to these problems, and achieve tangible, on-the-ground success that benefits wildlife and wild places. They are currently active in the Bukit Barisan Selatan NP to protect Sumatran tiger habitat which has become dominated by mantangan (*Merremia peltata*). Even though they are not actively working in the SMIAS project sites they could indirectly contribute to some project activities by creating awareness.
- ? YABI (Yayasan Badak Indonesia) or the Indonesian Rhino Foundation is a local NGO that works to protect rhino habitat in Indonesia. They have been particularly active in controlling the native invasive *Arenga obtusifolia* in Ujung Kulon N.P. and could provide valuable insights into IAPS management.
- ? KfW has provided Indonesia with several loans, especially regarding reducing carbon emission and promoting a green economy. Significant investments are also being made in reducing deforestation and restoring degraded landscapes. It is currently implementing a project, with local partners, to support the President of Indonesia's program on Social Forestry in areas near to the BTSNP.
- ? JICS (Japan International Cooperation System) is supporting rehabilitation activities within the BTSNP. This initiative has been active from 2010 to 2020, and is a collaboration between the BTSNP Centre, JICA, JICS and the Tengger community. All activities involve the local community and only utilize native species. The area that was identified for rehabilitation covered 2,000 hectares. So far only 110 hectares had been restored in the 2010-2020 period. The ecosystem restoration carried out by the TNBTS authority jointly with other parties is hoped to be able to slow down the rate of damage caused by fires, human encroachment, and invasive species. The project will learn from this initiative and work with communities that were involved in this project.
- ? Copenhagen Zoo and Baluran National Park have collaborated through the Copenhagen Zoo Baluran Programme. This collaboration which has been going on since 2012 is aimed at Wildlife Conservation and IAS handling in Baluran National Park.

It is noteworthy, where private-public sector relations are sought to both leverage and expand the regimens developed via this project, that several certified forest concession companies (e.g., PT. Erna Djulawati, Sari Bumi Kusuma, Sarmiento Parakanca, Intraca) have developed programmes for IAS control and management, and perhaps especially for *Acacia* species. Many of these companies are registered under the Forest Stewardship Council (FSC) Certification scheme which clearly states that *The Organization* shall only use alien species* when knowledge and/or experience have shown that any invasive impacts can be controlled, and effective mitigation measures are in place.**

The project will also interact and inform other companies that hold large natural forest and plantation forest concessions as to the threats posed by IAS and their management. These include but are not limited to Sumalindo Lestari Jaya which has concessions of 1.5 million ha, and the Alas Kusuma Group which manages 600,000 ha of natural forest in Indonesia.

The Tropical Forest Trust (TFT) works with companies and communities with the main focus to provide solutions to the issue of deforestation and the empowerment of forest dependent communities. The project will work closely with the Trust to enhance the involvement of forest communities in IAS management.

BBNP Office has established a partnership with the Faculty of Forestry, Hasanuddin University, to prepare IAS management planning documents. The outcome of the activity is the IAS risk analysis document in BBNP.

The SMIAS project will build on these ongoing programmes and initiatives and will further enhance capacities of national and subnational institutions and stakeholders in IAS management.

(3) Proposed alternative scenario with a brief description of expected outcomes and components of the project and the project's Theory of Change

IAS are a significant and growing problem in Indonesia: they are one of the main threats to Indonesia's national protected areas network, which is the very foundation of biodiversity conservation in the country; they have been identified as a key threat to some of the most important endemic and/or endangered species in the country, including the Sulawesi Black Macaca (*Macaca maura*), Tangkasi/tarsies (*Tarsius fuscus*), Javan Eagle (*Nisaetus barthelsi*), Javan Leopard (*Panthera pardus javanicus*), and Javan langurs (*Trachypithecus auratus*). For example, invasion of savanna in Baluran NP by the invasive shrub *Acacia nilotica* threatens the survival of the endangered banteng (*Bos javanicus*) while the proliferation of the sugar palm, *Arenga obtusifolia* (considered to be native), threatens the survival of the critically endangered Javan rhino in Ujung Kulon NP. IAS also have a negative impact on agricultural production and on Indonesia's efforts to enhance forestry production and improve forest conservation by inhibiting the growth of target species, increasing fire risk, etc.; and they reduce important ecosystem functions such as water provision, erosion control, production of NTFPs, and attractiveness for tourism. Indonesia's increasing integration into regional and international trade and transport networks, and growing inter-island transport and movement of people, is making the effective management of IAS even more urgent.

In recognition of these trends, the project proposes several key approaches for IAS management. At the national level, a key aspect of the project is to develop an IAS National Biosecurity Framework and establish a National Biosecurity Task Force, which will facilitate cross-sectoral approaches among line ministries and raise awareness of, and support for IAS management among decision-makers and the general public. At the site level, a key aspect of the project is to take a landscape level approach to IAS management, building on lessons from past efforts in Indonesia (e.g., the FORIS Project), which found that attempts to manage IAS solely within priority landscapes such as protected areas could be ineffective and unsustainable. This is largely because IAS know no boundaries and as such it is imperative that they be managed at a wider landscape or even regional level. Other key elements of the project approach include: i) strengthening the policy, regulatory, institutional and financing frameworks for IAS management^[80] (Component 1) and local/project site level (Component 2); ii) focusing specifically on Invasive Alien Plant Species (IAPS) at the site level (Component 2), but addressing IAS more broadly (i.e. both flora and fauna, terrestrial and coastal/marine) in the national level interventions under Components 1 and 3; and iii) focusing on IAS management approaches that include identification of priority species/pathways, risk assessment, prevention, quarantine, and early detection/rapid response (EDRR) in order to prevent both the entry and spread of IAS, as well as control measures to address IAS that are already present in the landscape. It should be noted that the site-based interventions under Component 2 as well as the information gathered under Component 3 will inform the policy development under Component 1. Similarly, policy interventions under Component 1 will influence the site-level implementation under Component 2. The before mentioned

approaches, interventions and policy will be inclusive to the Masyarakat Adat, in respect to the UNDRIP and in consideration of FPIC and IPPs for Masyarakat Adat as outlined in Annex J.

Together, the above components encompass a suite of outcomes that will result, by the end of the project, in the following fundamental changes (as shown in Figure 2, Theory of Change): i) a reduction in the risk of IAS being introduced into and spreading within Indonesia, especially IAPS which are often not considered as being as posing a threat to crop and pasture production, human and animal health, and water resources; ii) systems/mechanisms, capacities and experience that enable protected area managers and other stakeholders to effectively prevent the introduction and control of IAS, especially IAPS, in landscapes that are critically important for biodiversity conservation; and iii) widespread recognition that IAS prevention, early detection and rapid response, and control is a national priority with important ecological, social and economic benefits for the people of Indonesia.

To achieve these end states, the proposed project includes a suite of interventions organized under three inter-connected components: 1) strengthened policy, regulatory, institutional and financing frameworks for IAS management (leading to a reduction in the introduction and spread of IAS); 2) demonstrated landscape-level approaches, focussing on IAPS management (leading to reduced IAS impacts in priority landscapes focussing on biodiversity conservation); and 3) strengthened knowledge & awareness of IAS issues among key stakeholders (leading to prioritization of IAS prevention and management).

The success of this approach will depend on several key assumptions, many of which relate to actions that need to be carried out by the Government of Indonesia, including: enactment of a new IAS National Biosecurity Framework; creation and sustained support for a National Biosecurity Task Force; increased budget allocations for IAS management from Government and/or levies on transportation; and support for the up-scaling of IAS management approaches throughout the protected area system in the country. The project design also assumes that local-level stakeholders, including Masyarakat Adat among the other relevant stakeholders, will realize tangible ecological, social and economic benefits from improved IAS management, thereby providing them with incentives to support IAS management post-project. These actions will be taken following the IPPs^[81] to guarantee respect of the UNDRIP and of their FPIC.

Finally, it is assumed that Project interventions to support IAS prevention and management frameworks at the national level will strengthen the protection of all conservation areas in the country, and the conservation of the globally important biodiversity found within these areas.

The project's Theory of Change is shown below.

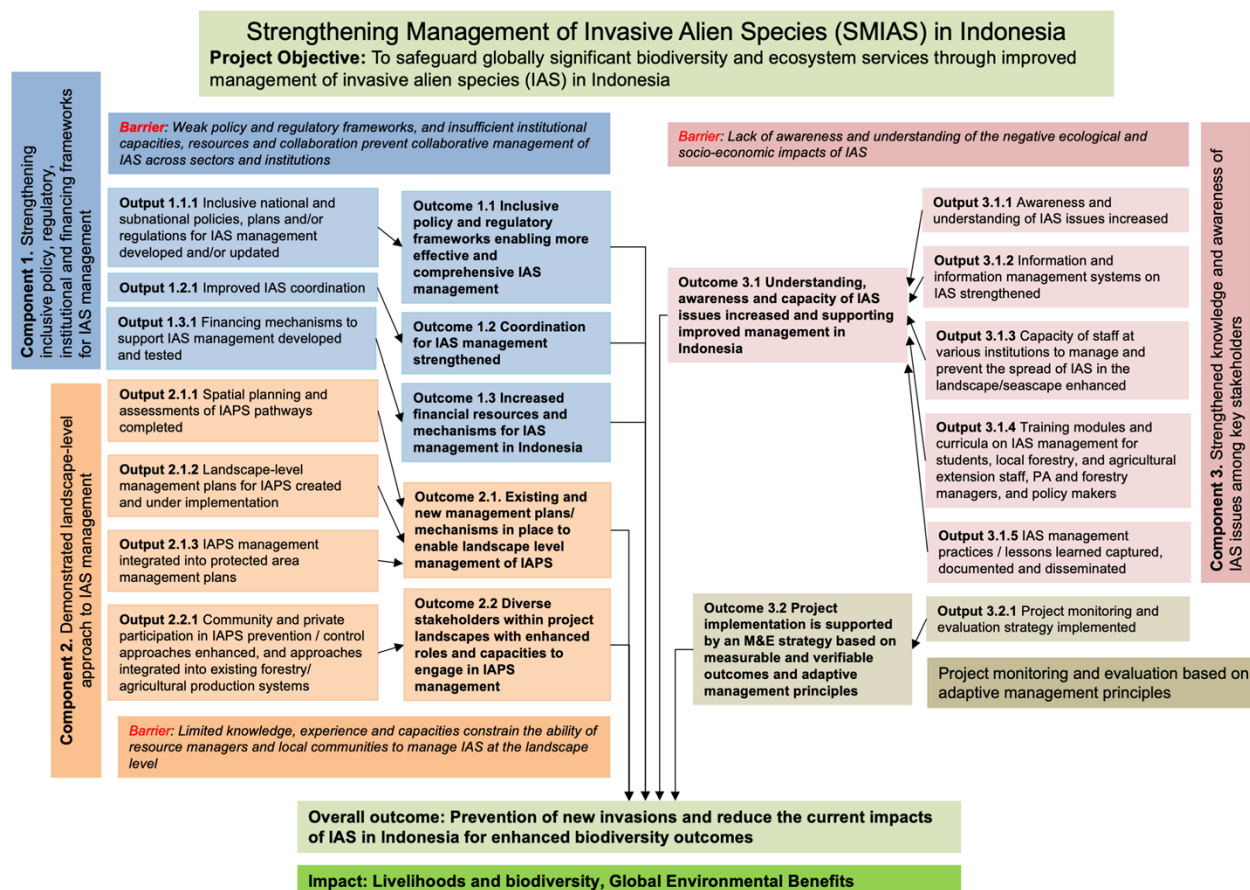


Figure 2: Theory of Change

The project's objective, components, outcomes and outputs are described below. The detailed results framework can be found in Annex A1, and a detailed work plan in Annex H of the Project Document.

As an overall recommendation, whenever impacting, including and targeting Masyarakat Adat, the activities of the project should be implemented following the IPP[82], in order to ensure full participation of the Masyarakat Adat, and that their rights according to the UNDRIP and FPIC are respected as identified in the IPPs that must be developed within the project.

Project Objective: To safeguard globally significant biodiversity and ecosystem services through prevention, control and improved management of invasive alien species (IAS) in Indonesia

Component 1: Strengthened inclusive policy, regulatory, institutional and financing frameworks for IAS management

The implementation of this component will also ensure to guarantee inclusion of Masyarakat Adat and respect of their rights to FPIC and those included in the UNDRIP.

Outcome 1.1: Inclusive policy and regulatory frameworks enabling more effective and comprehensive IAS management

Output 1.1.1 ? Inclusive national and subnational policies, plans and/or regulations for IAS management developed and/or updated: Under this output, the project will support the updating of the National Strategy and Action Plan on Invasive Species Control (NISSAP), including the

development of targets, budgets and timetables for implementation of the NISSAP, and building awareness about the NISSAP among relevant institutions/agencies, Masyarakat Adat representatives and the public at large (see Component 3). The project also will support the development of an IAS National Biosecurity Framework which will be the precursor to a Government Regulation, which is expected to strengthen existing IAS related regulations and coordination and become a strong foundation for developing policy on IAS^[83], whilst guaranteeing the rights to self-determined development and FPIC of the Masyarakat Adat. Based on this regulation, relevant ministries will be able to formulate derivative regulations to support their IAS-related activities. The framework will address issues relating to diseases and pests that may cause harm to human, animal or plant health or the environment.

Ministerial and Directorate General regulations and procedures on issues related to quarantine, risk analysis, and control in general, will be strengthened and/or developed. To this end the project will place significant emphasis on enhancing prevention, and early detection and rapid response (EDRR) systems, especially those pertaining to the importation of plants, which may become naturalized or invasive, including those that are already present in Indonesia. Climate risks will also be considered. Indications are that there is still an increased emphasis on the risks of pests associated with imported plants, more so than the plant species themselves. Risks to agriculture are still being seen as more important than those associated with biodiversity. A key objective will also be the development and implementation of subnational policies and regulations.

More and more, the nexus between Biodiversity conservation and sustainable food systems is being researched and evidence is informing global and regional discussions. The importance of Indigenous Peoples' Food systems in maintaining biodiversity and in managing territories and natural resources in a sustainable and resilient way has been documented in different FAO and Partners' publications. The importance of native seeds and planting material for both wild, semidomesticated and domesticated varieties in sustaining food systems capable of maintaining ecosystems and biodiversity is being progressively understood by practitioners and policy makers

There will also be an emphasis on improving mechanisms pertaining to the importation, testing, and release of host specific and damaging biological control agents. In addition, Ministerial and Directorate General regulations and procedures for the management of IAS in the landscape will be updated and/or developed to support the following objectives: involvement of local governments in IAS prevention and control; allowing the safe and effective control of invasive alien tree species within PAs (currently control is not permitted within PAs); and supporting regulations under Ministerial Decree Number 94 to enable IAS management activities to take place in all categories of conservation areas (regulations currently only support such activities within Nature Conservation Areas and Sanctuary Reserve Areas). Lessons learnt will be drawn from similar initiatives in other countries in order to reduce the risk of any negative consequences that could arise from this regulatory change. Moreover, the proposed project will contribute to the implementation of Law 22 on Sustainable Farming Systems (2019) in relevant project sites, with an emphasis on enhancing weed control and reducing fertilizer and pesticide use and will support revision of MOEF Ministerial Regulation 48 on Guidelines of Ecosystem Restoration in Nature Reserves and Nature Conservation Areas (2014) in order to ensure that IAS concerns are well-integrated into current and future regulations.

Implementation of the updated NISSAP is expected to begin during the period of project implementation. At present, the MoEF is elaborating detailed regulations needed to support implementation of the NISSAP, which is a key part of the MoEF's larger ongoing national program to adopt an ecosystem-based approach to management of natural resources and biodiversity. MoEF is also continuing to advocate for a high-level regulatory framework, such as an IAS National Biosecurity Framework to support the NISSAP and facilitate the involvement of all relevant line ministries (MMAF, MOA, Ministry of Education, BAPPENAS, Ministry of Trade, the Coordinating Ministry for Maritime Affairs and Investment and Ministry of Finance) in its implementation.

Regarding financing of the NISSAP, part of the co-financing provided by MoEF represents funds that will be allocated for implementation of the NISSAP. MoEF and other relevant ministries have already allocated approximately USD 450,000 to support the updating of the NISSAP and the associated regulatory work during the period of this project. Additional co-financing from MoEF and other ministries to implement the NISSAP will be generated once the NISSAP has been updated, the regulatory framework is finalized, and the implementation process gets underway. In addition to funding from government ministries/agencies, project activities under Output 1.3.1 (Financing mechanisms to support IAS management developed and tested) will help to create financing mechanisms for IAS management, including implementation of the NISSAP, over the long-term.

As noted above, the site-based interventions under Component 2 will inform the policy development under Component 1, and vice versa.

Key deliverables of Output 1.1.1:

- Updated NISSAP with targets, budgets, and timelines, including the production and dissemination of a non-technical version for dissemination among all interested and affected parties.
- Comprehensive review of regulatory frameworks and draft legislative framework/IAS National Biosecurity Framework as scenario for integrated management of IAS in Indonesia.
- Sub-national IAS legislation/policies/regulations pertaining to prevention, EDRR and control which is aligned with national IAS legislation.
- Improved prevention and EDRR systems, with an increased emphasis on pre-border prevention and monitoring.
- Supporting regulations under Ministerial Decree No. 94 to enable IAS management activities to take place in all categories of protected areas
- Sustainable farming practices, including Conservation Agriculture, adopted by 10% of farmers in project landscapes.
- Improved mechanisms facilitating introduction of classical biological control agents (as part of integrated IAS management)^[84] and establishment of a National Biocontrol Working Group, building on the existing Biocontrol Agents Commission.

As noted in Section "Environmental and Social risks from the project" (Section 5.b of the ProDoc), any biocontrol agents selected for introduction and possible release must be tested to ensure that they are host specific and pose no threat to crops, native and indigenous plants. An environment risk assessment will be conducted before the release of any biocontrol agent. Additionally, the Project will make sure that Government support is available for implementation of biological control. The project would only

introduce biocontrol agents if appropriate and approved, as part of integrated IAS management. This would be done only after initial assessment carried out that determines whether biocontrol is appropriate and feasible. Given the Project's defined resources and timeline, no agents will be sourced directly from the country of origin of the target IAPS. In other words, there will be no surveys for new potential agents for targeted IAPS. Only those IAPS for which there are known, tested, and established agents that have been officially released elsewhere in the world will be targeted for biocontrol. These are commonly known as 'off-the-shelf' agents. Some agents have been previously released and have established in parts of Indonesia – these can also be considered for redistribution if the target species are present and EIA/related due diligence confirms their possible introduction in the Project landscapes. All agents selected and approved for introduction by communities, PA management, and other relevant stakeholders will be imported following all of the required regulatory procedures. These are being reviewed under Component 1 – the revised procedures/protocols could be tested during the project period. FAO's guide on classical biological control^[1] also provides guidance on how to mitigate potential risks of introduction of biological control agents. Also, support for biocontrol will need to be gleaned from all community members, including Masyarakat Adat, residing in the Project landscapes.

^[1] <https://www.fao.org/3/ca3677en/CA3677EN.pdf> (see Figure 1 explaining the classical biocontrol process).

Indicative activities under Output 1.1.1:^[85]

| Activity Description | Level | | |
|---|----------|-------|------|
| | National | BTSNP | BBNP |
| Review current NISSAP, identify gaps (including gaps related to gender and Masyarakat Adat), and produce revised version in a consultative, inclusive and gender-sensitive process (including representation of Masyarakat Adat) for endorsement and implementation by national government | ? | | |
| Develop an IAS National Biosecurity Framework. | ? | | |
| Review and update/strengthen existing prevention and EDRR systems. | ? | | |
| Review and update regulations that contain lists of IAS to enable IAS management activities to take place in all categories of PAs | ? | ? | ? |
| Assess all existing institutional arrangements and procedures/protocols regarding the biological control of IAPS and develop TOR for the establishment of a Biocontrol Working Group (BWG). The BWG will be in charge of reviewing and proposing revisions to the current regulatory framework and procedures related to biocontrol, and supervising the biocontrol pilots under Component 2, among others. The BWG also will cooperate with universities and research institutions for conducting research on host specificity test, rearing the agents, and release of the Biocontrol agents based on protocols and quarantine procedure and The International Organisation for Biocontrol (IOBC) guidelines. | ? | | |

| | | | |
|--|---|--|--|
| Revise institutional arrangements and procedures/protocols for biocontrol (as part of integrated IAS management), aligned with international best practice and establish a BWG | ? | | |
|--|---|--|--|

BTSNP = Bromo Tengger Semeru National Park.

BBNP = Bantimurung Bulusaraung National Park.

Outcome 1.2: Coordination for IAS management strengthened

Output 1.2.1 ? Improved IAS coordination: Under this output, the Coordinating Ministry for Maritime and Investment Affairs (KEMENKO MARVES) will be designated as the IAS national focal point and coordinating agency under the new IAS National Biosecurity Framework. Within KEMENKO MARVES, the office of Deputy Assistant for Watershed Management and Natural Resource Conservation, which is responsible (*inter alia*) for coordinating national activities on natural resource and ecosystem conservation. Within the office of the Deputy Assistant, a National Biosecurity Task Force will be established, with a dedicated budget and core staff.

The Task Force will collate and make available, on request, all information pertaining to the presence, distribution, impacts and management of IAS in Indonesia, including the development and maintenance of an IAS database, which will include a list of all relevant national, regional and international IAS experts. KEMENKO MARVES will be the go-to-place for all information pertaining to IAS in Indonesia. Experts in specific areas such as taxonomy, prevention, EDRR, and control will be identified and sub-contracted to undertake activities in which core staff have insufficient capacity. The Task Force will also undertake a capacity needs assessment in Indonesia, develop a capacity building workplan, and identify and contract individuals or agencies to provide training or to develop training modules (see Component 3). The Task Force will be mandated to identify and coordinate all IAS research activities in Indonesia to avoid duplication, and most importantly, prioritize and coordinate all IAS management activities, including responses to pest outbreaks. The Task Team will also lead Indonesia's activities for international cooperation on IAS management. This approach is based on lessons learned in the FORIS project on the importance of creating a designated agency/unit that can champion IAS issues and bring key stakeholders to the table. Efforts will also focus on improving coordination between the Ministry of Environment and Forestry (MoEF), Ministry of Marine Affairs and Fisheries (MMAF) and Ministry of Agriculture (MoA) with regard to improving pre-border prevention and monitoring. This is particularly relevant in enabling effective implementation of Law No. 21 (2019) on Animal, Fish, and Plant Quarantine.

Key deliverables of Output 1.2.1:

- National Biosecurity Task Force within the Coordinating Ministry for Maritime and Investment Affairs (KEMENKO MARVES) established and operational

Indicative activities under Output 1.2.1:

| Activity Description | Level | | |
|---|----------|-------|------|
| | National | BTSNP | BBNP |
| Develop TOR for National Biosecurity Task Force, including the development and agreement on activities, targets and budgets | ? | | |
| Identify potential partners, and enter into formal cooperation agreements with individuals and institutions with the capacity to contribute to the improved management of IAS | ? | | |

| | | | |
|---|---|--|--|
| Actions, including an MOU or similar, to improve coordination between MoEF, MMAF and MoA with regard to prevention and EDRR | ? | | |
|---|---|--|--|

Outcome 1.3: Increased financial resources and mechanisms for IAS management in Indonesia

Output 1.3.1 ? Financing mechanisms to support IAS management developed and tested: Under this output, the National Planning Agency (BAPPENAS) will lead the development of a long-term financing plan for IAS prevention and management in Indonesia, which will be used to strengthen technical and human resource capacities within key institutions, including the National IAS Biosafety Task Force in KEMENKO MARVES, MoEF, the Ministry of Marine and Fisheries and the Ministry of Agriculture. The plan will include cost-benefit analyses (CBA) to demonstrate that the benefits of IAS management outweigh the costs, data which will be used to garner increased government budgetary contributions; fees/levies on key sectors; and payments for ecosystem services that can contribute to IAS management. For example, the project will work to enhance support from policy makers for IAS management by undertaking cost-benefit analyses of IAS of highest concern that have an impact on agriculture, environment and/or forestry. The analyses will include both environmental and socio-economic costs and benefits; for example the potential benefits for local communities of controlling IAS that impact on livelihoods, ecosystem functioning, and/or biodiversity, with the objective of building a strong business case for investing in IAS management at a national and local level so as to build support for new policies and strategies relating to IAS, ensure adequate budget allocations by government, and create acceptance in the private sector for contributing towards the costs of management. Building on lessons learned in the FORIS project, the project will engage with decision makers early in this process in order to ensure buy-in and support.

The Directorate of Biodiversity Conservation on Species and Genetic within MoEF, in consultation with the National Planning Agency (Bappenas) and the Ministry of Finance, is also currently drafting a mechanism to support national funding for biodiversity conservation (including IAS management). Among the elements under consideration is a mechanism for levies on trade, tourism, travel and transport (the ?4 Ts?), which are key pathways for IAS introduction and spread. The project will support efforts to promote this mechanism, including the results of cost benefit analyses that will help to justify its importance on economic and social grounds.

Finally, the project will assess the potential for Payments for Ecosystem Services (PES) from the private and public sector to support funding of IAS management activities. Possible PES mechanisms may include financial contributions from tourism operators to support IAS management (and thereby preserve the tourism attributes of the parks), as well as payments by water companies and/or municipal governments to support management of invasive plants impacting on water resources (e.g., *Salvinia molesta*, *Pontederia crassipes*, *Acacia decurrens*) that threaten water supplies. Activities will include carrying out willingness to pay (WTP) studies and collecting other relevant data to support PES design (e.g., water flows; water pricing; costs of alternatives such as dam construction; tourism levels and preferences; etc.). This will also build on the Focus Group Discussions (FGDs) and webinars related to sustainable financing conducted during PPG. Potential financing mechanisms highlighted by the technical experts and other stakeholders were: Initiating sustainable financing for IAS management by developing Biodiversity Budget Tagging for monitoring and tracking IAS management expenditure in the national budget system, Initiating unlocking green sukuk for project bundling in IAS management in Indonesia in the framework of biodiversity project financing and strengthening the ecological fiscal

transfer in sub national government. Based on this work, the project will support the development and testing of pilot PES programs in areas with highest potential for success.

Key deliverables of Output 1.3.1:

- Cost-recovery mechanisms to finance IAS management
- Cost-benefit analyses for IAS of highest concern
- Increased government funding for IAS management
- At least two Payment for Ecosystem Services (PES) programmes (or other financing mechanisms) (one in each project landscape) to support the costs of IAS management developed and tested.

Indicative activities under Output 1.3.1:

| Activity Description | Level | | |
|---|----------|-------|------|
| | National | BTSNP | BBNP |
| Identify potential sources/mechanisms for financing IAS management interventions such as fees, levies, PES, etc. | ? | ? | ? |
| Develop and implement at least two PES programmes (or other financing mechanisms), one at each of the project sites. | | ? | ? |
| Identify at least 5 IAS, including ?conflict? species and collate data on costs and benefits based on literature review and national/local research. | ? | ? | ? |
| Produce and disseminate findings of CBA to key stakeholders, especially government officials responsible for financing IAS management. The findings will also be used extensively in awareness campaigns (Component 3). | ? | | |

Component 2 ? Demonstrated landscape-level approach to invasive alien plant species (IAPS) management

Under this component, the project will take a landscape level approach with a focus on priority protected areas and adjacent production forests. Managed forest areas (community and individual forest management units; village forests; etc.) often coexist within and adjacent conservation areas so that IAPS management is inseparable from a landscape approach and community involvement is needed to prevent IAPS coming into managed or non-conservation forest areas and then spreading to conservation areas. For example, there is evidence suggesting that *Acacia mangium* from plantations is colonizing natural forest edges and gaps. Similarly, in the previous GEF-funded FORIS project it was determined that seeds of the invasive shrub, *Acacia nilotica*, were being introduced into Baluran NP by cattle (through faeces), brought into the NP by local villagers. *Acacia* is known to spread rapidly, suppressing the growth of local species, and making forest areas more susceptible to fire by increasing the amount of available biomass. For these reasons, the project will integrate improved IAPS management effectiveness across PAs, Forest Management Units, Masyarakat Adat, and local communities in two priority landscapes centered around the Bantimurung Bulusaraung and Bromo Tengger Semeru National Parks, while also promoting and enabling community-based approaches to IAS management. More broadly, since there are communities within both NPs, the project will formulate a special strategy to work jointly with communities and NP Authorities in implementing proposed activities. The selection of priority landscapes was confirmed during the project preparation phase using a nationally agreed set of criteria based on the GEF biodiversity global indicators. The

highly participatory consultations under this component (with PA management, communities) will reconfirm METT IAS threats, livelihood and natural resource use/needs, and identify the prioritized hotspots for biodiversity and the specific target IAPS.

Outcome 2.1: Existing and new management plans/mechanisms in place to enable landscape level management of IAPS in consideration of FPIC and *Masyarakat Adat* Plans[86] as outlined in Annex J

Output 2.1.1 ? Spatial planning and assessments of IAPS pathways completed in consideration of FPIC and *Masyarakat Adat* Plans as outlined in Annex J: Under this output, the project will carry out spatial planning/mapping for the two project landscapes, including the national parks, forest management units, and adjacent agricultural and forestry production lands, to identify ecosystem types, land uses, and the current extent of IAPS spread. Geospatial technologies (GIS, remote sensing) will be used where applicable and reconfirmed in PA and community consultations. The project also will identify the primary pathways for the introduction of IAPS into and spread within each project landscape. The determination of invasion pathways will constitute important baseline studies (of which there are very few in Indonesia) to support the goal of the national and local Quarantine Agencies to identify priority IAPS pathways in the forestry and agriculture sectors (e.g., use of IAPS seeds/seedlings, ornamental plants, etc.), and to develop specific regulations to address these pre-and post-border pathways. Identification of IAS pathways will also seek to develop approaches that promote learning and application by other landscape areas that may not have the resources to conduct in-depth studies.

Before starting the landscape-level interventions, the project will develop site-specific *Masyarakat Adat* Plan(s) in a participatory, consultative process and implement Free, Prior and Informed Consent (FPIC) process as outlined in Annex J.

The project will ensure that climate information, as well as wider project stakeholder and community livelihood and natural resource concerns are key aspects of planning activities to design and implement land-scale level approach to invasive alien plant species.

Key deliverables of Output 2.1.1:

- Two (2) spatial maps completed, one for each of the project landscapes, showing the distribution of IAS, and providing additional information with regard to habitats, land-uses, etc. The mapping is carried out in respect to the right to land, territory and natural resources of the *Masyarakat Adat* and their FPIC.
- Pathway Risk Assessment for each of the project landscapes.

Indicative activities under Output 2.1.1:

| Activity Description | Level | | |
|---|----------|-------|------|
| | National | BTSNP | BBNP |
| Organize participatory consultations with prioritized IAS-impacted buffer zone and PA communities and <i>Masyarakat Adat</i> , including validation of METT threats and mitigating options, to understand the needs of the communities and PA management, their perceptions and uses of IAS. Identify existing/potential formal and informal agreements and possibilities for collaborative management. | | ? | ? |

| | | | |
|---|--|---|---|
| Develop site-specific Masyarakat Adat Plan(s) in a participatory, consultative process and implement Free, Prior and Informed Consent (FPIC) process in line with Annex J. Continue participatory community engagement process during entire project duration, including implementation of Masyarakat Adat Plan(s). | | ? | ? |
| Undertake surveys and determine distribution of all IAPS in project landscapes, together with other relevant information on habitats, land-uses, etc. | | ? | ? |
| Produce spatial maps of two project landscapes | | ? | ? |
| Undertake Pathway Risk Assessment to determine why, how and when IAS were introduced to the project landscapes | | ? | ? |

Output 2.1.2 ? Landscape-level management plans for IAPS created and under implementation:

Under this output, the project will develop IAPS management plans for the two project landscapes to complement other forms of environmental management at the landscape level and optimise environmental, economic and social benefits.

The plans will be aligned with the guidelines of the NISSAP and will include: identification and mapping the distribution of IAPS at the landscape level (including assessment of climate, environmental and economic risks of priority IAS); prioritization of IAPS based on their impacts to local ecosystems; determination of plans for effective control actions that take account of ecological conditions, the needs of communities and their involvement, the availability of resources and potential trade-offs; development of practical training materials/approaches; and monitoring and evaluation plans.

Best management practices for prioritized IAPS will be determined through the implementation of demonstration trials where the effectiveness of different interventions will be compared together with their impacts on biodiversity. These accessible trials will also provide opportunities for hands-on training in different control interventions. Once the plans are completed, the project will support implementation of priority activities including prevention, early detection and rapid response, and control measures. Emphasis will be put on low-cost, high impact interventions, for example the use of off-the-shelf biological control agents, if available (in the productive landscape). Finally, the project will document lessons learned/effective models for IAPS management at the local landscape level based on the foregoing activities.

Potential compensation and benefit-sharing/natural resource use agreement measures will be discussed in a detailed consultative, participatory process with local communities and Masyarakat Adat, taking into account wider PA management objectives, sustainable off-take and ecosystem integrity, and the livelihoods of the communities with specific consideration of Masyarakat Adat traditional livelihoods, resource management and food systems and in respect to the right to land, territory and natural resources of the Masyarakat Adat and their FPIC.

Activities under this output will be implemented in close consultation with and engagement of local stakeholders (including women, men, youth^[87], Masyarakat Adat) and in consideration of FPIC and the Masyarakat Adat Plan.

As noted above and in Section ?Environmental and Social risks from the project? (Section 5.b of the ProDoc), any biocontrol agents selected for introduction and possible release must be tested to ensure that they are host specific and pose no threat to crops, native and indigenous plants. An environment

risk assessment will be conducted before the release of any biocontrol agent. Additionally, the Project will make sure that Government support is available for implementation of biological control. The project would only introduce biocontrol agents if appropriate and approved, as part of integrated IAS management. This would be done only after initial assessment carried out that determines whether biocontrol is appropriate and feasible. Moreover, support for biocontrol will need to be gleaned from all community members, including Masyarakat Adat, residing in the Project landscapes.

Key deliverables of Output 2.1.2:

- Database on IAS presence, distribution, and impacts in project landscapes.
- Best management practices for key IAPS in project landscapes determined and endorsed by Masyarakat Adat and community members.
- Best practice manuals and other training materials produced based on results of trials ? under Component 3.
- Two landscape level IAPS management plans finalized and implemented, including prevention and EDRR, together with budgets and timelines.
- At least 2,260 local inhabitants collaboratively managing and participating in IAPS activities within PAs, FMUs, production and other relevant landscapes.
- Area of 4 priority IAPS reduced by 187.2 ha: BBNP (129 ha) and BTSNP (58.2 ha).

Indicative activities under Output 2.1.2:

| Activity Description | Level | | |
|---|----------|-------|------|
| | National | BTSNP | BBNP |
| Identify and agree on species that should be targeted for control, including methodologies that should be trialed, based on distribution, impact and control options and the efficacy of the latter. Agreement on species to target will be informed through wider consultation, among communities, in particular Masyarakat Adat (including women, men and youth). | | ? | ? |
| Undertake trials in prioritized and accessible project landscapes, in partnership with Masyarakat Adat and local communities, including women, men and youth, to develop best management practices for targeted species ? efficacy on target species and impact on biodiversity and other land-uses. This data can also contribute to CBA undertaken under Component 1. | | ? | ? |
| Implement best management practices determined through trials, and based on community endorsement, especially that of women, youth and Masyarakat Adat, across the wider landscape in the two project sites. Community members involved, incentivized and collaboratively managing key activities in both project landscapes. A link will be established with the Payment for Ecosystem Services (PES) mechanisms to be developed under Output 1.3.1. Inputs developed through these consultations will also inform other activities under Component 1 and 2. | | ? | ? |
| Develop IAS management plans for both project landscapes, including prevention and EDRR largely based on the results of trials. | | ? | ? |

Output 2.1.3 - IAPS management integrated into protected area management plans: Under this output, the project will support PA managers in integrating IAPS management activities and targets into the two existing national park management plans (within the context of the landscape level management plans developed under 2.1.2, and co-management, above). The project also will work with PA managers and national MoEF staff to integrate IAPS management into action plans for keystone species that occur in the two landscapes. Indonesia's Keystone Species program addresses conservation of 25 national priority species, and the following species are found within the two target landscapes: the Sulawesi Black Macaca (*Macaca maura*) and the Makassar Tarsier (*Tarsius fuscus*) in the BBNP; and the Javan Eagle (*Nisaetus barthelsi*), Javan Leopard (*Panthera pardus javanicus*), and Javan langur (*Trachypithecus auratus*) in the BTSNP. Finally, the project will contribute to the national park management effectiveness including monitoring the success of the national park IAPS management activities; consolidate information on results and best practices; disseminate information throughout the overall national protected areas system, including through exchange visits for managers of other PAs.

Key deliverables of Output 2.1.3:

- IAS management plans developed under Output 2.1.2 integrated into protected area management plans.
- Improved scores on GEF METT for two PAs; BBNP from 78 to 82 and BTSNP from 74 to 80.

Indicative activities under Output 2.1.3:

| Activity Description | Level | | |
|---|----------|-------|------|
| | National | BTSNP | BBNP |
| Review existing PA management plans for BBNP and BTSNP and identify gaps with regard to IAS management interventions/strategies. | | ? | ? |
| Based on consultations integrate IAS management interventions as developed under Output 2.1.2 into PA Management Plans | | ? | ? |
| Produce revised PA Management Plans, including sustainable budget programmes for IAS management, and share with various stakeholders, especially those responsible for the management of PAs throughout Indonesia | | ? | ? |

Outcome 2.2: Diverse stakeholders (including Masyarakat Adat) within project landscapes with enhanced roles and capacities to engage in IAPS management

Output 2.2.1 ? Community and private participation in IAPS prevention/control approaches enhanced, and approaches integrated into existing forestry/agricultural production systems respecting the FPIC and rights to self-determined development of the Masyarakat Adat (see Annex J): Under this output, the project will support the establishment of multi-stakeholder coordinating mechanisms in each project landscape (building on work the MoEF has done in some areas on multi-stakeholder forums for managing FMUs) to bring together local governments, local units of relevant Ministries, community representatives and private partners to agree on priorities and collaboration for IAPS management. To enable better stakeholder participation, the project will strengthen the capacities of local community-based organizations to raise awareness, learn good practices, and plan and implement collective management of IAPS, such as training for local community members, Masyarakat Adat in IAPS identification and response measures, and it will

promote community participation in IAS management within protected areas (Nature Resource and Ecosystem Conservation Decree No. 6 of 2018 on Conservation Partnership enables collaboration between national park authorities and local community in controlling the spread of IAS in national parks), in respect to the right to land, territory and natural resources of the Masyarakat Adat and their FPIC. The regulation explicitly mentions that Conservation Partnership is intended to be done in the context of restoring damaged ecosystems, caused by: a. Natural resources, namely natural disasters and fires; b. Invasive species; and c. Human activities. Thus, this ecosystem restoration inside the rehabilitation zone inside the park is carried out by the national park management in collaboration with the community residing inside the park. Other clauses in this regulation also state that the contract period for this program would be within 10 years where communities are encouraged to harvest invasive alien plant species and replace them with the native/local plant species.

The project will also introduce conservation agriculture practices, with an emphasis on practices such as cover cropping to limit weed incidence. Other practices to reduce excessive application of fertilisers and pesticides, that are known to have negative impacts on biodiversity, and often facilitate invasions, will also be trialled. These will constitute an important contribution to the implementation of Law 22 on Sustainable Farming Systems (2019).

The project will also work with Masyarakat Adat, local communities, and the private sector, to find productive uses for near-term IAPS that have been removed from the landscape during control interventions. For example, the biomass from invasive trees felled during clearing operations can be utilised for fuelwood, charcoal and even timber for construction. However, this must also be regulated so that the plant species will not naturally regenerate outside their planting areas. In parallel to this, there should be efforts to promote alternative ways in order to replace the IAS with native or non-invasive exotic plant species. Thus, the project also will assist efforts to identify and grow non-invasive, economically attractive native plant species that Masyarakat Adat, and local communities can utilise in forestry and agricultural production in place of locally problematic IAPS, and work with agriculture and forestry extension services to make these plant species available, while respecting UNDRIP through FPIC and IPPs for Masyarakat Adat as outlined in Annex J. Finally, the project will support efforts of private forest landowners who wish to improve IAPS management on their lands in order to gain forestry certification.

Activities under this output will be implemented respecting the rights to self-determined development of the Masyarakat Adat as outlined in Annex J.

Key deliverables of Output 2.2.1:

- Two multi-stakeholder IAS coordinating mechanisms established and operating ? one in each of the project landscapes.
- Farmers practise conservation agriculture, with an emphasis on practices such as cover cropping to limit weed abundance.
- Uses, including value-addition, for IAPS removed during clearing operations identified.
- Database of all IAPS utilised by communities, together with a list of all native or benign exotic species that could be used to replace the IAPS ? selection of alternative species endorsed by community members.

- Nurseries established to grow native and benign exotic plant species ? managed by community members.

Indicative activities under Output 2.2.1:

| Activity Description | Level | | |
|--|----------|-------|------|
| | National | BTSNP | BBNP |
| Develop TOR and establish two IAS Coordination Units at each of the project landscapes, with equal representation by women, Masyarakat Adat, and other marginalized groups. | | ? | ? |
| Undertake trials to demonstrate value of Conservation Agriculture, especially the use of cover crops to reduce weed incidence. Promote activities at project landscapes to reduce pesticide and fertilizer use, such as Conservation Agriculture, in support of Law 22 on Sustainable Farming Systems (2019) | | ? | ? |
| Develop uses for IAPS removed during clearing operations, especially those that will benefit women and Masyarakat Adat. For example, fuelwood or charcoal for community beneficiation. | | ? | ? |
| Undertake surveys to identify all IAPS used by communities, especially women, including Masyarakat Adat, and other marginalized groups, and develop database. | | ? | ? |
| Identify alternative native species or benign exotic species that could be used to replace IAPS currently utilized, consulting with women, Masyarakat Adat, and marginalized communities and taking cognizance of their needs. | | ? | ? |

Component 3: Strengthened knowledge & awareness of IAS issues among key stakeholders, and project monitoring and evaluation based on adaptive management principles

Outcome 3.1: Understanding, awareness and capacity of IAS issues increased and supporting improved management in Indonesia

Output 3.1.1 - Awareness and understanding of IAS issues increased: Under this output, the project will carry out public awareness initiatives to increase awareness and understanding of IAS, utilizing a variety of media (on-line; mass media; educational publications, etc.). In so doing, the project will build on previous efforts in IAS awareness raising carried out by other projects, such as the GEF-funded *Removing Barriers for Invasive Alien Species Management in Production and Protection Forest of Southeast Asia?*, which developed and implemented a National IAS Communication Strategy which included various educational materials/programs at the local level), and the GEF-funded project in Mexico *Enhancing National Capacities to manage Invasive Alien Species (IAS) by implementing the National Strategy on IAS?*, which developed awareness raising programs focussing on PA visitors as well as for sectors responsible for IAS entry into the country.

Awareness campaigns on IAS management will be provided for PA managers/staff (linking to activities under Output 2.1.2), as well as private sector partners, in particular tourism operators, given that the two target project sites are heavily visited tourism destinations. This output also will include activities to develop specific IAPS awareness materials for local governments, Masyarakat Adat representatives, and communities in the project landscapes, with a focus on information that will encourage/incentivize behavioural changes that will reduce the use (intentional or unintentional) and spread of IAS, in particular changing practices of local farmers in and around Bromo Tengger Semeru

National Park that contribute to IAS introductions/spread (based on activities carried out under Output 2.2.1).

The project will seek to learn further from the experiences of the FORIS project, which undertook IAS public awareness campaigns in the region of the Baluran National Park that included various print and electronic media (including videos and animated movies) as well as outreach programs and competitions for students. This will also involve awareness raising on climate risks in relation to IAS.

Throughout the awareness raising and communications work, an emphasis will be placed on documenting, using and disseminating local/traditional knowledge and wisdom regarding IAS impacts and management options, and on delivering messages that address potential conflicts between cultural preferences/beliefs and conventional IAS management practices (e.g. some communities may view native trees as being of little value and desire to replace them with exotic species that will generate income; such perceptions need to be tackled head on through conducting and communicating a cost benefit analysis approach and through detailed consultations with Masyarakat Adat, and local communities (including women) to identify their needs and priorities, in respect to the right to land, territory and natural resources of the Masyarakat Adat and their FPIC.

Key deliverables of Output 3.1.1:

- Communication Strategy updated and implemented and included in NISSAP to ensure dissemination by all interested and affected parties, including various Government Departments.
- At least 30% increase levels of awareness among target audiences with regard to IAS issues

Indicative activities under Output 3.1.1:

| Activity Description | Level | | |
|--|----------|-------|------|
| | National | BTSNP | BBNP |
| Update/strengthen IAS Communication Strategy, with targets and budget, and agree on key messages, and identify target groups at national and local level (including Masyarakat Adat). Integrate into NISSAP. | ? | ? | ? |
| Determine baseline awareness levels, especially at the two project landscapes. | ? | ? | ? |
| Develop and implement awareness campaign, measuring changes in awareness over the project period (included in M&E Strategy), taking cognizance of the most effective modes of communication for selected audiences, especially women, Masyarakat Adat, and marginalized communities. | ? | ? | ? |

Output 3.1.2 ? Information and information management systems on IAS strengthened: Under this output, the project will update the national list of IAS of highest concern (Indonesia's 5th National Report to the CBD identifies 20 such species out of a total of 342 IAS listed in the country), using risk analysis tools that utilize, among others, data on their biology, impact and potential distribution. Updating the national list of IAS of highest concern (under Ministry of Forestry Decree Number P.94) will provide the legal basis for improved management of these species. These species will also be prioritized for management in the revised NISSAP and be the focus of all awareness campaigns, especially those targeting communities. The project will support the efforts of MoA, MoEF, MMAF and other partners (SEAMEO BIOTROP) to update/enhance their existing IAS databases and establish data sharing protocols/mechanisms, and it will support the National Biosecurity Task Force to

incorporate more information and data on IAS in Indonesia into existing international databases such as CABI's Invasive Species Compendium and the ISSG's Global Invasive Species Database.

Key deliverables of Output 3.1.2:

- National list of IAS of highest concern leading to improved IAS management.

Indicative activities under Output 3.1.2:

| Activity Description | Level | | |
|--|----------|-------|------|
| | National | BTSNP | BBNP |
| Engage organizations/individuals to update national list of IAS of highest concern, ensuring inputs from women and Masyarakat Adat who are often most impacted by the presence of IAS. | ? | | |
| Make national IAS list available and accessible to all interested and affected stakeholders, ideally on a website or similar established by KEMENKO MARVES | ? | | |

Output 3.1.3 ? Capacity of staff at various institutions to manage and prevent the spread of IAS in the landscape/seascape enhanced while respecting UNDRIP through FPIC and IPPs for Masyarakat Adat as outlined in Annex J: Under this output, the project will help to strengthen the technical capacities of the Indonesian Agricultural Quarantine Agency (IAQA) and other relevant technical agencies to prevent the entry of IAS into Indonesia by: i) building the capacity of IAQA and other relevant technical agencies to expand its scope of IAS prevention (which has historically been limited to IAS that threaten agriculture) to include IAS that impact the natural environment (as mandated under the new *Law 21 of 2019*); ii) strengthening IAQA's and other relevant technical agencies' capacity to carry out risk analyses and develop response strategies for IAS of highest concern (see Output 1.1.4), and to identify and manage priority IAS entry pathways (forestry and agriculture); and iii) establishing clear and efficient institutional rules/mechanisms to enable the importation of biocontrol agents for IAS management.

In addition, the project will help to strengthen the technical capacities of resource management ministries/agencies (in particular MoEF, MoA, MMAF) to manage IAS across landscapes/seascapes by: i) strengthening technical capacities to identify and manage priority IAS pathways (with a focus on forestry and agriculture sectors) that facilitate the spread of IAS across landscapes/seascapes; ii) strengthening institutional capacities to develop management plans for specific IAS pathways/species; and iii) developing protocols and tools for Early Detection and Rapid Response for new IAS outbreaks in the field, including an enhanced interactive mobile phone app (with data on additional IAS, local names, and translated into Bahasa Indonesia) to allow members of the public to easily and quickly identify new outbreaks. The app will build on an existing app such as the one developed during the FORIS project^[1], to be confirmed during project implementation based on a more detailed analysis and in collaboration with the Indonesian Science Institute and SEAMEO BIOTROP.

^[1] A mobile app which included descriptions and images of 50 invasive alien plant species was developed during the previous FORIS Project. Additionally, FAO has developed several digital tools that the project could build upon, including the FAW Monitoring and Early Warning System

(FAMEWS) for the real-time global monitoring of the Fall Armyworm (FAW).

<https://www.fao.org/digital-agriculture/digital-portfolio/en/>

The project will also develop capacity building activities for private sector entities, in particular import/export companies.

Key deliverables of Output 3.1.3:

- Improvement of 30% in quarantine staff knowledge/understanding of issues related to prevention, and risk analyses, with a focus on identifying and detecting those IAS that pose a risk to biodiversity.
- Improvement of 30% in knowledge/understanding in identification and management of high-risk pathway, in addition to EDRR, among resource management ministries.
- Mobile phone app to assist in IAS management, especially EDRR, for use among interested and affected parties, including members of the public.

Indicative activities under Output 3.1.3:

| Activity Description | Level | | |
|---|----------|-------|------|
| | National | BTSNP | BBNP |
| Consult with relevant stakeholders including Masyarakat Adat and identify capacity gaps and needs among institutions regarding IAS management ? capacity needs assessment | ? | ? | ? |
| Implement capacity building activities to enhance capacity, especially among quarantine staff, regarding prevention and risk analyses | ? | ? | ? |
| Develop/enhance existing mobile phone app, agree on long-term maintenance beyond the project's lifetime, and promote its use | ? | ? | ? |
| Build capacity regarding the protocols, safety and efficacy of biological control of IAPS | ? | ? | ? |

Output 3.1.4. - Development of training modules and curricula on IAS management for students, Masyarakat Adat, local forestry and agricultural extension staff, PA and forest managers, and policy makers: Under this output, the project will strengthen IAS monitoring, evaluation and enforcement capacities among staff of Protected Areas and Forest Management Units, including training in identification and response measures for IAS; joint training activities in the field to control IAPS that impact adjacent PAs and FMUs; provision of IAPS control equipment; and awareness raising for both PA and FMU staff to avoid the use of intentional planting of IAPS for timber production, boundary marking, etc. The project also will strengthen capacities of local government extension officers to provide technical advice and support to Masyarakat Adat and local communities to carry out IAPS management on community productive lands while respecting UNDRIP through FPIC and IPPs for Masyarakat Adat as outlined in Annex J. In addition, the project will build awareness and understanding among local officials of the potential role of government programs that promote/utilize IAPS and/or sustain IAPS pathways, and of the ecological and economic costs for local inhabitants from IAPS impacts on ecosystem services.

MoEF's existing technical training centre within the Agency for Extension and Human Resource Development, which has experience in developing technical guidelines and training materials on IAS prevention and risk analysis will play a key role in the development of training materials, also under 3.1.2. The capacity building and transfer of knowledge process during the project will include ?training

of trainers? for selected staff with IAS management responsibilities within key agencies (e.g., the National Biosecurity Task Force in KEMENKO MARVES; MoEF; Indonesian Agricultural Quarantine Agency, etc.) at the national and local levels.

Research capacity will be further enhanced by the development and implementation of IAS curricula at schools, especially those within or adjacent to the project sites, and universities. Currently IAS research is limited to a very few universities in Indonesia. The project will also support at least 15 post-graduate students (MSc) to undertake research on various IAS topics, including cost-benefit analyses. The key will be to mostly support individuals that are currently employed in relevant institutions (including MoEF internals and other students), in order to ensure that their skills are utilized post-project. The selection process will be based on clearly defined criteria elaborated by the Project Executives in collaboration with Development Partners and the TWG. It should involve at least 50% women and at least 1-2 Masyarakat Adat as outlined in Annexes I4 and J. Efforts will be made to source students from within institutions, where they will be continued to be employed once they have graduated. This is to ensure that capacity is retained within relevant agencies to enhance IAS management interventions throughout Indonesia.

Key deliverables of Output 3.1.4:

- Capacity needs assessment, focusing on the gaps in IAS knowledge among staff of Protected Areas and Forest Management Units, and policy makers from relevant institutions.
- Short courses developed, including e-learning modules in IAS identification, risks and management.
- Increased knowledge/understanding of IAS issues in 30% of those receiving training.
- Institutions requiring equipment supplied.
- IAS modules for inclusion into school and university curricula developed and integrated based on wider consultation.
- 15 post-graduate students conducting research on IAS issues (at least 50% women and 1-2 Masyarakat Adat).

Indicative activities under Output 3.1.4:

| Activity Description | Level | | |
|---|----------|-------|------|
| | National | BTSNP | BBNP |
| Undertake a capacity needs assessment among all relevant stakeholders, especially staff from Protected Areas and Forest Management Units, focusing on the needs of women, Masyarakat Adat and other marginalized groups. | ? | ? | ? |
| Identify agencies, including the Agency for Extension and Human Resource Development, to develop and implement identified IAS short courses and e-learning modules, taking cognizance of the barriers faced by women, Masyarakat Adat and marginalized groups in capacity building efforts. | ? | | |
| Provide training on IAS issues, ensuring that women and marginalized groups are provided with equal opportunities to increase their knowledge and understanding of IAS issues, and measure changes in levels of capacity/understanding of IAS issues. | ? | ? | ? |
| Identify needs in terms of control equipment and based on consultations purchase and supply. | ? | ? | ? |

| | | | |
|--|---|---|---|
| Develop IAS modules for inclusion in school and university curricula. | ? | | |
| Identify and support 15 post-graduate students in research on IAS-related issues | ? | ? | ? |

Output 3.1.5 ? IAS management practices/lessons learned captured, documented and disseminated while respecting UNDRIP through FPIC and IPPs for Masyarakat Adat as outlined in Annex J: Under this output, the project will develop and implement a strategy to disseminate information products on IAS management developed under Components 1 and 2 (in particular under Output 1.2.3) through publications, news features and other reporting both within Indonesia and at the regional / international level (e.g., through the ASEAN Centre for Biodiversity). In addition, the project will support regional-level workshops and/or learning visits between different PA management units (UPTs) to enable sharing of best practices and lessons learned; such activities will be continued post-project by MoEF. Furthermore, the project will collect the views, experiences and priorities of PA managers, Masyarakat Adat, and local communities regarding IAS prevention and management by coordinating existing stakeholders, their functions and resources via a mutual platform, or ?IAS Forum?, which will provide inputs and guidance for policy and regulatory changes as well as field activities. This forum will be modelled on the existing Watershed Forums (Forum DAS) and the Indonesian Elephant Conservation Forum (the latter was established in recognition of the fact that elephant conservation problems required a collective effort and cross-learning among individual programs, and now it brings together government, NGOs, academics, and the media to develop, monitor, and evaluate elephant conservation strategies in Indonesia).

Key deliverables of Output 3.1.5:

- Awareness material developed and disseminated, including information on best management practices.
- 15 publications on IAS.
- 20 staff (50% women) visited other locations to share information

Indicative activities under Output 3.1.5:

| Activity Description | Level | | |
|---|----------|-------|------|
| | National | BTSNP | BBNP |
| Produce and disseminate awareness material, including information gained from trials undertaken at the two project landscapes | ? | ? | ? |
| Undertake research and produce publications | ? | ? | ? |
| Undertake visits to new localities to disseminate information | ? | ? | ? |

Outcome 3.2: Project implementation is supported by an M&E strategy based on measurable and verifiable outcomes and adaptive management principles

Output 3.2.1 - Project monitoring and evaluation strategy implemented: Under this output, the project will develop, and implement, an M&E strategy with relevant interest groups that clearly defines expected outcomes and time periods for completion and provides for confirmation through objectively verifiable indicators and means of verification. This will cover indicators indicated in the Results

Framework (Annex A1) as well as relevant additional biophysical and socio-economic indicators to be identified during the inception phase. Baseline and annual M&E surveys will be carried out. The project will carry out a Mid-Term Review and Terminal Evaluation with the objective of constructively informing and guiding implementation of the project, supporting the application of adaptive measures when necessary, taking account of sustainability considerations, and documenting lessons learned for project management.

Key deliverables of Output 3.1.5:

- ? Project Monitoring and Evaluation Strategy
- ? Data on changes in biodiversity levels at project sites, and changes in awareness and capacity among all target groups
- ? Six-monthly Project Progress Reports and annual Project Implementation Reports (PIRs)
- ? Mid-Term Review
- ? Terminal Evaluation
- ? Terminal Report

Indicative activities under Output 3.2.1:

| Activity Description | Level | | |
|--|----------|-------|------|
| | National | BTSNP | BBNP |
| Produce M&E Plan | ? | | |
| Determine changes in biodiversity levels in project landscapes from baseline | | ? | ? |
| Determine changes in awareness and knowledge | ? | ? | ? |
| Identify consultant to undertake MTR (FAO) | ? | ? | ? |
| Identify consultant to undertake TE (FAO) | ? | ? | ? |

(4) Alignment with GEF focal area and/or Impact Program strategies

The project is aligned with GEF focal area programs BD-2-6 ?Address direct drivers to protect habitats and species through the Prevention, Control and Management of Invasive Alien Species? by: implementing cost effective response measures to prevent introductions; focusing on high risk pathways for IAS invasion and spread; controlling and managing IAS that have become established; addressing the impacts of IAS on critical ecosystem services, including water provision; and supporting the focus during GEF-7 on island ecosystems. The project also is aligned with BD-2-7 ?Address direct drivers to protect habitats and species and improve financial sustainability, effective management, and ecosystem coverage of the global protected area estate?, by: strengthening the protection of priority protected area ecosystems and the biodiversity that they harbor; strengthening individual and institutional capacity to manage protected areas (to improve management of IAS); and assessing the potential to use payments for ecosystem services mechanisms to support funding of IAS management (within and outside of protected areas).

The proposed project will directly contribute to Indonesia?s obligations to support the implementation of the *United Nations Convention on Biological Diversity* (CBD) (which Indonesia ratified in 1994), and specifically *CBD Article 8* (h), which states: ?Each contracting Party shall, as far as possible and as appropriate, prevent the introduction of, control or eradicate those alien species which threaten ecosystems, habitats or species?. In addition, the proposed project is in-line with Aichi Target Number

9, which states: "by 2020, invasive alien species and pathways are identified and prioritized, priority species are controlled or eradicated, and measures are in place to manage pathways to prevent their introduction and establishment". The project also will contribute to the following *Sustainable Development Goals*: Goal 2, 5, 6, 8 and 15.

The Post-2020 Global Biodiversity Framework is currently under development and in draft with CBD. Of interest, although a 2030 target has not been agreed, the IUCN Invasive Species Specialist Group has proposed the following to the CBD: "Halting the loss of biodiversity caused by invasive alien species by 2030, by preventing their impacts in [100% of] the most vulnerable areas, regulating [50% of] the most harmful invasive alien species, and effectively managing [50% of] the most significant pathways of introduction, such that their impacts are reversed through restoration and recovery by 2050." The quantitative elements suggested for 2030 are seen as a "stepping stone" for 2040 and 2050, where by 2040 all harmful invasive alien species are regulated, and all significant pathways of introduction are effectively managed, and that the impacts from IAS can be reversed through restoration and recovery by 2050.

Relevance of Project to Sustainable Development Goals (SDGs) and Post-2020 Global Biodiversity Framework

In 2010, Contracting Parties to the CBD adopted the Strategic Plan for Biodiversity 2011-2020 with 20 targets known as the "Aichi Targets", including one on IAS: Aichi Target 9 aims that "By 2020, invasive alien species and pathways are identified and prioritized, priority species are controlled or eradicated, and measures are in place to manage pathways to prevent their introduction and establishment". The evidence so far shows that while there has been some progress, for example on eradications and pathway management (CBD 2018), overall efforts to meet this target have been largely inadequate^[88].

Parties to the CBD are now negotiating a post-2020 global biodiversity framework and targets. A "zero draft" of the post-2020 framework was published in early 2020, and carries forward the 2050 Vision "Living in Harmony with Nature" from the previous 2010-2020 strategy, which aims to reduce the rate of biodiversity loss, while securing food production and climate change mitigation^[89]. The "zero draft" sets out four long-term goals for 2050. The framework also has 21 action-oriented targets for urgent action over the decade to 2030. Target 6 is on IAS, and calls signatory countries to "Manage pathways for the introduction of invasive alien species, preventing, or reducing their rate of introduction and establishment by at least 50 per cent, and control or eradicate invasive alien species to eliminate or reduce their impacts, focusing on priority species and priority sites (CBD 2021^[90]). The final decision regarding this proposed target will be made after the second part of COP 15, which will involve a face-to-face meeting in Kunming, China, from 25 April-8 May 2022. There have been several other proposals regarding an IAS target, including one from IUCN: "Halting the loss of biodiversity caused by invasive alien species by 2030, by preventing their impacts in [100% of] the most vulnerable areas, regulating [50% of] the most harmful invasive alien species, and effectively managing [50% of] the most significant pathways of introduction, such that their impacts are reversed through restoration and recovery by 2050."^[91]

The issue of IAS is also included in the United Nations Sustainable Development Goals (SDGs). SDG 15.8 has a target which aims to "prevent the introduction and significantly reduce the impact of IAS in terrestrial and water ecosystems and control or eradicate the priority species" by 2030. However, IAS

are a cross-cutting issue, impacting on crop and pasture production, biodiversity, human and animal health, water resources, livelihoods, etc., and as such the improved management of IAS will contribute to countries achieving, according to the IUCN^[92], many SDGs including:

1. SDG 1 (end poverty in all its forms everywhere);
2. SDG 2 (End hunger, achieve food security and improved nutrition and promote sustainable agriculture);
3. SDG 3 (Ensure healthy lives and promote well-being for all at all ages);
4. SDG 6 (Ensure availability and sustainable management of water and sanitation for all);
5. SDG 8 (Promote sustained, inclusive and sustainable economic growth, full and productive employment and decent work for all);
6. SDG 9 (Build resilient infrastructure, promote inclusive and sustainable industrialization and foster innovation industry, innovation and infrastructure);
7. SDG 10 (Reduce inequality within and among countries);
8. SDG 13 (Take urgent action to combat climate change and its impacts);
9. SDG 14 (Conserve and sustainably use the oceans, seas and marine resources for sustainable development life below water);
10. SDG 15 (Protect, restore and promote sustainable use of terrestrial ecosystems, sustainably manage forests, combat desertification, and halt and reverse land degradation and halt biodiversity loss life on land)

By addressing issues related to policies, coordination, finance, best management practices, awareness, capacity development, etc. the project will contribute, directly and indirectly, to the goals and targets of the proposed Post-2020 global biodiversity framework, especially Target 6, but also many other targets related to biodiversity conservation. Project interventions will also contribute to many of the SDGs as indicated above. This is supported by many of the examples provided elsewhere of the impacts of IAS.

(5) Incremental/additional cost reasoning and expected contributions from the baseline, the GEFTF, LDCF, SCCF, and co-financing

Scenario without the GEF project: Indonesia has a relatively weak, but nevertheless strengthening IAS legislative, policy and institutional framework with a NISSAP that has been poorly implemented, largely due to a lack of resources, timelines and targets. IAS coordination mechanisms are largely absent or ineffective. There are no systems in place to generate sufficient resources for IAS management, no clear procedures to analyze the risks associated with the importation of plants, especially for those that may impact on biodiversity, and a lack of systematic procedures for the early detection and control of IAS. There is a general lack of capacity regarding IAS management, with a few small pockets of expertise dotted around the country which frustrates attempts to implement effective national IAS strategies. Although there are lists of IAS, including field guides, especially of plants, there is limited information on their distribution, impacts and management. There are currently very few national publicity and awareness efforts focusing on IAS and those that are undertaken are limited in scope, single species focused and sectoral, and often only refer to pests in agriculture.

Although a Communication Strategy was developed during the previous FORIS project it has not been implemented due to a lack of resources and the absence of an effective coordination structure.

In the absence of the proposed project, IAS will continue to enter into and spread within Indonesia, exacerbated as a result of climate change, with growing negative impacts on biodiversity, ecosystems services, natural resources production and the well-being and health of all Indonesians. Although programs to address pest species that threaten agriculture, and to a lesser extent forestry and fisheries, will continue to operate, these will continue to suffer from a lack of sufficient data and the absence of effective tools and guidelines for identifying IAS, developing risk assessments, and implementing effective prevention and response programs for IAS incursions. Furthermore, Indonesia will continue to mostly ignore IAS that may have severe impacts on biodiversity and ecosystem services (because they do not also impact productive sectors such as agriculture, forestry and fisheries), resulting in continued severe threats to globally significant biodiversity (see discussion of GEBs below). Indonesia will continue to introduce, disseminate and promote IAS for agro-forestry and restoration that pose a significant threat to livelihoods. Finally, general awareness of IAS impacts will remain low among policy makers, the general public, and also development partners.

Fortunately, the timing of this SMIAS project is good and for a new emphasis on IAS management in Indonesia. Over the past decade the negative impacts of IAS on biodiversity, ecosystems services, natural resources, etc. have become more widespread, while awareness among resource management agencies and rural inhabitants of these impacts, and the need to do something about them, has grown significantly. This is in large part also as a result of the FORIS Project which laid much of the foundational work for what is now proposed but could never be realized because of the absence of a dedicated coordination unit with associated funding.

The NISSAP could not be adequately implemented due to some identified shortcomings, and there was no overarching regulation on IAS. In fact, much of what was developed during the FORIS Project could not be adequately implemented because of institutional, regulatory, and fiscal issues. However, the initiatives undertaken during the FORIS Project created sufficient awareness among the people of Indonesia to ensure support for additional interventions, to realize what was initiated during the FORIS Project. The FORIS project has been instrumental in identifying all of the gaps and needs that need to be addressed in order to realize the effective management of IAS in Indonesia.

Most protected areas in the country now identify IAS as one of their highest priority problems, and more institutional partners are identifying the impacts of IAS on their sectors, something that was unheard of more than 10 years ago. In addition, in recent years, the Government of Indonesia has undertaken significant efforts to improve management of its forests, including strengthening of Forest Management Units (FMU), and development of local forest management and business plans for forest restoration and production (KPH-P) as well as forest protection (KPH-L), and the FMU network of forest governance can be leveraged to improve management of IAPS. There is also now an initial institutional and regulatory base in Indonesia on which to build an incremental approach to management of IAPS.

KEMENKO MARVES had coordinated preparation of Presidential Instruction draft on mainstreaming Biodiversity Conservation in Sustainable Development involving relevant line ministries. MoEF was the initiator for this activity who prepared the technical substance draft for discussions in the working group. In relation to revision of Invasive Alien Species related regulation (Component 1), KEMENKO

MARVES plays an essential role in coordinating the cross-ministerial discussions with initiator from and technical substance draft is prepared by a relevant ministry.

The National Research and Innovation Agency (BRIN) has two research programs related to this SMIAS Project. Additionally, the research centres have facilities and infrastructure that can support the SMIAS Project implementation.

Scenario with the GEF project: In the Alternative Scenario, GEF funding will support the essential capacity building, development of tools and information resources, creation of new policies and regulations and strengthening of current ones, and awareness raising among decision-makers, resource managers, private sector players and the public, that will elevate support for IAS management and greatly strengthen Indonesia's ability to effectively manage IAS. By the end of the project, Indonesia will be benefitting from strengthened policy, regulatory, institutional and financing frameworks for IAS management; a demonstrated landscape-level approach to IAPS management; and strengthened knowledge and awareness of IAS issues among key stakeholders.

More specifically, IAS management in Indonesia will come to address a much wider scope of species and pathways; will address IAS at the appropriate geographic scale (landscapes) needed to effectively prevent IAS spread; will be based on much stronger technical capacities, information resources, and management tools and mechanisms; will involve for the first time numerous additional ministries responsible for all protected and productive landscapes and key IAS pathways in IAS management activities; and will benefit from the participation of a much broader spectrum of communities, institutional partners, civil society and private sector stakeholders. As a result, Indonesia will have sustained capacity to effectively address the potential negative impacts of IAS on globally significant biodiversity and ecosystem services.

Contribution from co-financing: Add contribution from co-financing.

(6) Global environmental benefits (GEFTF) and/or adaptation benefits (LDCF/SCCF)

The project will bring 94,026 hectares of protected areas under improved management by improving the prevention, management and control of IAS. Furthermore, it will result in 27.3 million ha of landscapes under improved management to benefit biodiversity, through project interventions to support IAS prevention and management frameworks at the national level, which will strengthen the protection of all conservation areas in the country from IAS impacts, and therefore will benefit the conservation of the globally important biodiversity found within these areas. Finally, it will bring a total of 103,098 ha of productive landscape (78,757 ha around the BBNP and 24,341 ha around the BTSNP) under sustainable land management through direct interventions under Component 2 as well as indirect benefits from the improved prevention and control of IAS in the target landscapes. Thus, the total area under improved management by this project for global environmental benefits is 27.5 million.

Myers et al. (2000) identified 25 'biodiversity hotspots' in the world as those areas containing high concentrations of endemic species and undergoing immense habitat loss. Indonesia includes within its geographic boundaries two of these hotspots (Sundaland and Wallacea). Approximately 10% of the world's flowering plant species (estimated 25,000 flowering plants, 55% endemic) can be found in Indonesia together with about 12% of the world's mammals (515 species). Home to 16% of the world's reptiles (781 species), and 35 species of primate, Indonesia also has 17% of the total species of birds (1,592 species) and 270 species of amphibians. At a regional level SE Asia has one-third or

284,000 km² of all global coral reefs which are the most biodiverse in the world. SE Asia contains over 61,000 km² of mangroves, approximately 35% of the world's total. These host nearly 75% of the world's mangrove species, and over 45% of seagrass species.

The Sundaland hotspot, has about 25,000 vascular plant species, of which 15,000 are endemic; approximately 770 bird species of which nearly 150 are endemic; more than 170 endemic mammal species; and over 450 species of reptiles of which roughly 250 are endemic. The Wallacea hotspot, with its centre in Eastern Indonesia, hosts approximately 1,500 endemic plant species and 265 endemic bird species. More than half of the mammal species and 60% of the amphibian species are endemic to the Wallacea hotspot. However, much of this biodiversity is threatened. The main factors affecting biodiversity loss and species extinction are habitat degradation and fragmentation, landscape changes, overexploitation, pollution, climate change, IAS, forest and land fires, and the economic and political crises occurring in the country. The current list of species threatened by extinction includes 140 species of birds, 63 species of mammals and 21 species of reptiles. Protecting this diversity and the millions of people that depend on it by managing IAS more effectively is critical.^[93]

Protection of much of this biodiversity within Indonesia will be supported through the implementation of this project, particularly within the targeted protected areas. Within the BBNP, at least 709 plant species have been identified, including six protected species, namely ebony (*Diospyros celebica*), palms (*Livistona chinensis*, *Livistona* sp.), and orchids (*Ascocentrum miniatum*, *Dendrobium macrophyllum* and *Phalaenopsis amboinensis*). The BBNP also harbours 33 species of mammals, 154 species of birds, 17 species of amphibians, 30 species of reptiles, 23 species of fish, and 240 species of butterflies; including the following national priority species: (1) Sulawesi black macaca (*Macaca maura*), (2) Kus-Kus (*Ailurops ursinus*), (3) Sulawesi Kus-Kus (*Strigocuscus celebensis*), (4) Sulawesi weasel (*Macrogalidia musschenbroekii*), (5) Sulawesi wild boar (*Sus celebensis*), (6) Sulawesi hornbill (*Aceros cassidix*), (7) Sulawesi kengkaren (*Penelopides exarhatus*), and (8) Sulawesi hawk (*Spizaetus lanceolatus*). Within the BTSNP, at least 439 plant species have been identified, including: orchids (131 species); trees (113 species); palms (7 species); shrubs (52 species); bamboo (4 species); liana (27 species); grass (14 species); terna (81 species); and snails (8 types), including a number of rare orchids (*Malaxis purpureonervosa*; *Meleola wetteana*; and *Liparis rhodocila*), endemic orchids (Tosari/*Habenaria tosariensis* and shrimp orchid/*Dendrobium jacobsonii*), endemic grasses (*Styphellia javanica*) and mountain plants including (*Anaphalis* sp). The BTSNP also harbours 38 species of wild animals that are protected according to *Government Regulation No.7 (1999)* concerning the Preservation of Plant and Animal Species, including 24 species of birds, 11 mammals, one reptile and two insects. Because the project is designed to establish a model for improved IAS management for landscapes that include protected areas, it has a strong potential to benefit biodiversity at a much broader scale throughout the country, including in particular the 552 conservation area units within Indonesia.

Additionally, the project will result in adaptation co-benefits by strengthening biodiversity and ecosystems through the prevention, management and control of IAS. It will also result in Land Degradation (LD) co-benefits such as the improved provision of agro-ecosystem goods and services, the conservation and sustainable use of biodiversity in productive landscapes, and reduced pollution and siltation of waterways. Finally, the project is expected to result in socio-economic benefits.

(7) Innovativeness, sustainability, potential for scaling up and capacity development

Innovation: By establishing Indonesia's first dedicated government unit for the management of IAS, the proposed project has the potential to transform national capacity, awareness and support for addressing the growing threats posed by IAS in the country. The establishment of a national coordination unit is seen as key to the management of IAS throughout the world since IAS have cross-cutting impacts and cannot adequately be managed by one Ministry or Government Department alone. Another key innovation of this project will be the piloting of a landscape level approach to IAS management that addresses IAS threats across both productive agricultural and forest lands as well as adjacent protected areas, and depends on the participation of PA administrations, productive forest management unit administrations, and the local inhabitants who reside throughout these areas. This landscape approach will also necessitate closer cooperation between all stakeholders and be the driver behind the establishment of local and regional IAS Coordination Units. These structures and their functions will then be rolled out to other areas, improving IAS management throughout Indonesia. The focus on supporting at least 15 post-graduate students could also be innovative since they will be key in generating information which will be used to 'convince' government to make greater investments in IAS management. The key here will be to mostly support individuals that are currently employed in relevant institutions, in order to ensure that their skills are utilized post-project. In addition, project activities to develop the use of effective and host specific biological control agents for IAS management will be innovative in Indonesia, where they have been used rarely, especially for plants, in the last 15-20 years. Effective biocontrol agents not only reduce the spread and impacts of IAS, but also the cost of other conventional interventions like physical or chemical control. Biological control is seen as the most cost-effective, sustainable and safe way of controlling IAS and is an integral part of integrated IAS management (a combination of strategies including physical/mechanical, biological, and chemical control). The main benefits of biocontrol are:

- ? Agents establish self-perpetuating populations, often throughout the range of a target weed, including areas that are not accessible using chemical or mechanical control methods;
- ? The control of a target weed is permanent;
- ? There are no negative impacts on the environment;
- ? The cost of biocontrol programmes is low, relative to other approaches, and requires only a one-off investment;
- ? Benefits can be reaped by many stakeholders, irrespective of their financial status or of whether they contributed to the initial research process.

Sustainability: GEF defines sustainability as 'the extent to which benefits continue, within or outside the project domain, from a particular project or programme, after GEF assistance/external assistance has come to an end.' By addressing the major barriers to effective IAS management, this project will contribute to the long-term sustainability of IAS interventions. Based on previous IAS projects the major issues with regard to sustainability have been a lack of sufficient resources; an absence of an effective and sustained coordination unit; and the lack of effective policies and regulations and/or implementation thereof. Little awareness and insufficient capacity have also been issues. This project seeks to address all of these and more. By establishing and operationalizing a dedicated National Biosecurity Task Force within Government and providing capacity building for that Task Force as well as other government agencies, the project will strengthen the sustainability of institutional programming for IAS management in Indonesia. The project also will produce several legal and institutional outputs, including modified regulations, improved information and data on IAS, new IAS

management tools and guidelines, etc. ? that will help national stakeholders to sustain IAS management after the project has ended. Based on consultation with several government agencies, the new IAS National Biosecurity Framework to be formulated during project implementation will have a strategic standing in legal terms, as it will enable the ministries to establish specific allotments in their budgets to address IAS issues in Indonesia. To support the financial sustainability of the project interventions, the project will invest in building the national case for effective IAS interventions, programming and budgets through calculating and communicating the costs of IAS to the economy, its people and the protected area network. This data could be used to generate support among policy makers for increased current investments in Indonesia on IAS and PA management, especially if it can be demonstrated that the benefits of management outweigh the costs. The project?s results framework includes a target to increase the amount of government funds allocated for the supervision and control of IAS in Indonesia. Additionally, the project will assess the potential for Payments for Ecosystem Services (PES) from the private sector to support funding of IAS management activities, for example funding from ecotourism operators to manage IAS that threaten natural areas/attractions, or from municipalities whose water supply is being impacted by the spread of invasive plants and will support the development and testing of pilot PES programs in areas with highest potential for success. Established biological control agents will continue impacting on the growth and reproduction of target species, even in the absence of funding or other interventions. Capacity development will be sustained in those institutions that have adopted the IAS curricula. The graduate students supported by the project will continue to contribute to IAS management post-project.

Scaling-Up: Project activities under Component 2 are designed to provide a model for landscape level approaches to IAS management that can help to protect globally significant biodiversity and ecosystem services within protected areas as well as generate benefits for adjacent agricultural and forest production systems. If successful, such a model has the potential for widespread replication in other landscapes that include terrestrial protected areas throughout Indonesia, as virtually all such areas are being heavily impacted by IAS. Project activities under Component 1 will establish the policy and institutional frameworks to enable such replication to take place more easily and efficiently, as well as financing strategies and mechanisms to enable scaling up of IAS management. In addition, the leadership of MoEF in this project (which is the Ministry responsible for most of the country?s protected areas) will facilitate scaling up of project lessons throughout the country?s PA system. MoEF will support information sharing, training, and visits among different PA sites to learn about and adopt existing and new IAS prevention and management practices (including training to implement the existing DG of Nature Reserve and Ecosystem Conservation Decree P.4/KSDAE/Set/KSA.2/11/2019 on Procedures for Risk Analysis of Invasive Plants in Sanctuary Reserve Areas, Nature Reserve Areas, and Hunting Areas). These activities have been included in the 2020-2024 mid-term plan (at both the national and site levels) of the DG of Natural Resources and Ecosystem Conservation within MoEF.

Capacity development: One of the major impediments to IAS management is the lack of information/data. This can only be generated if there is sufficient research capacity to determine which IAS are present, their distribution, impacts, and how best they can be managed. Without this information it is not possible to create awareness or influence policy, which is a critical requirement for generating funds for IAS management. To that end the project will make considerable efforts to develop sustainable mechanisms to capacitate IAS management. These will include the development of IAS courses which will be integrated into school and university curricula, especially those around the

two project landscapes. The project will also support at least 15 post-graduate students to undertake research on various IAS topics. Most of these students will be sourced from exiting institutions where they are currently employed. Tools will be developed to facilitate other capacity development initiatives.

Information sharing will be carried out through the existing Indonesia Biodiversity Clearinghouse, and technical training will be facilitated by the MoEF education and training centre through technical guidance (Bimtek Pusdiklat). As noted under Component 3, the project will support regional-level workshops and/or learning visits between different PA management units (UPTs) to enable sharing of best practices and lessons learned; such activities will be continued post-project by MoEF. More generally, project activities under Component 3 will increase awareness of and support for IAS management in the country and provide important mechanisms for ensuring that lessons learned, and relevant data are available to support replication by new stakeholders. Several training and capacity building activities are foreseen under Component 3 targeting various stakeholders at both national and subnational levels.

(8) Summary of changes in alignment with the project design with the original PIF

The only significant change has been the consolidation of all capacity and awareness creation activities/outputs under Component 3. This has resulted in the movement and/or consolidation of Outputs 1.2.1; 1.2.2; 1.2.3; and 2.2.1 under Component 3 as explained below. Accordingly, the budget of Component 3 is increased and the budget of Component 1 decreased compared to the PIF. Component 1 now deals specifically with improved policies, regulatory frameworks, coordination, and financing; Component 2 with landscape-level activities such as IAS and PA management plans and the development of best management practices for targeted IAS; and Component 3 with awareness creation, capacity development, and M&E. Associated indicators remain with relevant Outcomes/Outputs as in PIF.

The co-financing amounts have been adjusted and finalized in discussion with relevant partners and stakeholders. Total co-financing has been reduced from USD 65.9 million at PIF stage to USD 36.2 million at CEO ER. This still represents a ratio of 1:8 and is considered more realistic. In particular, after detailed analysis, the realistic MoEF co-financing is USD 33.27 million and all MoEF co-financing (including national park authorities) has been grouped in one co-financing letter. Restructuring in government institutions and also the COVID-19 pandemic have had impacts on the budget cuts in all ministries including relevant ministries to the SMIAS Project. Funding from IFAD, JICS and KfW that had been indicated at PIF stage are no longer valid as the relevant projects have been closed. The co-financing from the cement company indicated at PIF stage was removed as other private sector engagement was identified as more relevant to the project (see *Section 4) Private Sector Engagement* ? this engagement does not involve any co-financing).

Table 8: Summary of changes from the original PIF

| Topic | PIF | Suggested change | Explanation |
|-------|-----|------------------|-------------|
|-------|-----|------------------|-------------|

| | | | |
|-----------------------|--|--|--|
| Project title: | Strengthening Capacities for Prevention, Control and Management of Invasive Alien Species (SMIAS) in Indonesia | Strengthening Capacities for Management of Invasive Alien Species (SMIAS) in Indonesia | Prevention and control are a form of IAS management. IAS management encompasses prevention, early detection and rapid response (EDRR) and control. |
| Outcome 1.2 | Institutional capacities and coordination for IAS management strengthened | Coordination for IAS management strengthened | It was agreed that all activities related to capacity development should be consolidated under Component 3. |
| Output 1.2.1 | National IAS biosecurity/biosafety management capacities strengthened | Combined with Output 1.2.2 and moved to Output 3.1.3 : Capacity of staff at various institutions to manage and prevent the spread of IAS in the landscape/seascape enhanced | Capacity building activities moved to Component 3 |
| Output 1.2.2 | Capacity of institutions to manage and prevent the spread of IAS in the landscape/seascape enhanced | Combined with Output 1.2.1 and moved to Output 3.1.3 : Capacity of staff at various institutions to manage and prevent the spread of IAS in the landscape/seascape enhanced | Capacity building activities moved to Component 3 |
| Output 1.2.3 | Information and information management systems on IAS strengthened | Output 3.1.2 : Information and information management systems on IAS strengthened | Capacity building activities moved to Component 3 |
| Output 2.2.1 | Development of training modules and curricula on IAPS management for local forestry and agricultural extension staff, PA and forest managers, and policy makers | Retained but moved to Component 3 ? Output 3.1.4 . | Capacity building activities moved to Component 3 |
| Output 2.2.2 | Community and private participation in IAPS prevention/control approaches enhanced, and approaches integrated into existing forestry/agricultural production systems | Retained but is now Output 2.2.1 | Replaces Output 2.2.1 which has been moved to Output 3.1.3 |

| | | | |
|---------------------|---|--|--|
| Outcome 3.1 | Understanding and awareness of IAS issues increased and supporting improved management in Indonesia | Remains largely unchanged: Understanding, awareness, and capacity of IAS issues increased and supporting improved management in Indonesia | Component 3 now includes and places more emphasis on capacity development. |
| Output 3.1.2 | IAS management practices/lessons learned captures, documented and disseminated | Remains unchanged but has become Output 3.1.5 | |

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[11] Note: The boundaries and names shown, and the designations used on the maps in this document do not imply the expression of any opinion whatsoever on the part of FAO concerning the legal status of any country, territory, city or area or of its authorities, or concerning the delimitation of its frontiers and boundaries.

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- [80] Covering all types of IAS including plants, animals and other organisms.
- [81] Indigenous Peoples? Plan (IPP) or Masyarakat Adat Plan.
- [82] Indigenous Peoples? Plan (IPP) or Masyarakat Adat Plan.
- [83] Similarly to the National Biosafety Framework that will be used as the basis for the development of national legislation of GMO.
- [84] There are three main strategies for controlling IAS: physical/mechanical, biological, and chemical. These strategies are often combined for effective IAS control. Biocontrol measures will only be implemented if appropriate and approved by relevant national agencies and would be done only after initial assessment carried out that determines whether biocontrol is appropriate and feasible
- [85] Note: A more detailed description of activities can be found in Annex H (work plan) of the Project Document.
- [86] Free, Prior and Informed Consent (FPIC) and Indigenous Peoples? Plan (IPP).
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1b. Project Map and Coordinates

Please provide geo-referenced information and map where the project interventions will take place.

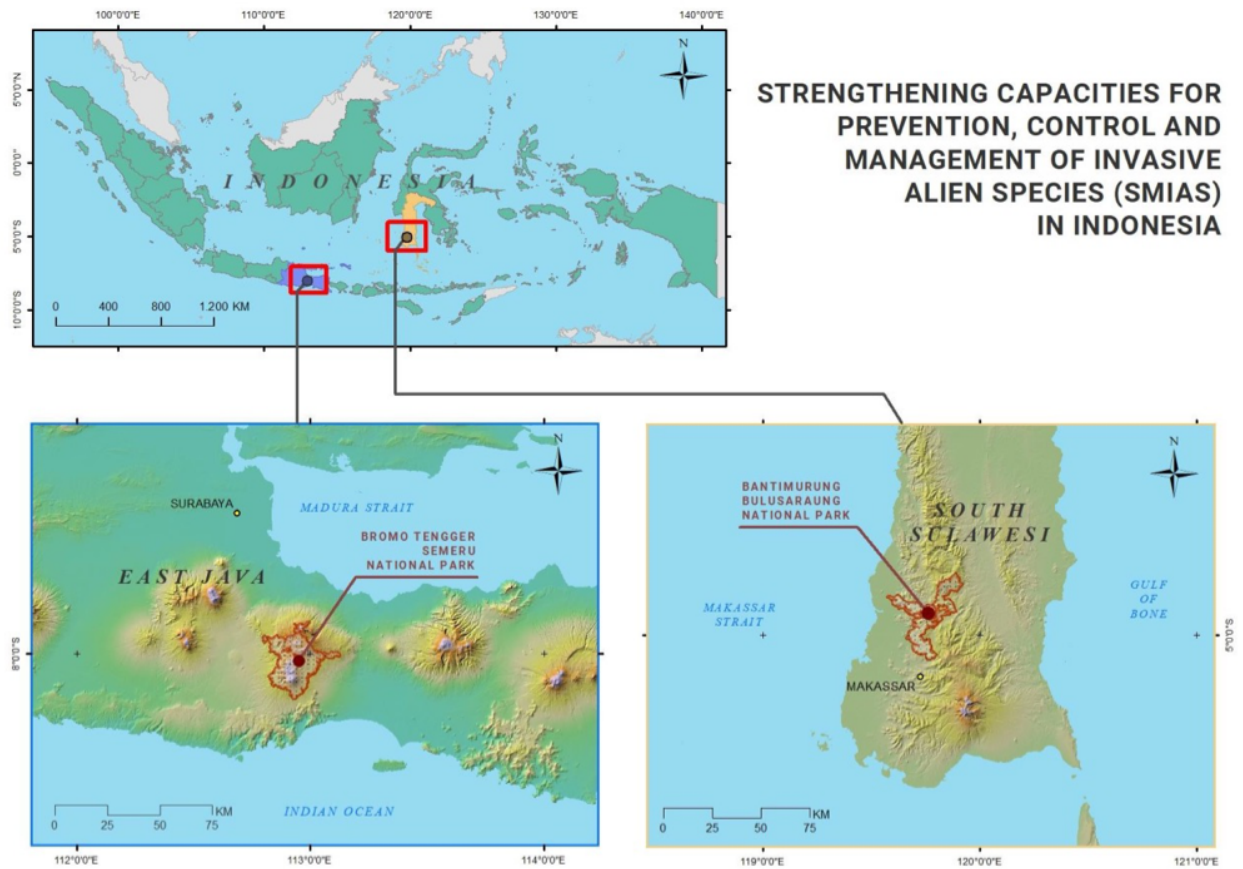


Figure 3: The localities of BTSNP and BBNP in Indonesia

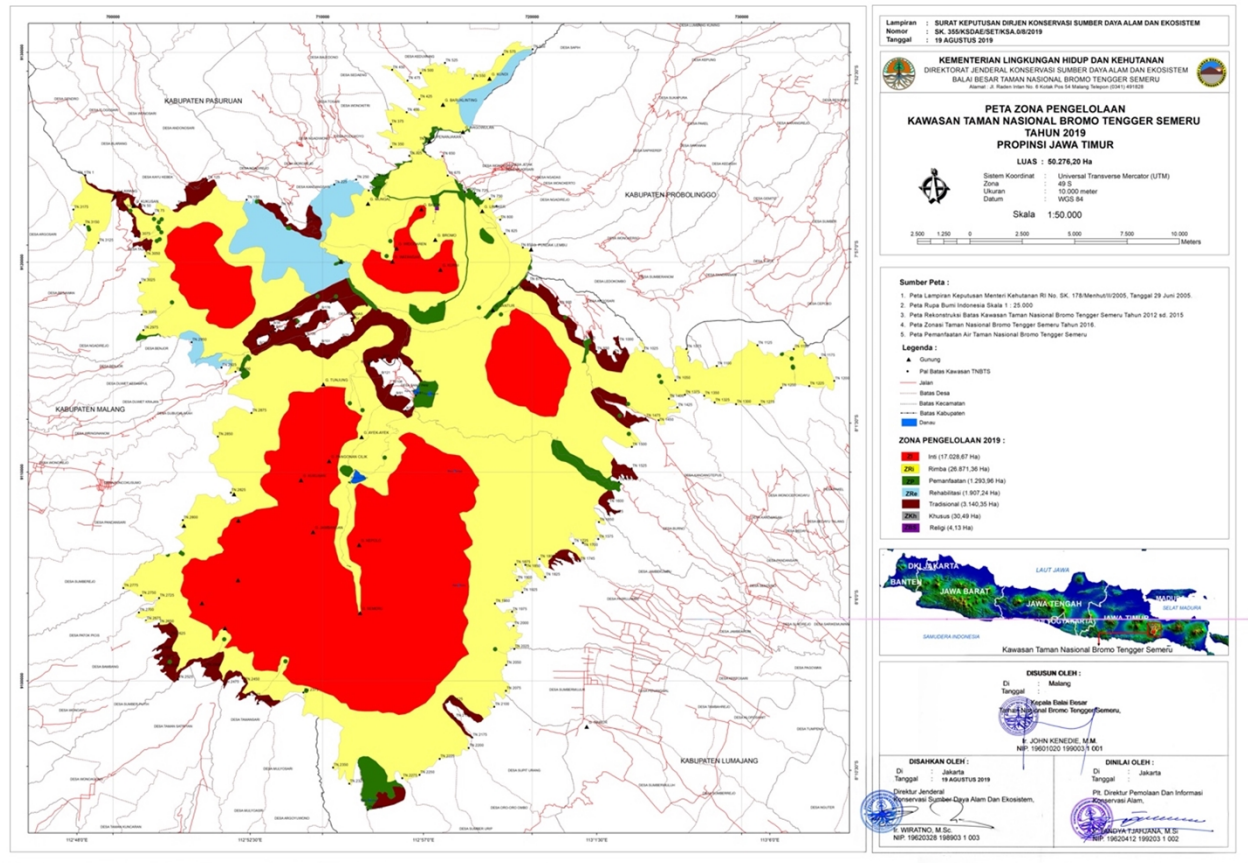


Figure 4: Bromo Tengger Semeru National Park showing the location of some important landmarks

1c. Child Project?

If this is a child project under a program, describe how the components contribute to the overall program impact.

Not applicable

2. Stakeholders

Select the stakeholders that have participated in consultations during the project identification phase:

Civil Society Organizations Yes

Indigenous Peoples and Local Communities Yes

Private Sector Entities

If none of the above, please explain why:

Please provide the Stakeholder Engagement Plan or equivalent assessment.

In line with GEF Policy on Stakeholder engagement and Implementation Guidelines, meaningful and continuous stakeholder engagement together with system-wide capacity enhancement approaches during the project design and implementation is key to maximize country ownership and contribute to more enduring results at scale. The project intends to strengthen polycentric, multi-stakeholder governance mechanisms within the identified landscapes building on integrated spatial planning and management to result in positive impacts within the productive landscapes and contribute to preserving the natural capital. The proposed stakeholder engagement plan is closely aligned with the overall social safeguards plans paying specific attention to ensure inclusion of key stakeholders and vulnerable groups.

A number of stakeholders at the national, provincial and local levels were consulted during the project preparation phase. Stakeholders consulted during the PPG include several agencies within the Ministry of Environment and Forestry (MoEF) such as the Directorate of Biodiversity Conservation, Directorate of Area Conservation, Bromo Tengger Semeru National Park Authority, and Bantimurung Bulusaraung National Park Authority. A number of additional stakeholders were also present during the Inception Workshop including representatives from the following organizations/agencies: Various learning institutions (BRIN, IPB University, University of Brawijaya, University of Hasanuddin); Coordinating Ministry of Maritime and Investment; Ministry of Agriculture; Ministry of Marine Affairs and Fisheries; Ministry of Energy and Mineral Resources; Regional Body for Planning and Development (BAPPEDA); SEAMEO BIOTROP; local government in which the two pilot landscapes are located; and others. Due to travel and other restrictions during the COVID-19 pandemic, many consultations were held virtually. Additional information was gleaned from desk-top reviews, online surveys, key informant interviews, focus-group discussions (FGD) and field visits. Field visits were conducted in August-October 2021 and initial consultations held with community representatives, although these were limited due to COVID-19. More focused discussions will need to take place with Masyarakat

Adat, and local communities in BBNP and BTSNP at the initiation of the project to glean additional information on the uses and impacts of IAS.

Given that consultations undertaken so far have not yet included significant participation of Masyarakat Adat or their representatives (just 1 Traditional shaman / pandhita was interviewed in Lumajang District, 14 September 2021 see below), the project implementation will ensure that Masyarakat Adat will be consulted and involved in any discussion, consultation, decision process and implementation activity, in respect of UNDRIP and FPIC process that when activities impact in territories with the presence of Masyarakat Adat traditional settlement.

The two project areas where the two National parks are located are inhabited by Masyarakat Adat. For instance, the Bromo Tengger Semeru National Park in Java is inhabited by Tengger Adat people. In 2019 the Probolinggo Regency, the East Java Province Environmental Services and MoEF, under the current MoEF regulations, met with Tengger authorities to discuss about Masyarakat Adat and data collection towards customary recognition and the issuance of Perda. FAO's Indigenous Peoples Unit (PSUI) in the past two years has also been working with local organizations in the area documenting the unique Food systems of the Tengger.

The Bantimurung Bulusaraung National Park in Sulawesi is in an area with several Masyarakat Adat living in the vicinities of the park and having relations with the protected area. The Batu Bassi; Karaeng Bulu; Bulu Lewang; and Tanralili are distinctive Masyarakat Adat inhabiting in the region. Some of them have their sacred ancestral sites for spiritual ceremonies inside the Bantimurung Bulusaraung National Park.

Both in the vicinity of Bromo Tengger and Bantimurung Bulusaraung National Parks, there are relevant local organizations, some of them Masyarakat Adat, worth involving in the project activities and in the stakeholder consultations. Some of them worth mentioning are: Sokola Institute and Mantasa in the Tengger areas; and WALHI South Sulawesi; AMAN South Sulawesi; Perkumpulan Wallacea are relevant organizations to be consulted in South Sulawesi.^[1]

All the above considerations and the fact that the project is targeting geographical areas traditionally inhabited by Masyarakat Adat, make the implementation of this project High Risk and in need to develop an Masyarakat Adat? Plan (IPP) for each of the two targeted areas. At the inception of the activities, the project team will ensure that the current gap in discussion about the project with Masyarakat Adat will be addressed, ensuring that in the two project areas, Masyarakat Adat leaders, representatives and their organizations are made aware of the project and start preparing the FPIC processes with the different members in the community, ensuring that elders, youth, women and men are involved in the FPIC discussions. At present there has not been consultations to state whether Masyarakat Adat agree or not with the proposed activities.

Summary of consultations during PPG:

| Date | Discussion topics |
|------------------|--|
| May to July 2021 | Meetings between FAO and the international consultant (CABI) concerning contracts, potential partners, and other issues around project development |

| | |
|---|--|
| Inception Workshop (July 2021) | A national inception workshop was held in July with most participants attending virtually due to the COVID-19 restrictions. The meeting was well attended with over 100 participants from various institutions across Indonesia. |
| Field visits to BBNP and BTSP (August - October 2021) | Field visits were undertaken to the two project landscapes to garner information from NP management and communities for the development of an Environmental and Social Impact Assessment (ESIA). National Park staff were interviewed to glean more information on IAS present, and management interventions taken to date. Interviews were also undertaken with community members, including <i>Masyarakat Adat</i> , either individually or in groups, to obtain information on livelihood strategies, particularly regarding crops grown, use of natural resources, presence of IAS, their perceived impacts, and perceptions regarding management. These interviews were supported by field observations to assess issues around land degradation, and IAS present, and their possible impacts. The visits were supported by desk-top reviews and consultations to gather/collate additional information on gender, <i>Masyarakat Adat</i> , IAS, etc. |
| Additional consultations (May 2021 - February 2022) | Throughout this period there have been regular meetings to discuss the development of the project document, including consultations on sustainable and innovative financing, biological control, etc. Most meetings were between FAO, CABI and the local consultant Titiek Setyawati. Additional meetings have also taken place between SEAMEO BIOTROP, responsible for the development of the ESIA, MoA, MoEF, FAO, MMAF, Coordinating Ministry for Maritime and Investment, and National Research and Innovation Agency (BRIN). |
| Validation Workshop | <p>A validation workshop between all stakeholders was held on 4th March 2022 to get endorsement for the full proposal. An internal validation workshop involving relevant directorates in the MoEF was held on 2nd March 2022.</p> <p>Points highlighted by stakeholders were subsequently incorporated into the Project Document. These included, among others:</p> <ul style="list-style-type: none"> ? The SMIAS Project should address the lack of coordination among relevant agencies in charge of IAS. ? BBNP will be forming public engagement group for the management of IAS. ? BTSNP have drafted an IAS risk analysis in 2021, upon which the project can build. ? Invasive fish species should also be considered in the development of policies. Technical capacity for identifying fish species should be enhanced. ? Scope of Components 1 and 3 should also include coastal and marine ecosystems, not only terrestrial. The Project will comprehensively address all IAS issues in Indonesia. ? The subnational (regional, local) Governments need to be involved in the implementation of policies and their awareness on IAS increased. ? Legislation and regulations already exist; rather than developing new laws the Project should focus on developing a IAS National Biosecurity Framework that will allow to align existing regulations; and support implementation and alignment of existing regulations. |

Stakeholder analysis

Regional and international stakeholders

The regional and international institutions that have contributed to IAS management in Indonesia are listed below. More details can be found in *Section 2) Baseline scenario*. The main role of these international and regional organizations will be to share knowledge and best practices from globally and from the region.

Table 9: Regional and international stakeholders and their past, current and potential roles

| Partner/ Organization | Areas of Interest | Project related activities |
|---|---|---|
| 1. Regional and international stakeholders | | |
| ASEAN Centre for Biodiversity (ACB) | ? Regional cooperation in the conservation of biodiversity throughout SE Asia | ? Component 3; Outputs 3.1.1. and 3.1.5: Not an official partner of SMIAS but ACB will contribute by sharing knowledge and raising awareness of IAS across the region by disseminating information of the presence, distribution and impacts of IAS in Indonesia |
| SEAMEO-BIOTROP | ? A regional initiative involved in research, training, networking, personnel exchange and information dissemination in tropical biology including those related to invasive alien species issues, including biological control | ? Component 1: Output 1.1.1.: Could be involved as a partner in developing and/or strengthening protocols regarding the importation and release of biocontrol agents; ? Component 3: Outputs 3.1.1.; Output 3.1.3 and 3.1.4: Could be involved as a partner for raising awareness on the presence and impacts of IAS and the benefits of biocontrol; developing training modules on biocontrol and IAS control in general; also, be involved in the development/enhancement of a mobile phone app to enhance awareness of IAS and contribute to improved early detection of IAS. |
| Asia-Pacific Forest Invasive Species Network (APFISN) | ? Collate and disseminate information on IAS throughout SE Asia including hosting of regional workshops and training | ? Component 3: Outputs 3.1.1: Share knowledge and raise awareness about the presence, distribution, impacts and best management practices for IAS in Indonesia. |
| FAO | ? Agricultural development and food security; develop international and regional instruments to deal with the problem of invasive species. | ? GEF Implementing Agency |
| Global Invasive Species Programme (GISP) | ? Were involved in IAS policy development, awareness creation, and capacity building | ? Component 3: Outputs 3.1.4: GISP training materials and publications |
| International Union for Conservation of Nature (IUCN) | ? Biodiversity organization also working on IAS ? Invasive Species Specialist Group (ISSG) | ? Component 3: Outputs 3.1.1, 3.1.4, and 3.1.5: Provide information on issues associated with IAS ? Global Invasive Species Database (GISD) |

| Partner/ Organization | Areas of Interest | Project related activities |
|--------------------------|---|--|
| CABI | ? International non-profit organization that improves people's lives by providing information and undertaking research in agriculture and the environment | ? Component 3: Outputs 3.1.1, 3.1.4 and 3.1.5: Provide information on issues associated with IAS ? Invasive Species Compendium. Information generated through project can also be uploaded/included in Invasive Species Compendium (ISC). Share knowledge and best practices from globally and from the region. |

Those agencies involved in the development and implementation of the UN-REDD Programme (Reducing Emissions from Deforestation and Forest Degradation), a collaborative initiative of the FAO, UNDP, and UNEP are also important stakeholders in this project. The programme assists developing countries (including Indonesia) to prepare and implement their national REDD+ strategies and mechanisms to improve forest governance. REDD+ includes activities aimed at reducing emissions due to deforestation and forest degradation, boosting forest carbon stocks, and sustainable forest management. The Programme helps participating countries to monetize carbon stored in forests as an incentive to protect and sustainably manage their forests. In the context of this project forests can only be managed sustainably if there are effective mechanisms in place to control forest IAS.

National and local stakeholders

A list of national and local stakeholders and institutions relevant to this project is included in the Table below. These are proposed partnerships/roles to be confirmed during implementation. Please also refer *Section 2) Baseline scenario* for more details.

Table 10: National stakeholders and their past, current and potential roles

| Partner/ Organization | Areas of Interest | Project related activities |
|--|-------------------|----------------------------|
| 1. Government departments/organizations | | |

| Partner/ Organization | Areas of Interest | Project related activities |
|---|--|---|
| <p>Ministry of Environment and Forestry (MoEF)</p> <p>Directorate of Biodiversity Conservation on Species and Genetic; part of the Directorate General of Natural Resources and Ecosystem Conservation (DJ KSDAE) within MoEF</p> | <p>? Administering government affairs in the field of environment and forestry to assist the President in administration of the State government.</p> <p>? Policy and regulation related to environmental safeguards and protection. Forest and natural resource conservation and protection, forest land rehabilitation and restoration, management of natural forest and plantation, forest governance, and climate change.</p> <p>? Responsible for the formulation and implementation of policies, as well as technical guidance on biodiversity</p> | <p>The Directorate General of Natural Resources and Ecosystem Conservation (DJ KSDAE) within MoEF will be the Lead Executing Agency</p> <p>? Component 1; Output 1.1.1: Currently responsible for National Strategy and Action Plan for Invasive Species (NISSAP) and as such will be responsible for updating the Strategy and driving adoption by other Ministries ? the Ministry has allocated significant co-funding to the update of the NISSAP; also critical partner in coordinated response with regard to prevention and EDRR</p> <p>? will need to be improved collaboration between MMAF, MoEF, and MoA regarding the effective implementation of Law No. 21 (2019) on Animal, Fish and Plant Quarantine; responsible for Ministerial Decree No. 94 which inhibits the control of IAS in all PA zones ? this will have to be addressed during project implementation; the driving Ministry behind the development of an IAS National Biosecurity Framework.</p> <p>? Component 1; Output 1.3.1: The Directorate of Biodiversity Conservation on Species and Genetic within MoEF, in consultation with BAPPENAS and MoF is currently drafting a mechanism to support national funding for biodiversity conservation (including IAS management). Will also be an important player in the development and implementation of PES mechanisms</p> <p>? Component 2; Output 2.1.2 and Output 2.1.3: Important partners in the development of IAS management plans and integration of IAS management plans into PA management plans at both project landscapes. The Directorate General of Natural Resources and Ecosystem Conservation will play an important role here together with the Directorate for Conservation Areas and Management of Protection Forest (part of KSDAE within MoEF)</p> <p>? Component 2; Output 2.2.1: Build on MoEF initiatives about establishing multi-stakeholder forums in project landscapes to facilitate IAS management.</p> <p>? Component 3; Output 3.1.2: MoEF will contribute to determining the national list of IAS of highest concern.</p> <p>? Component 3; Outputs 3.1.4: Agency for Extension and Human Development will contribute to the development of technical guidelines and training materials on IAS prevention and RA.</p> |

| Partner/ Organization | Areas of Interest | Project related activities |
|--|--|--|
| Bromo Tengger Semeru National Park Authority | ? Conservation of biodiversity in the BTSNP | ? Components 2 and 3: All activities under Component 2 will be undertaken in BTSNP and as such the project will be collaborating with PA staff throughout much of the project; many activities under Component 3 especially regarding awareness raising and capacity development will be undertaken in the PA. |
| Bantimurung Bulusaraung National Park Authority | ? Conservation of biodiversity in BBNP | ? Components 2 and 3: All activities under Component 2 will be undertaken in BBNP and as such the project will be collaborating with PA staff throughout much of the project; many activities under Component 3 especially with regard to awareness raising and capacity development will be undertaken in the PA |
| Coordinating Ministry for Maritime and Investment Affairs (KEMENKO MARVES) | ? Responsible for the formulation and implementation of policies for various ministries and agencies (including Maritime Affairs and Fisheries; Tourism; Transportation; and Energy and Mineral Resources), and for monitoring, analysing, evaluating and reporting on issues and activities related to issues in the field of biodiversity conservation. | ? Component 1; Output 1.2.1: The Ministry will be designated as the IAS national focal point. A National Biosecurity Task Force in the office of the Deputy Assistant for Watershed Management and Natural Resource Conservation in KEMENKO MARVES will be responsible for IAS coordination. |
| Ministry of Marine Affairs and Fisheries (MMAF) | ? Main aim is to increase the contribution of fisheries to human welfare. They are also responsible for stopping the entry and spread (from port to port) of pests and diseases of aquatic organisms, especially fish. Also has responsibility for monitoring aquatic species that have already entered Indonesia's territory. | ? Component 1; Output 1.1.1: Improved collaboration between MMAF, MoEF, and MoA with regard to the development and implementation of supporting regulations to enable effective implementation of Law No. 21 (2019) on Animal, Fish and Plant Quarantine; also the responsible agency for Regulation No. 41 of 2014, concerning the prohibition of importing dangerous fish species from abroad into Indonesia; will contribute to the development of a national strategy and action plan for management of IAS ? update and promulgation of NISSAP; critical partner regarding prevention and EDRR of various fish species ? important stakeholder in development and implementation of an IAS National Biosecurity Framework. ? Component 1; Output 1.2.1: Will contribute and support the establishment and functioning of the National Biosecurity Task Force under KEMENKO MARVES. ? Component 3; Output 3.1.2: Will contribute towards developing the list of IAS of highest concern in Indonesia |

| Partner/ Organization | Areas of Interest | Project related activities |
|--|---|--|
| Ministry of Agriculture (MoA) | <p>? Food stock and security, horticulture, quarantine, livestock and veterinary, agriculture products and processing, community empowerment and agriculture extension, agricultural infrastructure, and research and development on agricultural commodities</p> <p>? Undertakes activities in the agricultural sector to assist the President in administering the State. In carrying out its duties, the MoA undertakes the following functions: formulation, determination, and implementation of policies in the agricultural sector</p> | <p>? Component 1; Output 1.1.1: The Indonesian Agricultural Quarantine Agency is housed in the MoA and is one of the most important Ministries in terms of prevention and EDRR ? the MoA is responsible for the implementation of, among others: Quarantine Law number 21 of 2019 concerning Animal, Fish and Plant Quarantine; Decree on Fish Quarantine, Quality Control, and Safety of Fishery Products Number 107/KEP-BKIPM/2017 concerning Guidelines for Risk Analysis of IAS; Decree on Quarantine No. 78/KEP-BKIPM/2018 concerning Guidelines for Fish Disease Risk Analysis; Decree on Quality Control and Safety of Fishery Products No. 99/Kep-Bkipm/2017 concerning the categorization of risk levels of fish pests/diseases; Agricultural Quarantine Act No. 3252/KPTS/KR.120/K/12/2019 concerning guidelines for detection of IAS; Agricultural Quarantine Act No. 3253/KPTS/KR.120/K/12/2019 concerning guidelines for the monitoring of imports and exports of IAS. MoA will contribute to the development of the updated NISSAP; contribute to the effective implementation of Law No. 21 (2019) on Animal, Fish and Plant Quarantine; will be involved in the development of the IAS National Biosecurity Framework; MoA is also the responsible agency regulating the import and release of biocontrol agents and as such will have an important role to play under this output.</p> <p>? Component 1; Output 1.2.1: Will contribute and support the establishment and functioning of the National Biosecurity Task Force under KEMENKO MARVES.</p> <p>? Component 3; Output 2.2.1: Be involved in the development and implementation of sustainable farming practices in the project sites, especially Conservation Agriculture</p> |
| Ministry of Education, Culture, Research and Technology (MOECRT) | <p>? Organises early childhood education, elementary education, secondary education and community education affairs and the management of culture within the Indonesian government. Also responsible for providing oversight with respect to research and technology</p> | <p>? Component 3; Output 3.1.4: Development and integration of IAS issues into school curricula and university curricula</p> |

| Partner/ Organization | Areas of Interest | Project related activities |
|---|--|---|
| Ministry of Finance (MoF) | <ul style="list-style-type: none"> ? Funding, fiscal, and alternative finance policies ? Implementing a responsive and sustainable fiscal policy ? Achieve high level of state revenue through excellent service and effective supervision and law enforcement ? Ensuring a fair, effective, efficient and productive state spending | <ul style="list-style-type: none"> ? Component 1; Output 1.3.1: Facilitate development and implementation of mechanisms to fund IAS management in Indonesia. The Directorate of Biodiversity Conservation within MoEF, in consultation with BAPPENAS and MoF is currently drafting a mechanism to support national funding for biodiversity conservation (including IAS management) |
| Ministry of National Development Planning (BAPPENAS) | <ul style="list-style-type: none"> ? Formulation and determination of policies in the field of national development planning, national development strategies, sectoral, cross-sectoral and cross-regional policy directions, as well as macroeconomic framework that includes a comprehensive picture of the economy including fiscal policy direction, regulatory framework, institutions, and funding ? Coordination and synchronization of policy implementation in the field of national development planning and budgeting ? Fostering and providing administrative support to all elements of the organization within the Ministry of National Development Planning ? Management of state property /assets that are the responsibility of the Ministry of National Development Planning ? Oversight of the implementation of tasks within the Ministry of National Development Planning. | <ul style="list-style-type: none"> ? Component 1; Output 1.1.1: Facilitating the restructuring of institutional arrangement to enhance IAS management ? key Ministry in facilitating the development and implementation of IAS policies, and budgeting. ? Component 1; Output 1.3.1: Will lead the development of a long-term financing plan for IAS management; the Directorate of Biodiversity Conservation within MoEF, in consultation with BAPPENAS and MoF is currently drafting a mechanism to support national funding for biodiversity conservation (including IAS management) |

| Partner/ Organization | Areas of Interest | Project related activities |
|--|--|---|
| Ministry of Women Empowerment and Child Protection (MoWECP) | <p>? Responsible Ministry in Indonesia responsible for protecting and enhancing the rights of women and children</p> <p>? Within the Ministry, there is a secretariat for a Gender Mainstreaming forum, comprising officers from a range of government agencies and for a biannual policy meeting of the top-level government officers.</p> <p>? Since 1978 a number of policies and/or laws have been promulgated to address gender discrimination in Indonesia</p> | <p>? All Components: MoWECP will be consulted when required to ensure that the project supports gender equality across all of its activities. It is critical that women and other vulnerable groups benefit from project activities/interventions. This is especially relevant regarding policies under Component 1; under Component 2 regarding women's participation in IAS management activities at project landscapes; and with reference to capacity development under Component 3.</p> |
| Local Governments (in East Java and South Sulawesi Province) | <p>? Provincial and District Governments are tasked with coordinating and promoting development in their regions, and therefore have direct responsibility over likely IAS pathways such as trade, transport, tourism, and agricultural activities.</p> | <p>? Component 1: Output 1.1.1 and 1.3.1: The project intends to develop/strengthen local legislation with regard to IAS management. BTSNP falls within East Java, and BBNP in South Sulawesi and as such they will be prioritized in terms of the development of localized IAS legislation/policies/regulations; the provinces will also be consulted and contribute to the development and implementation of cost-recovery mechanisms</p> <p>? Component 2: The project landscapes fall within these two provinces, and as such they will be consulted and collaborate regarding interventions within BBNP and BTSNP</p> <p>? Component 3: Awareness creation and capacity development will focus on the two project landscapes, and as such there will be a need for involvement of these two local governments, especially regarding promoting the adoption of IAS curricula in local schools and universities</p> |

| Partner/ Organization | Areas of Interest | Project related activities |
|--|--|--|
| National Research and Innovation Agency/ Badan Riset dan Inovasi Nasional (BRIN) | <p>? Responsible for assessment and formulation of national policies in the field of scientific research; conducting basic scientific research; organization of focused inter and multi-disciplinary research; monitoring and examining science and technology trends; and facilitation/support for government agencies on scientific research</p> <p>? Responsible for operating and maintaining the national plant and zoological collections, including the various herbaria, taxonomic research including on IAS, as well as related field programmes.</p> | <p>? Component 2; Output 2.12: Provide research data on invasive species impact and management at the two project landscapes ? recommendations on invasive alien species management.</p> <p>? Component 3; Output 3.1.2; 3.1.3 and 3.1.4: Its collection contained in the Herbarium in Cibinong, and staff expertise will be of utmost importance to the project plans on national IAS inventories, as well as training of additional staff on IAS identification and other capacity building initiatives.</p> |
| 2. Universities/Institutes | | |
| Bogor Agriculture Institute (IPB), National Research and Innovation Agency (BRIN), and other tertiary institutions such as Padjajaran, Hasanuddin, Brawijaya, Lampung, Jember Universities | ? Involved in research on biology and management of IAS | <p>? Component 1; Output 1.3.1: Students will be involved in undertaking cost-benefit analyses and developing cost-recovery mechanisms.</p> <p>? Component 2; Output 2.1.2: Undertake research on the biology and ecology of some IAS and their impacts.</p> <p>? Component 3; Output 3.1.4: Staff/students registered at IPB and other universities will be undertaking research on IAS issues. IAS modules will also be developed and integrated into university curricula</p> |
| 3. International and national NGOs | | |
| WCS-Indonesia | ? Biodiversity conservation and habitat restoration | ? Components 2 and 3: Has been working with local government to prevent habitat degradation (including those damaged by invasive species), particularly in national parks and lobbying for increased funding. Also involved in awareness campaigns. Not directly involved in IAS management but could be a partner in creating awareness about the threat of IAS. |
| Rhino Foundation of Indonesia (YABI) | ? Collaborating with IRF on rhino conservation in Indonesia | ? Component 2: Very active in the management of <i>Arenga obtusifolia</i> , an invasive plant in Ujung Kulon NP. Could provide inputs into IAS management in the two project landscapes. Could potentially also make inputs into the financing of IAS management activities under Component 1. |

| Partner/ Organization | Areas of Interest | Project related activities |
|---|--|---|
| AMAN | ? AMAN is the largest Masyarakat Adat organization in the country | ? AMAN will be consulted on all three Components during project implementation. |
| RMI (Indonesian Institute for Forest and Environment) | ? RMI is active at Jakarta level and has members and collaborators in different parts of the country | ? RMI has been working with FAO for several years on Masyarakat Adat |
| SOKOLA Institute | ? SOKOLA | ? Institute researching on Masyarakat Adat |
| AMAN South Sulawesi | ? AMAN is the largest Masyarakat Adat organization in the country | ? AMAN South Sulawesi will be consulted on all three Components during project implementation. |
| MANTASA | ? Relevant in resource management in BNSP | ? Masyarakat Adat organizations supported by PSUI |
| Perkumpulan Wallacea | ? South Sulawesi | ? Working with Masyarakat Adat in Sulawesi |
| WALHI | ? South Sulawesi WALHI | ? Working with Masyarakat Adat in Sulawesi |
| 4. Masyarakat Adat | | |
| <i>Masyarakat Adat</i> | ? Masyarakat Adat live in and have ancestral relations with the two proposed project areas in Bromo Tengger Semeru National Park in Java and Bantimurung Bulusaraung National Park in Sulawesi | ? All Components: Masyarakat Adat will play a key role in project implementation. They will be closely engaged and consulted on the implementation, management and monitoring of project activities. Also refer to Annex J for more details on the FPIC process and Indigenous Peoples (Masyarakat Adat) Plan. ? The Masyarakat Adat representatives will be engaged in all three Project Components along with Masyarakat Adat Organizations |
| 5. Local communities | | |
| Local communities (including women, men, youth), community groups, youth groups, women groups | ? Local communities in the Project's target landscapes | ? All Components: Local communities including community organizations, women and youth groups will play a key role in project implementation. They will be closely engaged and consulted on the implementation, management and monitoring of project activities. The project also aims to empower local communities through fostering their leadership. |
| 6. Private sector | | |
| Indonesian Forest Concessionaires (PT. Erna Djuliawati, Sari Bumi Kusuma, Sarmiento Parakanca, Intraca and several others including Sumalindo Lestari Jaya and the Alas Kusuma Group) | ? Management of natural production forest (timber production) | ? Component 2: Potentially contribute to the development of programme for IAS management; could also benefit from trainings on IAS, contributing to improved IAS management across forests in Indonesia |

| Partner/ Organization | Areas of Interest | Project related activities |
|--|---|--|
| Tropical Forest Trust (TFT) ? now Forest Trust | ? Combat illegal logging through forest law enforcement, governance and trade. Provide solutions to deforestation and the empowerment of forest dependent communities | ? Component 2: Assist in the involvement of Masyarakat Adat and local communities in the management of IAS. |

FAO Comparative Advantage

FAO's key comparative advantages related to this project are summarized below.

The FAO is a specialized agency of the United Nations that leads international efforts to defeat hunger. Its goal is to achieve food security for all and make sure that people have regular access to enough high-quality food to lead active, healthy lives. With over 194-member states, FAO works in over 130 countries worldwide. Indonesia became a member of FAO in 1948 and the Representation was established in 1978. Collaboration between FAO and Indonesia across the food and agricultural sectors, including in fisheries and forestry, has strengthened over the decades. As of today, over 650 projects and programs have been implemented by FAO throughout Indonesia with the assistance of more than 1,600 experts and consultants (both national and international). FAO and the CBD Secretariat signed a Memorandum of Cooperation for the International Plant Protection Convention (IPPC) and CBD Secretariats in 2004. A joint work programme for the two Secretariats has been agreed in developing guidance on how IAS, which are also quarantine pests of plants, should be regulated under the IPPC framework. FAO has published several technical papers on Invasive Alien Species including their impact on forests and forestry^[2], fisheries and aquaculture^[3], and crops. FAO also developed a Guide to implementation of phytosanitary standards in forestry (2011).^[4] In 2017, FAO published Guidelines for the export, shipment, import and release of biological control agents and other beneficial organisms.^[5]

FAO also facilitates the Asian-Pacific Forest Invasive Species Network (APFISN), a cooperative alliance of the 34-member countries in the Asia-Pacific Forestry Commission (APFC). The network focuses on inter-country cooperation that helps to detect, prevent, monitor, eradicate and/or control forest invasive species in the Asia-Pacific region.^[6]

FAO promotes One Health in work on food security, sustainable agriculture, food safety, antimicrobial resistance (AMR), nutrition, animal and plant health, fisheries, and livelihoods. Ensuring a One Health approach is essential for progress to anticipate, prevent, detect and control diseases that spread between animals and humans, tackle AMR, ensure food safety, prevent environment-related human and animal health threats, as well as combatting many other challenges.^[7]

The International Plant Protection Convention (IPPC)

The IPPC is a multilateral treaty deposited with FAO and in force since 1952. With 111 governments as Contracting Parties, the purpose of the Convention is ?to secure common and effective action to prevent the spread and introduction of pests of plants and plant products, and to promote appropriate measures for their control?. The IPPC Secretariat, housed at FAO, facilitates the development of internationally agreed standards for the application of phytosanitary measures in international trade to prevent and control the spread of plant pests (many of which are invasive alien species). The standards developed under IPPC are recognized by the World Trade Organization under the Agreement on the Application of Sanitary and Phytosanitary Measures (SPS Agreement). Thus, the scope of the IPPC covers any invasive alien species that may be considered to be a plant pest.

[1] The current president of AMAN at national level is from Sulawesi and therefore is relevant to involve AMAN at Jakarta level and inform them about the scope and reach of the project.

[2] <https://www.fao.org/forestry/aliens/en/>

[3] <https://www.fao.org/publications/card/en/c/e33ecc7b-54c7-4e4b-982b-44e9fbc58071/>

[4] ?FAO (2011). *Guide to implementation of phytosanitary standards in forestry*. FAO Forestry Paper no. 164. Rome.

<https://www.fao.org/documents/card/en/c/d8862477-6085-5123-a222-e280a144b5e5/>

[5] <https://www.fao.org/publications/card/en/c/e4e617ac-db1b-4aed-b676-36d1f3b1b321/>

[6] <https://www.apfisn.net/>

[7] <https://www.fao.org/one-health/en>

In addition, provide a summary on how stakeholders will be consulted in project execution, the means and timing of engagement, how information will be disseminated, and an explanation of any resource requirements throughout the project/program cycle to ensure proper and meaningful stakeholder engagement

Stakeholder Engagement Plan

The project will engage with all key stakeholders during project implementation ranging from government, NP management and staff, civil society such as NGOs, private sector associations, and farmer cooperatives. Civil society such as members from academia and local associations, NGOs and women's groups will be involved as partners, beneficiaries and technical experts throughout project implementation. The table below summarizes the main methods for consultation and engagement of different stakeholder groups during project implementation, at both national and local levels. Knowledge management activities under Component 3 will ensure meaningful participation by all target stakeholders, and dissemination of relevant and timely knowledge, good practices and lessons learned. A more detailed Stakeholder Engagement Matrix/list of stakeholders consulted during PPG is included in Annex I2. In addition, a grievance mechanism has been defined for project stakeholders (see Annex I3).

The two project areas are inhabited by Masyarakat Adat (see Annex J) therefore the project is considered a ?High Incidence/relevance? project from the side of Indigenous Peoples. Therefore, the project will recruit an Masyarakat Adat Expert that within the PMU who, in coordination with the FAO RAP focal person for Masyarakat Adat and with the FAO Unit on Indigenous Peoples (PSUI), will ensure that Masyarakat Adat? rights are respected.

In particular, the Masyarakat Adat Expert will ensure the inclusion of Masyarakat Adat in the project activities through the following:

1. Identification with key Masyarakat Adat Organizations of leaders for their inclusion in the Project Steering Committee
2. The technical soundness and rigour of the FPIC process at community level in each of the project areas
3. The technical soundness and process validation of the drafting of one IPP for each project area.

Please refer to Annex J for more details regarding the engagement of Masyarakat Adat during project implementation. Besides engaging local and Masyarakat Adat identified in the project sites, the Alliance of Indigenous Peoples of the Archipelago (AMAN), RMI, Mantasa, Sokola Institute, AMAN South Sulawesi, WALHI, Perkumpulan Wallacea will also be engaged as an important stakeholder.

| Stakeholder group | Methods for consultation and engagement | Frequency |
|--|--|--|
| 1. National, regional, provincial and local government | The following methods will be the main channels for communication with government stakeholders. ? Email, phone, text messages and virtual/face-to-face meetings ? Workshops ? Project reports ? Project knowledge products and website | At least monthly with local government; quarterly with national government and their regional counterparts |
| 2. Local communities and community groups, including <i>Masyarakat Adat</i> , women, youth and vulnerable groups | The project will communicate with Masyarakat Adat, and local communities mainly through the project's field coordinators, partners, and local government. The main channels used will be face-to-face meetings, phone calls and text messages, as well as information, education and communication (IEC) materials. The <i>Masyarakat Adat</i> will be engaged in accordance with the measures outlined in Annex J. | Continuous |
| 3. Civil society and academe | The main channels used for communication with civil society and academe are the following: ? Email, phone, text messages, meetings ? Workshops | At least bi-annually; some more frequently if they are engaged in the project implementation |
| 4. Private sector | Private sector actors will be engaged primarily through meetings, workshops, phone calls and text messages. | At least bi-annually; some more frequently if they are engaged in the project implementation |
| 5. Regional and international organizations, development partners | Regional and international organizations and development partners will be kept informed through the project's knowledge products and website, as well as workshops and participation in events. Exchange of knowledge with other initiatives, in particular GEF-funded projects, will be fostered by the project. | At least annually |

Budget and responsibility

The National Project Management Unit (PMU) will be responsible for coordinating and implementing the stakeholder engagement plan as outlined above. Budget for stakeholder engagement has been allocated through the meeting, training and travel budget lines in [Annex A2](#). Relevant activities have been included in the work plan (Annex H). The PMU will also be responsible for monitoring and reporting on stakeholder engagement through the annual project implementation reports (PIRs).

In the annual PIRs, the PMU will report on the following indicators:

? Number of government agencies, civil society organizations, private sector, vulnerable groups and other stakeholder groups that have been involved in the project implementation phase.

? Number of engagements (such as meetings, workshops, official communications) with stakeholders during the project implementation phase.

? Number of grievances received and responded to/resolved.

Select what role civil society will play in the project:

Consulted only;

Member of Advisory Body; Contractor; Yes

Co-financier;

Member of project steering committee or equivalent decision-making body; No

Executor or co-executor; No

Other (Please explain)

3. Gender Equality and Women's Empowerment

Provide the gender analysis or equivalent socio-economic assesment.

According to the gender inequality index (GII, 2019) of the United National Development Programme (UNDP) Indonesia scores 0.480, ranking it 121 out of 162 countries in the 2019 index. In Indonesia, 17.4 percent of parliamentary seats are held by women, and 46.8 percent of adult women have reached at least a secondary level of education compared to 55.1 percent of their male counterparts.

Labour force participation. Despite recent progress, gender inequalities continue to exist in the Indonesian economy. Despite making up around 51% of the population, according to a 2017 survey, Indonesia's female labour-force participation rate was well below that for males (around 80%) and lower than average for countries at a comparable stage of development. In addition, the gender wage gap is 34% in the formal sector and 50% in the informal sector. According to a recent study, the main drivers of low female labour force participation in Indonesia are marriage, having children under the age of two in the household, low educational attainment (below upper-secondary and tertiary levels) and a changing economic structure that has seen a decline in the sector of agriculture because of migration from rural to urban areas, in particular. Policy support, together with shifting social norms and practices is needed. However, the trend seems to be changing among the younger generation, with more educated women in urban areas starting to participate in the labour force. The Indonesian Government has also committed itself to addressing this issue by decreasing the gap between female and male labour force participation by 25% by 2025.

Education. Significant progress has already been made in education with the gap between enrolment and attainment between men and women narrowing to the point of disappearing and there does not appear to be a significant 'son preference' for education in Indonesia. This is a relatively recent phenomenon so while for younger women there is very little gender differential, older women still have lower education levels than their male counterparts. For example, the rate of illiteracy among older women was twice as high for women than for men: 6.26% compared to 13.85%. As a result, women are underrepresented in occupations that are correlated with literacy, with a large percentage still employed in the agricultural sector despite rapid urbanization.

Agriculture/fisheries sector. In 2013, the agricultural/fisheries sector accounted for about 34.9% of total employment and 32.8% of total female informal employment. However, many of these women farmers still have limited access to information, extension advice and technology compared to men, especially regarding invasive species management. Research in developing countries has shown that extension approaches, visits and trainings reach more men than women. As a result of limited access to agricultural inputs, the productivity rate of farms managed by women in a global analysis is 20-30% less than that of men.

Women in biodiversity conservation. Conservationists generally recognize that gender equality is fundamental to effective, inclusive, just, and sustainable efforts to stem biodiversity losses^[1]. This is largely because women are more averse to policy inequalities and more likely to share resources^[2]. Other studies have been able to demonstrate that the condition of natural resources were enhanced in local areas where women were involved in natural resource management^[3] and at national levels more environmental protection regulations were passed when women were involved in decision-making^[4]. For example, when a group of Sumatran village decision makers were given a 50/50 gender inclusivity mandate, tree retention was linked to groups with gender parity, although the specific cause was not documented^[5].

Despite the benefits of having women more active in conservation initiatives, recent research indicates that there are still considerable barriers^[6]. Four major challenges to women's participation have been identified in the workplace: formal exclusion, informal exclusion, assumed inadequacy, and assumed wrongness^[7]. According to Poor et al. (2021)^[8] the conservation field in Indonesia is dominated by men, especially in roles requiring outdoor activity ('fieldwork'). This even though there are nearly twice as many women studying natural sciences than men, yet women receive fewer than half of doctoral degrees nationwide^[9]. These high attrition rates of women during graduate or postgraduate education result in significant underrepresentation in the workforce. Established women conservationists in Indonesia also found that community, cultural, and religious views on gender roles and the 'unconventionality of a woman in the field and in the forest' were as a major challenge when they started their careers^[10]. Other challenges at the beginning of careers included a lack of available conservation training at Indonesian universities. Early-career respondents still viewed traditional and religious gender norms, particularly the social expectations of women at work or home, as a challenge to their chosen conservation career^[11].

Building IAS management capacity, especially among women is key, in order to address the disparity in employment in the conservation sector. Women working in this field in Indonesia noted that they would benefit from improved communication skills, particularly local language fluency, technical skills like field data collection, GIS (geographic information systems), statistical analysis, the 'capacity to

adjust quickly in a new environment, teamwork skills, the ability to take and use constructive criticism well, and better physical fitness^[12].

Gender-differentiated roles and impacts. It is also widely acknowledged that IAS disproportionately affect communities in poor rural areas who depend on agriculture and natural resources for their livelihood. This impact also has gender dimensions based on the roles of women and men in the community. For example, a study in Cameroon found that that 39% of women interviewed were involved in collecting NTFP's compared to only 12% of men ^[13]. The displacement of NTFP's as a result of plant invasions would therefore have a greater impact on women. In Low- and Middle-Income Countries (LMIC) where women are primarily engaged in unpaid care work activities, such as collecting fuel wood and water for household use, the impact of invasive species that affect access, availability and quality of drinking water and fuel wood will be felt more strongly by women and girls. For example, dense stands of the IAPS *Opuntia stricta* and *Prosopis juliflora* prevent access to water and other resources. The presence of waterweeds such as water hyacinth, giant salvinia, and water lettuce often harbor dangerous animals like snakes or provide cover for crocodiles and hippopotamus, putting women at an increased risk of being attacked when collecting water. According to a Global Invasive Species Programme (GISP) report on mainstreaming gender issues women generally rate risks due to invasive species higher than men. This is further supported by studies in Nigeria where it was found that women contribute 90% to hand-weeding labour and that 69% of children aged 5-14 are forced to leave school to work on farms, particularly at peak weeding periods. Hand-weeding is extremely laborious and time-consuming. Interventions which focus on adopting improved technologies will enable women to have more time to spend in other care or income generating activities and enable children to spend more time in education.

FAO's country gender assessment of agriculture and the rural sector in Indonesia (2019)^[14] highlighted the important role women play in agriculture and natural resources management in the country. Women often play a significant role in resource management, including the collection and harvesting of natural resources, and thus their experience and expertise may mean women are more knowledgeable about IAS impacts and possible management practices. In the BTSNP landscape, the women of the Tengger communities participate fully in farming and livestock management activities, as well as collection of foods, medicines etc. from the surrounding environment. In the BBNP landscape, women have played an important role in local community programs for the utilization of non-timber forest products, including for example the Samaenre Village Forest Farmer Group, which focuses on mushroom cultivation and uses some of its profits from the sale of these products to support a nursery that is used to replant degraded forests and other areas. Involving women in IAPS related activities will significantly contribute to the success of IAPS management in these sites.

Gender relationships define men and women's participation and roles in agricultural production and natural resource management and their access and control over resources. Women and men will experience the impacts of invasive species differently based on their gender roles and their ability to access and use information and technology to manage invasive species, which are influenced by their access and control of resources and social norms. Effective measures to manage invasive species should be responsive to these gender differences to provide appropriate support to men and women. A gender sensitive approach to invasive species management will ultimately contribute to the reduction of the gender productivity gap in agriculture, improvement of household food security and reduction of poverty.

Gender-responsive project interventions. The project will attempt to address all of these issues. Under Component 1, additional information on the differential impacts of IAS will be gleaned during the cost-benefit analyses by assessing the different impacts that IAS have on men and women. The role of men and women in terms of management will also be assessed, and if the removal of particular IAS have a gender bias in terms of benefits and costs. For example, women may benefit from the removal of aquatic weeds because they are responsible for collecting water for household-use, but they may be negatively affected by the removal of woody weeds which they harvest and utilize for cooking (fuelwood). Every effort will be made to ensure that women are not negatively impacted because of IAS control.

At the two project sites, BBNP and BTSNP, men and women will receive training in the identification and management of IAS. Since women generally perceive IAS as more of a threat than men the project will build on this and apply guidelines to target fair gender distribution in these capacity building activities (e.g., selection of trainees, co-management groups at project sites, as well as decision making fora, which in most cases will be near 50:50 throughout all strata of the project stakeholder groups). Additional efforts will also be made to further enhance capacity and awareness amongst women ? gender sensitive awareness material will be developed, and separate workshops will be held for women and men based on their availability, but more importantly to allow women in male dominated communities to comment and participate more freely in issues pertaining to IAS. Awareness creation activities will also take cognisance of literacy levels, especially among older women in rural areas. As such awareness material will focus more on visual content to ensure that marginalized women are not excluded. Where communities will be directly involved in IAS management activities (Component 2), at least 50% of field workers will be women. At the same time, IAS control plans developed by the project, and endorsed by communities, will take account of the potential burden that could be placed on women if they become responsible for IAS control activities, especially in croplands. Best practices from the Global Invasive Species Programme (GISP) on *Mainstreaming gender into prevention and management of invasive species* will also be taken into account.^[15]

All monitoring and evaluation activities will collect gender-disaggregated data, and where appropriate, women-only focus group discussions will be held regarding the impact of project activities on women's time (e.g. less or more time spent weeding). M&E will be led by an Indonesian-based institution or M&E Specialist to be confirmed at project initiation. This information will be an integral part of the reporting by the National Executing Agency to the FAO. In other words, the participation of women and men in all project activities will be monitored, and the required changes made should there be evidence of gender bias or discrimination.

A more detailed Gender Analysis and Action Plan is included in [Annex I4](#).

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[3] Cook, N. J., et al. (2019). Gender quotas increase the equality and effectiveness of climate policy interventions. *Nature Climate Change*, 9, 330-334

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- [9] WEF (World Economic Forum) (2020). Global gender gap report 2020. Geneva: World Economic Forum.
- [10] Poor E.E. et al. (2021) Increasing diversity to save biodiversity: Rising to the challenge and supporting Indonesian women in conservation. *Conservation Science and Practice* 3(6): e395 (<https://doi.org/10.1111/csp2.395>)
- [11] Poor E.E. et al. (2021) Increasing diversity to save biodiversity: Rising to the challenge and supporting Indonesian women in conservation. *Conservation Science and Practice* 3(6): e395 (<https://doi.org/10.1111/csp2.395>)
- [12] Poor E.E. et al. (2021) Increasing diversity to save biodiversity: Rising to the challenge and supporting Indonesian women in conservation. *Conservation Science and Practice* 3(6): e395 (<https://doi.org/10.1111/csp2.395>)
- [13] Norbert et al., (2014). Gender analysis of non-timber forest product utilization by neighbourhood communities of Cross-river National Park. *Journal of Agriculture, Forestry and the Social Sciences* 12(1): 195-208.
- [14] <https://www.fao.org/3/ca6110en/ca6110en.pdf>
- [15] https://www.gisp.org/whatsnew/docs/GISP_GenderIASA4.PDF

Does the project expect to include any gender-responsive measures to address gender gaps or promote gender equality and women empowerment?

Yes

Closing gender gaps in access to and control over natural resources; Yes

Improving women's participation and decision making Yes

Generating socio-economic benefits or services or women Yes

Does the project's results framework or logical framework include gender-sensitive indicators?

Yes

4. Private sector engagement

Elaborate on the private sector's engagement in the project, if any.

The private sector is often involved in the importation and proliferation of IAS. Based on an analysis of IAPS in several countries, most were intentionally introduced by the ornamental plant trade, followed by agro-forestry species introduced by forestry companies, development agencies or governments. In many instances IAPS are also introduced for restoration, especially in degraded landscapes. The pet and aquaria trade is also largely responsible for the introduction of exotic species, many of which are known to be invasive.

To reduce the pressure on natural forests significant investments have been made in the planting of industrial and other plantations, using native and exotic species. Planting trees on degraded or cleared forest lands and on the private holdings of villagers living near remnant forests has been identified by the government and its advisers as one means of achieving its conservation and development goals^[1]. The forestry sector has also ruled that all concessionaires, mostly private companies, must replant at least part of their leases with fast-growing trees. Smallholders have also been encouraged to plant economically useful trees on private land to strengthen their farming systems. The promotion of smallholder agroforestry schemes by international donor and research agencies has also been endorsed by the Indonesian government.

A number of species have been promoted and planted in large-scale timber and pulp plantations and include *Acacia mangium* (native to NE Australia, Molucca Islands of eastern Indonesia and PNG), *Pinus merkusii* (native to northern Sumatra, with two outlying populations in central Sumatra on Mount Kerinci and Mount Talang, and in parts of the Philippines), *Paraserianthes falcataria* (native to parts of Indonesia, Papua New Guinea, Solomon Islands and Australia), *Gmelina arborea* [native to Bangladesh, Cambodia, China (Yunnan and Guangxi Provinces), India, Laos, Myanmar, Nepal, (west) Pakistan, Sri Lanka, Thailand and Vietnam], and the slower-growing teak (*Tectona grandis*) (native to parts of India, Laos, Myanmar, and Thailand), and mahogany (*Swietenia macrophylla*) (native to Tropical America). There have also been plantings, albeit at a smaller scale of *Acacia decurrens* (native to parts of Australia) and *A. crassiparva* (native to parts of Australia, Indonesia and PNG). All of these species are known to be invasive outside of their native ranges. The government has offered private companies? interest-free loans, and also supported companies borrowing establishment capital from banks or other financial institutions and has allowed some to further minimize establishment costs by cooperating with a state forestry company. Other incentives include low land taxes and the right to clear cut and sell any remnant vegetation on concessions.

Tree planting has also been promoted among smallholders by many international development and research agencies across Indonesia. Soil and water conservation techniques involving fast growing tree legumes, such as *Leucaena* spp. and *Calliandra* spp., have been widely promoted to stabilize and intensify upland agriculture in drier regions. Species in both genera are known to be invasive in Indonesia, and elsewhere in SE Asia. In order to reduce the pressure on natural forests, and enhance crop and livestock production, many private companies, development agencies, and NGOs have, with the support of the government, promoted the use of these invasive agro-forestry species.

Many plants have also been intentionally introduced to Indonesia for ornamental purposes. These include a large number of water weeds such as *Pontederia crassipes*, *Pistia stratiotes* and *Salvinia molesta*. Terrestrial plants introduced for ornamental species include, among others, *Lantana camara*, various *Ipomoea* spp., *Melastoma malabathricum*, *Cryptostegia grandiflora*, *Tithonia* spp., *Rosa*

multiflora, *Impatiens balsamina*, *Asystasia gangetica*, and *Thunbergia grandiflora*. These are widely traded within Indonesia, largely by private nurseries, contributing to their further spread.

Many species of fish have also been introduced to Indonesia, most of them intentionally, either for consumption or the ornamental fish industry. Once introduced, many have escaped from rearing facilities or have been intentionally released into various water bodies. For example, surveys of a water-filled volcanic crater on Mount Galunggung, West Java, Indonesia, revealed that there were 13 exotic fish species, compared to only 11 native species. Most of the introduced fish had been introduced to Indonesia for ornamental purposes and included *Xiphophorus helleri*, *Andinoacara rivulatus*, *Amphilophus citrinellus*, *Cribroheros alfari*, *Cryptoheros spilurus*, *Mayaheros urophthalmus*, and *Parachromis managuensis*. Another introduced fish, also introduced through the pet trade is the carnivorous fish *Arapaima gigas*, which is also now present in many water bodies in Indonesia. This charismatic fish that belongs to a primitive group of carnivorous bony-tongued fishes is an ideal candidate for ornamental fishkeeping especially in smaller sizes. It is one of many species of ornamental fish pet-traded in Indonesia with many adult individuals being released or escaping to freshwaters in Java and Sumatra. Even crayfish are a popular pet-traded organism in Indonesia, including some of the most invasive species such as *Cherax quadricarinatus* and *Procambarus clarkia*. Indonesia imported ornamental fish to the value of US\$ 2,910,194 in 2020.

This is therefore a critical pathway that needs to be addressed, and as such will need to involve extensive negotiation and participation from the private sector. The project will work closely with forest concessionaires, the pet and aquarium trade, the horticultural industry, and other private companies who work in the forestry sector and/or are involved in the importation of exotic species. These sectors will be consulted during the formulation of policies and strategies to manage IAS. It is hoped that the private sector will regulate their own activities to curb the spread of IAS.

Private owners of tourism facilities within protected areas or adjacent to them will also be involved. They will be encouraged to create awareness and remove IAS from areas immediately around their facilities. Landowners who stand to benefit from the development and implementation of best management practices will be consulted and may contribute to various associated activities.

Universities and research organizations will be involved, especially in building capacity. The project aims to develop and integrate IAS into university curricula, especially at post-graduate level. The project will also be working closely with research organizations such as SEAMEO BIOTROP, especially regarding the development and implementation of IAS management interventions, including biological control.

The project will seek to develop a number of financing schemes by working with private sector partners not only through the Corporate Social Responsibility program (which are well-established in Indonesia) but also other potential innovative ways that could support IAS management action

The project also will engage with the private sector in exploring possible Payments for Ecosystem Services (PES) and other potential financing schemes (see Output 1.3.1). For example, the state-owned water company (PDAM) and private sector agricultural interests will be engaged in the management of IAS (*Salvinia molesta*) in Ranu Pani Lake at the BTSNP project site, and the possibility of a PES or other potential schemes where PDAM will support management of IAS so as to secure its water supplies will be explored.

The project will also promote the growing and marketing of native and non-invasive exotic species by the nursery industry. The project will provide training/expertise on the growing of unfamiliar species, species that can be used to replace those IAS targeted for management.

^[1] Potter, L. & Lee, J. (1998) Tree planting in Indonesia: trends, impacts and directions.
<https://doi.org/10.17528/cifor/000414>

5. Risks to Achieving Project Objectives

Elaborate on indicated risks, including climate change, potential social and environmental risks that might prevent the project objectives from being achieved, and, if possible, the proposed measures that address these risks at the time of project implementation.(table format acceptable):

The risks to the project listed below are mitigated through effective project management, the capacitated support of government staff and the project's governance system.

| Description of risk | Impact ^[1] | Probability of occurrence ³ | Mitigation actions | Responsible party |
|--|-----------------------|--|--|-------------------|
| Rapid changes in climate conditions could outstrip the ability of Indonesia to successfully manage IAS | H | L | <p>Managing IAS at project sites will strengthen the health of ecosystems and their resilience to the impacts of CC. In addition, project interventions will mitigate against some of the impacts of CC, e.g., including a projected increase in the frequency and intensity of droughts. Woody and aquatic weeds are known to increase evapotranspiration. By removing these from water bodies, the project will improve provision of water to downstream users. This and related work underscore ecosystem-based adaptation as a cost-effective means of protecting human and ecological communities against the impacts of climate change. The project is developed to support 'building nature's resilience to the impacts of climate change, while also helping to meet people's basic needs.' The project's holistic approach will protect ecosystems, ensuring their health and functionality to sustain people and the resources on which they depend. This integrated EBA approach provides the framework addressing impacts from both climate change and invasive species. (Burgiel and Muir, 2010)</p> <p>A more detailed analysis of climate risks is provided in the following section.</p> | PMU |

| | | | | |
|---|---|---|---|-----|
| Resistance to gender mainstreaming by local, provincial and national stakeholders | M | L | Starting within the PPG, there has been clear communication on gender issues. The project will continue to ensure that all activities undertaken during the project will support the inclusion of women and other vulnerable populations. Women are and will continue to be included at all project levels in the development of IAS strategies and their implementation. | PMU |
| Lack of interest and support from key national stakeholder groups and organizations | M | L | Indonesia has an IAS Communication Strategy. This will be updated and improved via the project. The project's communications programme, based on the Strategy, will strengthen understanding and ownership support by national stakeholders, and in complement to their involvement in project training, awareness raising activities, consultations, and decision making. | PMU |
| Lack of coordination among concerned ministries and local government authorities | M | L | The adoption of Indonesia's NISSAP has provided a roadmap and framework for inter-institutional collaboration on IAS, and this project's activities to convert the NISSAP from a policy document to an action plan with targets, budgets and timetables will help to further solidify cooperation efforts. Moreover, the establishment and operationalization through this project of a National Biosecurity Task Force within KEMENKO MARVES will create for the first time in Indonesia a central node / office, with dedicated staff and budget, to coordinate multi-agency efforts and provide technical support and information to various ministries and other stakeholders | PMU |

| | | | | |
|--|---|---|--|-----|
| Insufficient funding and Government support to continue implementation of IAS activities after the project ends | H | L | Several factors will increase the likelihood that increased funding and support will be available for IAS management post-project. First, the updated NISSAP will highlight the need for government's continued commitment for IAS management activity support and funding. The project will also develop and implement various cost-recovery mechanisms. The project will also increase awareness and understanding of decision makers on the full range of benefits provided by IAS management, not only in terms of agricultural production and livelihoods but also in terms of hydrological services and other vital ecosystem functions and services. This will be demonstrated by undertaking cost-benefit analyses clearly demonstrating that the benefits of IAS management outweigh the costs. In addition, respecting UNDRIP through FPIC and IPPs for Masyarakat Adat as outlined in Annex J, IAS management in agricultural practices will demonstrate to Masyarakat Adat, and local communities the tangible economic and social (e.g., health) benefits of effective IAS prevention and control practices, while the introduction of host-specific and damaging biocontrol agents will result in cost-effective and sustainable control of invasive plants, which together will incentivize Masyarakat Adat, and local communities to continue these practices even in the absence of external support. | PMU |
| Conflicts of interest where certain invasive alien plants provide benefits to individuals or groups (e.g., for fuelwood) | H | M | The project will develop and disseminate information regarding the pros and cons of various IAS. Cost-benefit analyses (CBA) will be undertaken - specifically on those species characterized as 'conflict' IAS, to inform all stakeholders of the true costs of these species, including impacts on livelihoods, ecosystem services, and biodiversity, and a comparison of the benefits they provide. In addition, participatory and consultative approaches will be used to develop consensus among stakeholders on policies towards conflict IAS, and to raise awareness and develop alternative natural resource and livelihood options via the project. Results of the CBA will be communicated to policy and decision makers at national level related to PA, agriculture, and forestry management. | PMU |

| | | | | |
|---|---|---|--|-----|
| Farmers and others living within or adjacent to PAs may expect to receive remuneration for their involvement in IAS management | M | L | The project will mitigate this risk by providing farmers with information regarding the long-term benefits they will accrue by participating in IAS management actions, and by providing farmers with non-monetary incentives in the form of preferred fruit trees and other valuable native plant species, including valuable NTFP and medicinal plants (e.g., building soil horizon, canopy, functionality and connectivity in the PA buffer zones) to support sustainable agricultural production activities. Utilizing accessible demonstration trials, farmers will view first-hand the benefits of crop rotation, crop integration, cover crops and FMNR ? these options mitigate the need for monetary ?compensation?. Potential compensation and benefit-sharing/natural resource use measures will be discussed in a detailed consultative, participatory process with Masyarakat Adat, and local communities, taking into account wider management objectives of the PAs, the livelihoods of the communities, etc. | PMU |
| Inability to demonstrate impact of project interventions due to complex natural interactions and a long-time span until impacts are noticed | M | L | The project will demonstrate and establish the necessary awareness and ownership for proposed systems, rather than targeting near term/large scale impacts (via the pilot sites). The project will not itself clear large tracts of land of IAS, and rather will demonstrate that this is needed and feasible, building the capacity for and identifying the long-term financing mechanisms to control the spread of IAS. Additionally, stakeholders will be informed and capacitated, to continue and replicate the work started under the GEF project; as well as conduct participatory monitoring about immediate and long-term developments and the impacts of IAS, thus additionally motivating them to continue the work tested in the pilot sites. | PMU |

| | | | | |
|---|---|---|---|-----|
| <p>Impacts on project implementation from restriction measures established by national and local authorities related to the COVID-19 pandemic</p> <p>There is a risk that the COVID-19 pandemic may impact the following:</p> <ol style="list-style-type: none"> 1) Stakeholder engagement 2) Project implementation 3) Co-financing commitments 4) Socio-economic impact | M | L | <p>In response to the COVID-19 pandemic, the project will develop measures to increase the flexibility of project management, taking account of the possible continuation (or reinstatement) of COVID-19 containment measures. For example, the Project may engage CSO / NGOs who retain field staff in areas targeted by the project to carry out various project activities, which can help to mitigate restrictions on the mobility of staff of MoEF and other partners. The Project will organize virtual meetings and working groups as needed, if containment measures are in effect and travel and in-person consultations are not possible. In addition, under Component 1, the project will look in detail at capacity building measures to assist the National Biosecurity Task Force within KEMENKO MARVES as well as MoEF in managing for COVID-19 impacts over the longer term. Finally, the project design will include contingency planning for the possibility of changes in baseline and/or co-financing resources due to COVID-19 impacts on budgets.</p> <p>Precautionary measures will be taken when travelling to and organizing meetings with Masyarakat Adat, and local communities to avoid spread of COVID-19.</p> <p>At the same time, FAO will work with the GOI to ensure that, in case of significant shortfall in co-finance, joint efforts are made to increase co-finance from other sources.</p> <p>Additionally, the Project will seek opportunities to support Indonesia's National Economic Recovery Program through investment in green recovery.</p> <p>A more detailed analysis of COVID-19 related risks is provided below.</p> | PMU |
| <p>Masyarakat Adat do not feel their rights, knowledge and food systems are taken into consideration and project activities have been carried out without their consent</p> | H | M | <p>Annex J details the mitigation actions needed by the PMU to avoid a situation of grievances.</p> | PMU |

Risks related to the COVID-19 pandemic and aftermath

As of February 7, 2022, the number of confirmed COVID-19 positive cases in Indonesia has risen by 26,121 from the previous day to 4,542,601 cases. In that same period, the number of deaths rose by 82 to 144,636 while the number of recovered patients rose by 8,577 to 4,191,604. Confirmed cases have been reported from throughout Indonesia.

Indonesia is currently implementing a more restrictive form of lockdown wherein non-essential and non-critical commercial activities are not allowed. Domestic travel is restricted while inter-regional travel is permissible only with a vaccination certificate or a valid negative COVID-19 test result.

As of September 15, 2021, foreigners or non-Indonesian citizens are allowed to enter Indonesia if they have been completely vaccinated for COVID-19. This is stipulated under Minister of Law and Human Rights Regulation No. 34/2021 (or Permenkumham No. 34/2021) on the Granting of Visa and Immigration Permit During the COVID-19 Pandemic Handling Period and Towards National Economic Recovery. It should be noted that visa-on-arrivals are still not being granted until such time that the Indonesian government has deemed the COVID-19 pandemic to be over.

Restrictions on travel, and related activities, could delay project implementation. The development of new variants is likely, although the probability of new strains being more virulent than the earlier strains like Alpha and Delta is low, based on the most recent experience with the Omicron strain. That said, project implementation will need to adapt to the current scenario, and possibly a worse situation should a more virulent strain make its appearance. To that end it is imperative that the timing of project activities remain as flexible as possible with priority being given to activities which can be done in isolation or remotely, until such time as current restrictions have been eased. Many activities such as policy development, capacity development (training), etc. can be done with limited personal contact and as such these activities could be prioritized. Activities at the project sites may have to be delayed.

Climate risks

A Climate risk analysis was prepared for the project and is provided as a separate document in the GEF Portal. The climate risk of the SMIAS project is rated high^[2], meaning that the project area will be likely affected by extreme weather events in the following decades. Many of the impacts are considered irreversible in the midterm and the magnitude and/or spatial extent of the hazard is expected to severely impact livelihoods, ecosystems and infrastructures. While these impacts may not be fully addressed in the framework of this project, the following recommendations were made:

- ? IAS management should incorporate knowledge of current and future impacts of climate change on biodiversity and ecosystem. For example, the key findings and policy recommendations emerging from the implementation of FAO's MOSAICC activities in Indonesia highlighting the impacts of climate change on agriculture and hydrology across the country. The AMICAF project also included activities like raising awareness on climate risks, identifying climate change impacts, mainstreaming climate smart agriculture, including adaptation and mitigation practices relevant to Masyarakat Adat, and local communities, and targeting climate finance and investment programs for adaptation in agriculture, while respecting UNDRIP through FPIC and IPPs for Masyarakat Adat as outlined in Annex J.^[3]
- ? Introduce climate-resilient conservation agriculture and nature-based solutions into the project activities such as those that have been successfully adopted by farmers in Indonesia under FAO's Conservation Agriculture Project in collaboration with the Government of Indonesia.

- ? Ensure that climate information is a key aspect of planning activities to design and implement land-scale level approach to invasive alien plant species. Incorporate studies related to how species will respond to changing climate and environmental parameters.
- ? Increase and support research and development related to climate change drivers of invasive plant species and treatment measures. In Indonesia, the Indonesian Institute of Sciences maintains the best curated and equipped biological collections situated in West-Java (von Rintelen et al., 2017).
- ? Incorporate climate topics and early warning system knowledge in the development of training modules and curricula on IAPS management for local forestry and agricultural extension staff, PA and forest managers, and policy makers.
- ? Assess climate, environmental and economic risks of priority IAS based on likelihood of incidence and impact.

As explained in *Section 1) Global environmental problems*, climate change is a major driver of invasions. Indonesia is predicted to experience temperature increases of approximately 0.8°C by 2030 with an associated change in rainfall patterns, with the rainy season ending earlier and the length of the rainy season becoming shorter. A reduction in rainfall may result in more frequent droughts. For example, extensive fires in West Africa in the 1980s during extremely dry years contributed to the proliferation of invasive species such as paper mulberry (*Broussonetia papyrifera*) which took advantage of an increase in the size of forest gaps and reduced competition from native species. In 1982-1983 more than 3.7 million ha of land, including forests, burned on the island of Borneo while more than 2 million ha of forest and scrubland burned during 1997-1998, both due to prolonged droughts. Extensive fires in 2015 were linked to a prolonged drought. Some invasive plants such as *Chromolaena odorata*, which is common in Indonesia, have high levels of oil in the dry pithy stems and leaves and as a result rapidly spread fire. The ability of chromolaena to invade forest edges and gaps results in fires being carried well into relatively undisturbed forests and woodlands, further depleting native biodiversity. Seed germination of a number of invasive species present in Indonesia, such as *Acacia decurrens*, is enhanced by fires.

It is also predicted that climate change will contribute to an increase in extreme weather events, which will contribute to increased land degradation/disturbance. Natural disasters in Indonesia from 1998-2018 were dominated by flooding (39%), heavy wind/storms (26%), landslides (22%), and drought (8%). In 2019, Indonesia experienced 3,622 natural disasters - about 90% were caused by hydro-meteorological phenomena like tornadoes, flooding and landslides[4]. These severe weather events will create conditions suitable for the establishment and subsequent spread of invasive species. Increased disturbance will reduce resistance in recipient communities and create enemy-free sites for the establishment of invasive plants.

Changes in weather patterns and increasing temperatures may also enable species to expand their current ranges. Some invasive plant species will also benefit from higher carbon dioxide levels and temperatures. Strong winds, currents and wave action can facilitate the movement of invasive species at regional and global scales.

In conclusion, global climate change will thus exacerbate the already serious levels of habitat degradation resulting in further loss of ecosystem services and species. It is, therefore, even more important to accelerate the prevention and spread of invasive alien species in Indonesia. It is expected that the Project interventions will contribute to enhancing the resilience of biodiversity and ecosystems to the impacts of climate change. Consideration of climate risks has been incorporated into the project design, as outlined in *Section 3) Alternative scenario*. For example, the early detection and rapid response (EDRR) systems

developed under Component 1 will take into consideration climate risks. Furthermore, the awareness and capacity building activities under Component 3 will also involve awareness raising on climate risks in relation to IAS.

It should be noted that although climate change impacts to forests may be significant, their time scale is well beyond the life of the project. Additionally, best practice guidelines for 'Climate Change & Invasives; and Early Warning Systems', from the 'Toolkit for Best Prevention and Management Practices of Invasive Alien Species' will be integrated into IAS management strategies and methodologies for pilot activities.

Managing forest IAS will in principle strengthen the health of the forest and as such its resilience to short and long terms changes and impacts of CC, such as, for example, in levels of precipitation. This is related to the concept of ecosystem-based adaptation which is a cost-effective means of protecting human and ecological communities against the impacts of climate change.[5],[6] Ecosystem based adaptation is described as 'building nature's resilience to the impacts of climate change, while also helping to meet people's basic needs.' These ecosystem-based approaches are therefore not just about protecting ecosystems, but also about using ecosystems to help sustain people and the resources on which they depend. Such an approach can also provide an integrative framework to address impacts from both climate change and invasive species.[7]

Some key strategies for increasing resilience of forests and trees to climate change through management of forests include (i) maintaining healthy forest ecosystems for resilience; (ii) restoring degraded forests; and (iii) conserving, enhancing and using biodiversity.[8] The prevention and control of IAS is an integral part of these strategies.

[1] H: High; M: Moderate; L: Low.

[2] On a scale of low, moderate, high and very high.

[3] <http://www.fao.org/in-action/amicaf/countries/idn/en/>

[4] Indonesia Disaster Management Reference Handbook (2021) Centre for Excellence in disaster management and humanitarian assistance

[5] Heller, N.E. and Zavaleta, E.S. (2009) Biodiversity management in the face of climate change: A review of 22 years of recommendations. *Biological Conservation* 142:14-32.

[6] World Bank (2009) Convenient solutions to an inconvenient truth: Ecosystem-based approaches to climate change. Environment Department, The World Bank, Washington, DC, US

[7] Burgiel, S.W. and Muir, A.A. (2010) Invasive Species, Climate Change and Ecosystem-Based Adaptation: Addressing Multiple Drivers of Global Change. Global Invasive Species Programme, Washington, DC, and Nairobi, Kenya

[8] <https://www.fao.org/3/i3084e/i3084e09.pdf>

6. Institutional Arrangement and Coordination

Describe the institutional arrangement for project implementation. Elaborate on the planned coordination with other relevant GEF-financed projects and other initiatives.

6.a Institutional arrangements for project implementation.

GEF Implementing Agency (IA). The Food and Agriculture Organization (FAO) will be the GEF Implementing Agency for the Project, providing project cycle management and support services as established in the GEF Policy. As the GEF IA, FAO holds overall accountability and responsibility to the GEF for delivery of the results. In the IA role, FAO will utilize the GEF fees to deploy four different actors within the organization to support the project (see [Annex K](#) for details):

- ? The *Budget Holder (BH)*, i.e., the FAO Representative in Indonesia, will provide oversight of day-to-day project execution;
- ? The *Lead Technical Officer(s) (LTO)*, drawn from across FAO will provide oversight/support to the projects technical work in coordination with government representatives participating in the Project Steering Committee;
- ? The *Funding Liaison Officer(s) (FLO)* within FAO will monitor and support the project cycle to ensure that the project is being carried out and reporting done in accordance with agreed standards and requirements;
- ? The *HQ Technical Officer* is accountable for advising and supporting the LTO in ensuring project formulation, appraisal and implementation adhere to FAO corporate technical standards and policies.

As GEF agency, FAO's responsibilities will include:

- ? Administrate funds from GEF in accordance with the rules and procedures of FAO;
- ? Oversee project implementation in accordance with the project document, work plans, budgets, agreements with co-financiers, Operational Partners Agreement(s) and other rules and procedures of FAO;
- ? Provide technical guidance to ensure that appropriate technical quality is applied to all activities concerned;
- ? Conduct at least one supervision mission per year;
- ? Reporting to the GEF Secretariat and Evaluation Office, through the annual Project Implementation Report (PIR), the Mid Term Review, the Terminal Evaluation and the Project Closure Report on project progress;
- ? Financial reporting to the GEF Trustee.

Lead Executing Agency (EA). The Directorate General of Natural Resources and Ecosystem Conservation in the Ministry of Environment and Forestry (MoEF) will be the project's Lead Executing Agency and will have the overall executing and technical responsibility for the project, with FAO providing oversight as GEF Agency as described above. The Directorate General of Natural Resources and Ecosystem Conservation will be responsible for the day-to-day management of project results entrusted to it in full compliance with all terms and conditions of the Operational Partners Agreement (OPA) signed with FAO. As Operational Partner (OP) of the project, the Directorate General of Natural Resources and Ecosystem Conservation is responsible and accountable to FAO for the timely implementation of the agreed project results, operational oversight of implementation activities, timely reporting, and for effective use of GEF resources for the intended purposes and in line with FAO and GEF policy requirements.^[1]

Project Steering Committee. A Project Steering Committee (PSC) will be established to provide strategic guidance to the PMU and take decisions related to the project implementation including approval of project plans, budgets and revisions. Chaired by the Director General of Natural Resources and Ecosystem Conservation (MoEF), the PSC will include Echelon 1 officials, including the Deputy Minister of Maritime Affairs and Natural Resources (Bappenas), the Deputy Coordinating Minister of Maritime and Investment Affairs (CMMIA)^[2], the Director General for Fish Quarantine and Inspection of the Ministry of Marine Affairs and Fisheries (MMAF), the Director General of the Indonesian Agricultural Quarantine Agency (MoA). The FAO Representative for Indonesia and Timor Leste will also be a member of the PSC. At project inception and in consultation with other PSC members, consultation will be held with key

Masyarakat Adat Organizations and leaders for their inclusion in the Project Steering Committee. The PSC will provide strategic guidance to the National Project Coordinator (NPC) as well as Project Management Unit (PMU) and to all executing partners. The PSC will meet at least once in a year to ensure: i) Oversight and assurance of technical quality of outputs; ii) Close linkages between the project and other ongoing projects and programmes relevant to the project; iii) Timely availability and effectiveness of co-financing support; iv) Sustainability of key project outcomes, including up-scaling and replication; v) Effective coordination of governmental partners work under this project; vi) Review and approval of the Annual Work Plan and Budget; vii) Making by consensus, management decisions when guidance is required by the National Project Coordinator of the PMU. The members of the PSC will each assure the role of a Focal Point for the project in their respective agencies. As Focal Points in their agency, the concerned PSC members will: (i) technically oversee activities in their sector; (ii) ensure a fluid two-way exchange of information and knowledge between their agency and the project; (iii) facilitate coordination and links between the project activities and the work plan of their agency; and (iv) facilitate the provision of co-financing to the project. The National Project Director will be the Secretary to the PSC.

The Project's organizational structure is shown in the figure below.

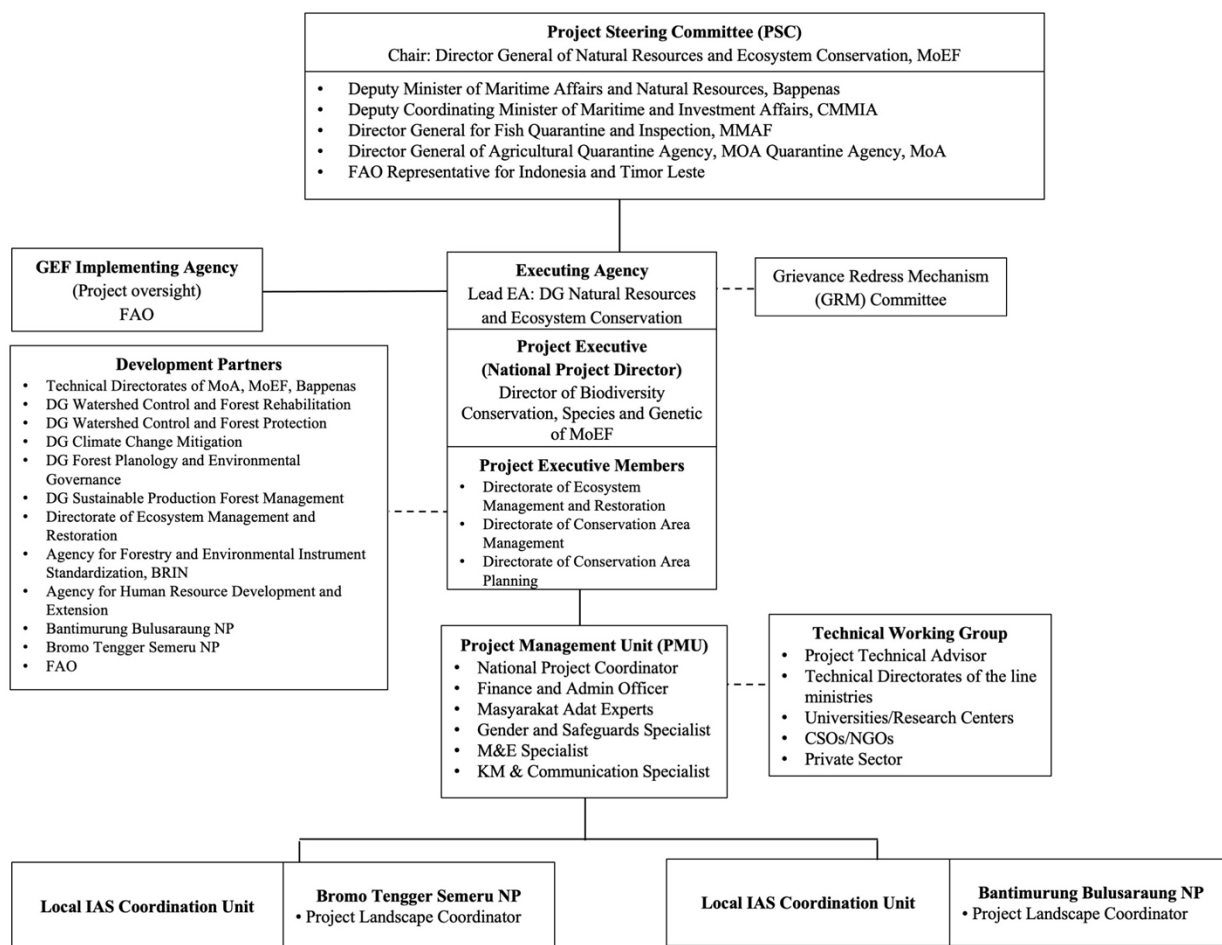


Figure 6: Project organizational structure

National Project Director (NPD). The Directorate of Biodiversity Conservation, Species and Genetic of MoEF under the Directorate General of Natural Resources and Ecosystem Conservation will designate a National Project Director (*funded by Government*). Located in the Directorate of Biodiversity Conservation, Species and Genetic, the NPD will be responsible for coordinating the activities with all the national bodies related to the different project components, as well as with the project partners as shown in

the Stakeholder Table above. The NPD will also be responsible for supervising and guiding the National Project Coordinator (see below) on the government policies and priorities. As the Secretary to the PSC, the NPD (with support from the National Project Coordinator) will be in charge of organizing the PSC meetings, preparing meeting minutes, and ensuring communications among PSC members.

Technical Working Group (TWG). A Technical Working Group will be established to provide technical advice and guidance to the project and provide inputs to specific technical issues. The TWG will include Echelon 3 officials from key line ministries and agencies, academic/research institutions, private sector associations, and civil society to provide support the PMU. It will be convened *ad hoc* on a needs? basis by the project implementation (at least once a year). The TWG may call on additional relevant experts and institutions depending on the agenda items. The TWG will be chaired by the Project Technical Advisor.

Project Management Unit (PMU). A Project Management Unit will be co-funded by the GEF grant and established within the Directorate General of Natural Resources and Ecosystem Conservation. The main functions of the PMU, following the guidance of the Project Steering Committee, are to ensure overall efficient management, coordination, implementation and monitoring of the project through the effective implementation of the annual work plans and budgets (AWP/Bs). The PMU will be composed of a National Project Coordinator (NPC) who will work full-time for the project lifetime. The PMU will also include a Finance and Administration Officer, two Masyarakat Adat Experts (1 per site), a Gender and Safeguards Specialist, an M&E Specialist, and a Knowledge Management and Communication Specialist. Additionally, the PMU will hire experts to provide technical expertise to the implementation of the Project Components, including a Policy Specialist, a Biodiversity Specialist, and a Finance Specialist.

National Project Coordinator (NPC). The National Project Coordinator (*funded by the GEF grant*) will oversee daily implementation, management, administration and technical supervision of the project, on behalf of the Operational Partner (OP) and within the framework delineated by the PSC. S/he will be responsible, among others, for:

- i) Overall technical lead for the implementation of all project outputs and activities and ensure technical soundness of project implementation.
- ii) Ensuring technical and operational lead and guidance in the implementation of all project outputs, in particular Outputs 1.1.1 (national and subnational policies), 2.1.1 (spatial planning and assessments), 2.2.1 (community and private participation in IAPS), and 3.1.3 (capacity development).
- iii) Coordination with relevant initiatives and activities by other projects including other GEF-financed projects.
- iv) Supervising the work of the Project Management Unit (PMU) staff and any project consultants.
- v) Ensuring a high level of collaboration among participating institutions and organizations at the national and local levels.
- vi) Ensuring compliance with all Operational Partners Agreement (OPA) provisions during the implementation, including on timely reporting and financial management.
- vii) Coordination and close monitoring of the implementation of project activities.
- viii) Leading and supervising the preparation of various technical outputs, e.g., knowledge products, reports and case studies.
- ix) Ensuring meaningful engagement of stakeholders as per the Stakeholder Engagement Plan.
- x) Ensuring that all project resources are used solely to achieve project objectives consistent with the approved work plan and budget and government financial policies and FAO/GEF requirements.
- xi) Tracking the project?s progress and ensuring timely delivery of inputs and outputs, including targets for the project?s indicators in line with the results framework.
- xii) Providing technical support and assessing the outputs of the project national consultants hired with GEF funds, as well as the products generated in the implementation of the project (e.g., reports, data).
- xiii) Approving and managing requests for provision of financial resources using provided format in OPA annexes.
- xiv) Monitoring financial resources and accounting to ensure accuracy and reliability of financial reports.

- xv) Ensuring timely preparation and submission of requests for funds, financial and progress reports to FAO as per OPA reporting requirements.
- xvi) Maintaining documentation and evidence that describes the proper and prudent use of project resources as per OPA provisions, including making available this supporting documentation to FAO and designated auditors when requested.
- xvii) Implementing and managing the project's monitoring and communications plans.
- xviii) Organizing project workshops and meetings to monitor progress and preparing the Annual Budget and Work Plan.
- xix) Submitting the six-monthly Project Progress Reports (PPRs) with the AWP/B to the PSC and FAO;
- xx) With support from the Knowledge Management and M&E Specialist, preparing the first draft of the Project Implementation Review (PIR).
- xxi) Supporting the quality assurance related activities i.e, regular audits, spot checks and field visits in close communication with FAO.
- xxii) Supporting the organization of the mid-term review in close coordination with the FAO Budget Holder and the GEF Coordination Unit.
- xxiii) Supporting the organization of the terminal evaluation in close coordination with the FAO Budget Holder and the FAO Independent Office of Evaluation (OED).
- xxiv) Submitting the required OP technical and financial reports to FAO and facilitate the information exchange between the OP and FAO, if needed.
- xxv) Providing draft of terminal report for Budget Holder (BH) two months before the ending date of the OPA or the project;
- xxvi) Provide support to the PMU in submitting the OP six-monthly technical and financial reports (Project Progress Report/PPR) to FAO and facilitate the information exchange between the OP and FAO, if needed.
- xxvii) Informing the PSC and FAO of any delays and difficulties as they arise during the implementation to ensure timely corrective measure and support.
- xxviii) In collaboration with the Gender and Safeguards Specialist and the Masyarakat Adat Experts, ensure implementation of the Environmental and Social Management Plan, FPIC, Indigenous Peoples' Plan (IPP)/ Masyarakat Adat Plan, Gender Action Plan, Stakeholder Engagement Plan.

Local IAS Coordination Units. Local IAS Coordination Units, with representatives from Government, Masyarakat Adat and local communities, and other stakeholders will be established at each of the project landscapes to coordinate implementation of the three Project Components at the local level.

Grievance Redress Management (GRM) Committee. A GRM Committee will be established and convened on an ad hoc basis, to resolve any grievances, request further information to clarify issues, refer the grievances to independent mediation or determine the request is outside the scope and mandate of the Project Steering Committee and refer it elsewhere (e.g., the judicial system). The National Project Director will serve as the secretariat for the project-level grievance redress mechanism (GRM). The detail grievance redress mechanism is described in [Annex I3](#).

6.b Coordination with other relevant GEF-financed projects and other initiatives.

The project builds on lessons learned of past and ongoing projects in Indonesia, in the region and globally, and will ensure there is strong coordination with ongoing and planned GEF-funded projects and other initiatives. The main relevant initiatives are summarized in the table below. Coordination will be ensured through the lead of the Ministry of Environment and Forestry.

| Project or initiative | Complementarity with the project / lessons learned |
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| <p>? WB GEF-6 Project ?Strengthening of Social Forestry in Indonesia? (GEF ID 9600)</p> | <p>The SMIAS project will coordinate closely with this project, which is designed to support a national Social Forestry Program (supported by Presidential Regulation 86/2018 on Agrarian Reform), that is intended to address systemic poverty by selecting, demarcating, and registering lands in forest areas as community-managed, and by providing poor Indonesians with long-term leases (35 years, with options for 5-year renewals) covering an areas of approximately 14 million hectares of forest land. The Government of Indonesia aims to use the Social Forestry Program to enhance forest management and restoration in the buffer zones of critical protected areas. Therefore, the proposed project will work with the GEF-WB social forestry project to jointly enhance the management and conservation of forests within the two project landscapes (both of which include areas designated for the SFP) by managing IAPS threats/impacts in these areas.</p> |
| <p>? UNEP GEF-5 project ?Strengthening forest and ecosystem connectivity in RIMBA landscape of central Sumatra through investing in natural capital, biodiversity conservation, and land-based emission reductions? (RIMBA project) (GEF ID 5285)</p> | <p>This project aims to strengthen forest and ecosystem connectivity in RIMBA landscape of central Sumatra through investing in natural capital, biodiversity conservation, and land-based emission reductions. The SMIAS project will coordinate with this project through the sharing of information and strategies for managing IAS impacts in protected landscapes.</p> |
| <p>? UNDP GEF-5 project ?Transforming Effectiveness of Biodiversity Conservation in Priority Sumatran Landscapes? (GEF ID 4892)</p> | <p>The project objective is to enhance biodiversity conservation in priority landscapes in Sumatra through adoption of best management practices in protected areas and adjacent production landscapes, using tiger recovery as a key indicator of success. The SMIAS project will coordinate with this project through the sharing of information and strategies for managing IAS impacts in protected landscapes.</p> |
| <p>? UNDP/GEF-5 project in Mexico ?Enhancing National Capacities to manage Invasive Alien Species (IAS) by implementing the National Strategy on IAS? (GEF ID 4771)</p> | <p>The SMIAS project will seek to learn lessons and best practices from other GEF projects focused on IAS. As noted under Output 3.1.1, this will include GEF-funded project in Mexico ?Enhancing National Capacities to manage Invasive Alien Species (IAS) by implementing the National Strategy on IAS?, including its awareness raising programs focused on PA visitors as well as for sectors responsible for IAS entry into the country, as well as its other approaches and strategies to addressing IAS at points of entry and in the context of protected areas.^[3]</p> |

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| <p>? FAO GEF-5 project in Argentina ?Strengthening of Governance for the Protection of Biodiversity through the Formulation and Implementation of the National Strategy on Invasive Alien Species (NSIAS)? (GEF ID 4768)</p> | <p>The project will also explore learning opportunities from this project, regarding the development and implementation of an effective national strategy for IAS management.</p> |
| <p>? UNEP/GEF-4 regional project ?Removing Barriers for Invasive Alien Species Management in Production and Protection Forest of Southeast Asia? (FORIS Project) (GEF ID 3957) (completed)</p> | <p>The proposed project's approach to managing IAPS at the broader landscape level will build on several results achieved under the FORIS project. In Indonesia, the FORIS project supported the development of a national list of IAPS as well as the NISSAP and other national policies and procedures on the detection and management of IAS; developed capacities on IAS management through pilot interventions, for example with <i>Acacia nilotica</i> in Baluran National Park, and the flowering vine (<i>Merremia peltata</i>) in Bukit Barisan Selatan National Park; developed new tools guidelines and information materials on risk analysis, Early Detection and Rapid Response (EDRR), plant identification and awareness raising; and disseminated information on IAS distribution, impacts, and management. As described in the Alternative Scenario, the proposed project will build on a number of these achievements, such as supporting actual implementation of the NISSAP; extending the training developed for PA staff at the landscape level to include other resource managers and local stakeholders; developing additional tools for IAS management (e.g., an improved mobile phone app for reporting IAS), etc.</p> |
| <p>? KfW-funded project ?Forest Programme V: Social Forestry Support Programme?, a 5-year project with a budget of USD 12,869,500.</p> | <p>The SMIAS project will coordinate with the KfW-funded project that is being implemented by MoEF and includes activities in East Java in the region of the BTSNP. Social forestry is a national priority in Indonesia's National Medium-Term Development Plan (2015-2019) and a signature initiative of the current government to reduce poverty, promote equitable distribution of income, contribute to biodiversity conservation, and support the reduction targets of the country's national climate strategy. The proposed project will work with the Social Forestry Support Programme to investigate the potential benefits of enhanced IAS prevention and control for forest areas with the programme, including integrating IAS management into social forestry policies, management and information systems, and capacity building activities.</p> |
| <p>? JICS-funded project in the BBNP (completed)</p> | <p>The project can also build on past and current programs of the Japan International Cooperation System (JICS) in Indonesia. A recent JICS-funded project in the BBNP focused on assessing IAPS threats, developing nursery and planting programs for native species, removing IAS (e.g., <i>Salvinia molesta</i>), and control of sedimentation / land degradation processes. JICS is now supporting additional land rehabilitation using native plant species in the BBNP.</p> |

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| <p>? Regional and global initiatives</p> | <p>The Project is well cognizant of and has incorporated many of the lessons learnt from previous and ongoing IAS projects in Africa, Asia, Caribbean and the Pacific. The SMIAS Project will coordinate and exchange with, among others, the following regional and global initiatives:</p> <ol style="list-style-type: none"> 1) GEF-6 UNEP ?Preventing COSTS of Invasive Alien Species (IAS) in Barbados and the OECS Countries? (GEF ID 9408); 2) GEF-6 UNEP ?Enhancing sustainability of Protected Area systems in Malawi, and stabilizing agro-production in adjoining areas through improved IAS management? (GEF ID 9539); 3) GEF-5 UNEP ?Support to the Integrated Program for the Conservation and Sustainable Development of the Socotra Archipelago? (GEF ID 5347); and 4) GEF-6 UNEP ?Reduce the threats from Invasive Alien Species (IAS) to terrestrial, freshwater and marine biodiversity in the Pacific by developing and implementing comprehensive national and regional IAS management frameworks? (GEF ID 9410), a project which is being led by the Secretariat of the Pacific Regional Environment Programme (SPREP) and the Pacific Community (SPC)[1]. <p>The proposed Project will also support ongoing work on IAS being undertaken by the ASEAN Centre for Biodiversity[2]. Results from the SMIAS project, such as its proposed PES approach, will be shared with these initiatives, and vice versa. For example, South Africa has experience with the use of water levies to raise funds for the management of invasive alien plants in water catchments.</p> |
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[1] <https://www.thegef.org/projects-operations/projects/9410> and <https://www.sprep.org/gef6-rip>

[2] <https://asean.chm-cbd.net/documents/invasive-alien-species-keeping-intruders-out>

[1] It should be noted that the identified Operational Partner(s) or OP, results to be implemented by the OP and budgets to be transferred to the OP are non-binding and may change due to FAO internal partnership and agreement procedures which have not yet been concluded at the time of submission.

[2] Coordinating Ministry for Maritime and Investments Affairs.

[3] <https://erc.undp.org/evaluation/documents/download/11897>

7. Consistency with National Priorities

Describe the consistency of the project with national strategies and plans or reports and assessments under relevant conventions from below:

NAPAs, NAPs, ASGM NAPs, MIAs, NBSAPs, NCs, TNAs, NCSAs, NIPs, PRSPs, NPFE, BURs, INDCs, etc.

Indonesia has a long history of intentional introductions of exotic species, starting during Dutch colonial times and its related agriculture commodity development programmes. The NBSAP (2003) of Indonesia already stated that the introduction of exotic species has often been done with little consideration of their potential negative impacts on local species with the result that 'competition with local species often led to the loss of the latter.' The issue of ballast water being a pathway for IAS and the introduction and impact of *Acacia nilotica* (again restricted to Baluran NP) is also mentioned. The 4th Report to the CBD explicitly states that the introduction of alien species is one of the threats to Indonesian biodiversity. In the 5th National Report to the CBD (2014) IAS are again listed as one of the main threats to biodiversity and should be eliminated 'through executable action plans and strategy.' The Indonesian Biodiversity Strategy and Action Plan (2015-2020) highlights 'the threats to the preservation of biodiversity is the presence of Invasive Alien Species (IAS). The IAS influence to a very large ecosystem because it can alter the natural ecosystem and cause degradation and loss of a species, even their habitat.' The Strategy has outlined several activities that need to be undertaken including 'IAS control through mapping of distribution, regulation, implementation and eradication.' Listed indicators include (i) Number of invasive alien species (IAS) prohibited in Indonesia; (ii) Number of regulations supporting IAS prevention in Indonesia; (iii) IAS distribution map in Indonesia; and (iv) Number of IAS prioritized for eradication. These tasks are supposed to be undertaken by the Ministry of Environment and Forestry, Ministry of Marine Affairs and Fisheries, Ministry of Agriculture, and Indonesian Institute of Sciences. There was also a call to build capacity in IAS management.

Many of the proposed activities listed in the Indonesian Biodiversity Strategy and Action Plan (2015-2020) will be supported during this proposed project. The NISSAP will be updated; associated policies and regulations will be developed, prevention and EDRR mechanisms will be enhanced; IAS inventories will be developed; capacity will be built; and awareness will be created. Activities undertaken during the project will also contribute to the development of subsequent NBSAP's by increasing the number of references and actions taken or planned to manage IAS. By giving increased prominence to the issue of IAS, the second biggest threat to biodiversity after habitat destruction, in the NBSAP, will make a considerable contribution to biodiversity conservation in Indonesia.

The 2005-2025 Long-Term National Development Plan is the continuation of the preceding development aimed at attaining the goal of development as stipulated in the Preamble of the 1945 Constitution of the Republic of Indonesia. The Plan refers to the fact that is essential and urgent for the people of Indonesia to reform various measures, among others, in the field of managing natural resources, human resources, the natural environment and its institutions. It highlights the fact that a desire for attaining short-term economic benefit has often created the desire to excessively exploit natural resources leading to the decline in the quality and quantity of natural resources and of the environment. The Plan also refers to air, water and soil pollution, issues which need to be addressed together with the recognition of local knowledge. The Plan acknowledges that if there are no appropriate policies and measures to address the current state of natural resources Indonesia will face a food, water and energy crisis. The Plan makes several recommendations including that natural resources be utilized sustainably and responsibly; water resources be protected; degraded habitats be rehabilitated or restored; and that awareness regarding the protection of the natural environment be enhanced. Without IAS management many of these goals will not be achieved.

The proposed Asian Development Bank (ADB) country partnership strategy (CPS) for Indonesia, 2020-2024 aims to support inclusive, competitive, and sustainable development. It is geared toward helping Indonesia emerge stronger from the COVID-19 pandemic by focusing on three strategic pathways,

one of which aligns itself with the proposed project by strengthening resilience regarding climate change mitigation and adaptation measures, environmental sustainability and green recovery, disaster risk management and finance, and water and food security. IAS will need to be managed in order to sustain the goods and services provided by ecosystems.

The project is also in line with FAO's Country Programming Framework (CPF) 2021 – 2025 for Indonesia. It is aligned with Strategic Priority 3. Climate and Disaster Resilient Agro-food Chains and Output 3.5. Strengthening of Agricultural Support Service in CSA. Furthermore, the project will also contribute to Asia Pacific Regional Initiatives on One Health.

Additionally, as noted above, the SMIAS project will coordinate with and contribute to regional and global initiatives. These initiatives include, among others, the GEF-6 UNEP project "Reduce the threats from Invasive Alien Species (IAS) to terrestrial, freshwater and marine biodiversity in the Pacific by developing and implementing comprehensive national and regional IAS management frameworks" (GEF ID 9410) led by the Secretariat of the Pacific Regional Environment Programme (SPREP) and the Pacific Community (SPC), the work on IAS carried out by the ASEAN Centre for Biodiversity. Results from the SMIAS project, such as its proposed PES approach, will be shared with these initiatives, and vice versa.

Consistency of the project with national strategies and plans or reports and assessments under relevant Conventions:

| National document | Main relevant strategies |
|--|---|
| National Action Program (NAP) under UNCCD | Indonesia has developed policies and strategies with regard to a national action plan for climate change adaptation. Known as RAN-API the goal is for Indonesia to foster climate-resilient development within the sustainable development framework. The objective is to enhance climate risk management in four priority sectors and affected areas (water, agriculture, marine and coastal, and health) considering gender, vulnerable groups, ecosystems, landscapes and financial innovation. The project will contribute to some of these interventions by restoring ecosystem goods and services, especially the provision of water. Many invasive plants are known to have a significant impact on water quantity and quality. Agricultural productivity will be affected by the impact of introduced pests, an area which the project will try to address through improved prevention mechanisms, reducing the accidental introduction of pests. IAS are also known to contribute to the disease incidence, and as such project interventions are consistent with the NAP. |
| National Biodiversity Strategies and Action Plan (NBSAP) under UNCBD | See above. |
| The 3rd National Communications (NC) under UNFCCC ^[1] | The 3rd National Communication under the United Nations Framework Convention on Climate Change was submitted by Indonesia in 2017. The report makes numerous references to the increased frequency of droughts and floods. As such water demand and supply is considered to be a key issue which requires improved management. According to the report the important sectors affected by climate change in Indonesia are the coastal (marine and fisheries), agriculture, water resources, forest, special areas (urban/rural), and health. The proposed project will increase the reliance of natural ecosystem to climate change perturbations. |

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| Biennial Update Report (BUR) under UNFCCC | Indonesia produced a BUR in 2018. The report acknowledges that forest resources are very important and support the lives of 48.8 million people (Ministry of Forestry, 2010), of which 60% are directly dependent on shifting cultivation, fishing, hunting, collecting, logging and selling timber and non-timber forest products (Nandika, 2005). In addition to short-term benefits in the form of wood, forests also provide very long-term benefits that are very diverse, such as sources of medicinal plants, water environmental services, microclimates, microbes, fungi, guardians of groundwater water balance, maintaining soil fertility, flood prevention, landslides, wildlife habitats, which represent more than 95% of the value of forest resources? (Pusdatin, 2016). In addressing the causes of deforestation and forest degradation, Indonesia has issued and implement five priority policies to namely (i) combating illegal logging and forest fire, (ii) restructuring of forestry sector industries including enhancing plantation development, (iii) rehabilitation and conservation of forest, (iv) promoting sustainable forest area, and (v) strengthening of local economies. The proposed project is aligned with many of these policies since the intention is to manage IAS which degrade forests, reducing their resilience to climate change, and eroding their ability to provide the goods and services on which millions of people depend. |
| Technology Needs Assessment (TNA) under UNFCCC | The TNA for Climate Change Mitigation (2012) report acknowledges that healthy forests are an important carbon sink, and as such the management of forests needs to be improved. The impacts of pests, diseases and weeds on forest health are acknowledged and as such need to be mitigated. The role of fire in GHG emissions is also acknowledged. It is well known that weeds like <i>Chromolaena odorata</i> , which is widespread and abundant in Indonesia contribute to the increased frequency and intensity of fires. All proposed project interventions are consistent with the TNA. |
| National Capacity Self-Assessment (NCSA) under UNCBD, UNFCCC, UNCCD | The report acknowledges that there is a need to strengthen national expertise in areas such as environmental economics, ecosystem management, etc. The proposed project intends to build significant capacity with regard to IAS management, including economic assessments of the costs and benefits of IAS management. This will involve the development of training modules, training of trainers, integration of IAS issues into school and university curriculum, etc. |
| National Implementation Plan (NIP) under POPs | The project will not use any listed chemicals such as aldrin, chlordane, DDT, dieldrin, endrin, heptachlor, and mirex in the management of IAS in support of the NIP under POPs. |

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| Poverty Reduction Strategy Paper (PRSP) | <p>SNPK or the National Strategy for Poverty Reduction has five main strategies: creation of greater opportunities for the poor, strengthen community's institutionalization, raise community's capacity, improve social protection, and connect the global partnership. Pro-poor policies have borne fruit. Between the periods of 2006-2016, the number of people living in poverty dropped as much as 11.29 million, from 39.30 million in 2006 to 28.01 million in March 2016. By the end of 2016, the number of poor people was about 27.76 million (10.7% of the population) (BPS, 2018). Unemployment, although still relatively high has been decreasing from about 10.3% in 2006 to around 5.6% in 2016 (BPS, 2018). However, poverty is still a significant issue in rural areas, including those communities living in the buffer zone of one of the pilot sites, BBNP. Contributing factors are the low level of education, the high number of dependents, the low involvement of the community in the group, the slow process of capacity building, and the low income of the community in meeting their daily needs. Based on the classification of the level of community welfare according to Sayogyo in Wantasen (1998), as many as 65% of the people around BBNP are still below the poverty line, with 48% of them belong to the very poor category. This means that most of the people around BBNP cannot meet their daily needs. Without more recent data we cannot confirm if the situation has changed in the past 20 years. A more detailed poverty analysis will be conducted as part of Activity 2.1.1.1, including on how the project can contribute to address poverty. That said the project will attempt to improve livelihoods by building capacity and improving the management of IAS which impact negatively on the resource base on which most people depend.</p> |
| National Legislation, Governance and provisions for Environmental and Social Risk Management | <p>The proposed Project is directly aligned to, and directly contributes to, the implementation of several national priority strategies and policies related to biodiversity, invasive species and protected areas:</p> <ul style="list-style-type: none"> ? The National Invasive Species Strategy and Action Plan (NISSAP), which sets priorities, identifies objectives and establishes roles and responsibilities of stakeholders with regards to managing, containing, preventing and eradicating invasive species. This proposed project will contribute directly to the implementation of the NISSAP by developing targets, budgets and timetables for the priorities identified in the NISSAP. ? The National Mid-term Planning (RPJMN) 2020-2024, which includes IAS management as a priority. ? The Ministry of Environment and Forestry national strategic priorities for Forestry and for the Environment in Indonesia. For environment, the ten stated priorities include ?preparing a complete national inventory of invasive species (and their impacts)?, while for forestry, the ten stated priorities include ?addressing the threat from IAS that is threatening almost all protected areas?. ? Regulation of the Director General of Natural Resources and Ecosystem Conservation Number: P.6/Ksdae/Set.3/Ren.0/9/2020 concerning the Strategic Plan of the Directorate General of Natural Resources and Ecosystem Conservation for 2020-2024 which includes making regulations of IAS as a priority. |

^[1] https://unfccc.int/sites/default/files/resource/8360571_Indonesia-NC3-2-Third%20National%20Communication%20-%20Indonesia%20-%20editorial%20refinement%2013022018.pdf

8. Knowledge Management

Elaborate the "Knowledge Management Approach" for the project, including a budget, key deliverables and a timeline, and explain how it will contribute to the project's overall impact.

As described in the Alternative Scenario above, the proposed project will establish tools and mechanisms to systematically collect data, document lessons learnt, and consolidate this information so that important data and key lessons are shared with national, regional and international partners. The National Biosecurity Task Force within KEMENKO MARVES will act as the central node for technical knowledge on IAS issues in Indonesia and will work to incorporate more information and data on IAS in Indonesia into existing international databases. In addition, other information management systems managed by MoA, MoEF, MMAF and other partners (e.g. SEAMEO BIOTROP) will be supported to update / enhance their existing IAS databases and establish data sharing protocols / mechanisms, while the existing Indonesia Biodiversity Clearing House Mechanism, managed by the Directorate of Biodiversity Conservation, Species and Genetic under the MoEF, will provide a mechanism for disseminating information on the project results, including information to support reporting on the achievement of national objectives under Aichi Target 9. Products derived from training modules and curricula on IAPS management will be disseminated in order to build awareness and understanding of IAPS pathways and of the ecological and economic costs for local inhabitants from IAPS impacts on ecosystem services. Under Component 3, the project will carry out public awareness initiatives to increase the general public's awareness and understanding of IAS issues and impacts, including documenting, using and disseminating local / traditional knowledge and wisdom regarding IAS impacts and IAS management options. In addition, the project will develop and implement a strategy to disseminate information products on IAS management developed under Components 1 and 2 (in particular under Output 3.1.2) through publications, news features and other reporting both within Indonesia and at the regional / international level (e.g., through the ASEAN Centre for Biodiversity and/or the Asia-Pacific Forest Invasive Species Network). Under Output 3.1.1, the project will develop and implement awareness campaign, taking cognizance of the most effective modes of communication for selected audiences, especially women and marginalized communities. Under Output 3.1.5, the project will develop and implement a strategy to disseminate information products on IAS management developed under Components 1 and 2 through publications, news features and other reporting both within Indonesia and at the regional / international level (e.g., through the ASEAN Centre for Biodiversity). In addition, the project will support regional-level workshops and/or learning visits between different PA management units (UPTs) to enable sharing of best practices and lessons learned; such activities will be continued post-project by MoEF. Furthermore, the project, respecting UNDRIP through FPIC and IPPs for Masyarakat Adat as outlined in Annex J, will collect the views, experiences and priorities of PA managers, Masyarakat Adat, and local communities regarding IAS prevention and management by coordinating existing stakeholders, their functions and resources via a mutual platform, or ?IAS Forum?, which will provide inputs and guidance for policy and regulatory changes as well as field activities.

The relevant KM budget and key deliverables are shown below.

| Deliverable | Timeline | Budget (USD) |
|---|-----------|--------------|
| 1. Knowledge Management & Communication Specialist: Implementation of knowledge management and communications activities, in particular under Output 3.1.5 | Years 1-5 | 96,000 |
| 2. Communication strategy updated and outreach campaigns developed and undertaken including use of media, workshops and meetings (targeting government officials, PA staff and affected communities) (BP2SDM of MoEF) | Years 1-5 | 102,000 |
| 3. Printing of awareness material (eg. Flyers, brochures, pamphlets, banners, etc.) | Years 1-5 | 33,000 |
| 4. Printing/publication of training manuals, e-books, etc. | Years 1-5 | 30,000 |
| 5. Publications in peer-reviewed journals (Output 3.1.5) | Years 1-5 | 40,000 |

9. Monitoring and Evaluation

Describe the budgeted M and E plan

1. The project results, as outlined in the project results framework (Annex A1), will be monitored regularly, reported annually and assessed during project implementation to ensure the project effectively achieves these results. Monitoring and evaluation activities will follow FAO and GEF's policies and guidelines for monitoring and evaluation. The M&E system will also facilitate learning, replication of the project's results and lessons which will feed the project's knowledge management strategy.

Monitoring Arrangements

2. Project oversight and supervision will be carried out by the Budget Holder (BH) with the support of the Project Task Force (PTF), Lead Technical Officer (LTO) and Funding Liaison Officer (FLO) and relevant technical units in FAO headquarters. Oversight will ensure that: (i) project outputs are produced in accordance with the project results framework and leading to the achievement of project outcomes; (ii) project outcomes are leading to the achievement of the project objective; (iii) risks are continuously identified and monitored and appropriate mitigation strategies are applied; and (iv) agreed project global environmental benefits / adaptation benefits (*specify as appropriate*) are being delivered.

3. The FAO-GEF Coordination Unit and HQ Technical units will provide oversight of GEF financed activities, outputs and outcomes largely through the annual Project Implementation Reports (PIRs), periodic backstopping and supervision missions.

4. Day-to-day project monitoring will be carried out by the Project Management Unit (PMU)/Operational Partner (OP). Project performance will be monitored using the project results matrix, including indicators (baseline and targets) and annual work plans and budgets. At inception phase, the results matrix will be reviewed to finalize the identification of i) outputs ii) indicators iii) targets and iv) any missing baseline information

5. A detailed M&E plan, which builds on the results matrix and defines specific requirements for each indicator (data collection methods, frequency, responsibilities for data collection and analysis, etc) will also be developed during project inception by the PMU's/OP's Knowledge Management and M&E Specialist.

6. In addition to the 'standard' impact monitoring reporting outlined in the previous paragraph and given the specific project investments in capacity building, outreach and IAS control in the two project landscapes, the project will devise a Project Impact Monitoring System measuring and reporting in standardized ways:

- (i) The impact of IAS control measures (Outcome 2.1) on PA conservation objectives, habitat restoration, farmers uptake and welfare, and general environmental quality parameters;
- (ii) Improvement in awareness levels about IAS of key national decisions makers (related to PA management and IAS) and local stakeholder groups in and around the two project landscapes; and
- (iii) Success and quality of capacity building;
- (iv) Attainment of the targets set in the Project Framework, as well as GEF Tracking Tools.

7. A Project M&E Specialist will be hired during the first year of the project to firstly design the Project Impact Monitoring System, as well as subsequently and at a part-time basis guide the data collection and systemic reporting throughout the life of the project. Once agreement has been reached on the indicators, parameters, data collection and reporting protocols to be applied, the results of this consultancy will be captured in a Project M&E Manual, a Midterm M&E results report, as well as the Consolidated report on Project Impacts, for use by the Terminal Evaluation.

The timeline of key M&E activities, a budget, and roles and responsibilities are presented in the table below.

Project Monitoring and Evaluation Plan

| M&E Activity | Responsible Parties | Timeframe | GEF Budget (USD) |
|--|---|--|---------------------------|
| Inception Workshop | Project Management Unit (PMU)/Operational Partner (OP) | Within two months of project document/OPA signature | 7,000 |
| Project Landscape Inception Workshop | PMU/OP | Within 1 month of national Inception Workshop | 10,000 |
| Project Inception Report | PMU/OP | Within two weeks of inception workshop | 120,000 M&E Specialist |
| National Completion Workshop | PMU/OP | Within six months prior to actual project completion | 9,000 |
| Project Landscape Completion Workshop | PMU/OP | Within six months prior to actual project completion | 12,000 |
| Technical Working Group Meetings | PMU/OP | Annually | 25,000 |
| Project Progress Reports (PPRs) | PMU/OP, LTO/BH | Annually | Covered by the above |
| Project Implementation Review reports (PIRs) | PMU/OP, LTO/BH | Annually in July | Covered by the above |
| Mid-term Review | BH | At mid-point of project implementation (3 rd quarter of project year 3) | 45,000 |
| Terminal Evaluation | The BH will be responsible to contact the Regional Evaluation Specialist (RES) within six months prior to the actual completion date (NTE date). The RES will manage the decentralized independent terminal evaluation of this project under the guidance and support of OED. | To be launched within six months prior to the actual project completion date | 50,000 |
| Terminal Report | PMU/OP, BH, LTO | Two months before the end date of the project | 6,550 |
| Total Budget | | | 284,550 |

Monitoring and Reporting

8. In compliance with FAO and GEF M&E policies and requirements, the PMU/OP, in consultation with the Project Steering Committee (PSC) and PTF will prepare the following i) Project inception report; (ii) Annual Work Plan and Budget (AWP/B); (iii) Project Progress Reports (PPRs); (iv) annual Project Implementation Review (PIR); (v) Technical Reports; (vi) Co-financing reports; and (vii) Terminal Report.

In addition, the Core Indicators included in Annex A1 will be used to monitor Global Environmental Benefits and updated regularly by the PMU/OP.

9. Project Inception Report. A project inception workshop will be held within two months of project start date and signature of relevant agreements with partners. During this workshop the following will be reviewed and agreed:

- ? The proposed implementation arrangement, the roles and responsibilities of each stakeholder and project partners;
- ? An update of any changed external conditions that may affect project implementation;
- ? The results framework, the SMART indicators and targets, the means of verification, and monitoring plan;
- ? The responsibilities for monitoring the various project plans and strategies, including the risk matrix, the Environmental and Social safeguards and Management Plan, the gender strategy, the knowledge management strategy, and other relevant strategies;
- ? Finalize the preparation of the first year AWP/B, the financial reporting and audit procedures;
- ? Schedule the PSC meetings;
- ? Prepare a detailed first year AWP/B.

10. The PMU/OP will draft the inception report based on the agreement reached during the workshop and circulate among PSC members, Budget Holder (BH, i.e., the FAO Representation in Indonesia), LTO and FLO for review within one month. The final report will be cleared by the FAO BH, LTO and the FAO GEF Coordination Unit and uploaded in FAO's Field Program Management Information System (FPMIS) by the BH.

11. Results-based Annual Work Plan and Budget (AWP/B). The draft of the first AWP/B will be prepared by the PMU/OP in consultation with the National Project Director (NPD), the Project Executive Members, the Development Partners and the FAO Project Task Force, reviewed at the project Inception Workshop, and submitted to the Project Steering Committee (PSC). The Inception Workshop and PSC inputs will be incorporated and subsequently, the PMU/OP after approval by the PSC and the NPD will submit a final draft AWP/B to the BH within two weeks after the first PSC meeting. For subsequent AWP/B, the PMU/OP will organize a project progress review and planning meeting for its progress review and adaptive management. Once PSC comments have been incorporated and after approval by the PSC and the NPD, the PMU/OP will submit the AWP/B to the FAO BH for non-objection, LTO and the FAO GEF Coordination Unit for comments and for clearance by BH and LTO prior to uploading in FPMIS by the BH. The AWP/B must be linked to the project's Results Framework indicators to ensure that the project's work and activities are contributing to the achievement of the indicators. The AWP/B should include detailed activities to be implemented to achieve the project outputs and output targets and divided into monthly timeframes and targets and milestone dates for output indicators to be achieved during the year. A detailed project budget for the activities to be implemented during the year should also be included together with all monitoring and supervision activities required during the year.

12. Project Progress Reports (PPR): The PPRs are used to identify constraints, problems or bottlenecks that impede timely implementation and to take appropriate remedial action. PPRs will be prepared based on the systematic monitoring of output and outcome indicators identified in the Project Results Framework (Annex A1), AWP/B and M&E Plan. Each semester the National Project Coordinator (NPC) will prepare a draft PPR, will collect and consolidate any comments from the National Project Director, the Project Executive Members and FAO PTF. The NPD will submit the final PPRs to the PSC and to the FAO Representation in Indonesia every six months, prior to 31 July (covering the period between January and June) and before 31 January (covering the period between July and December). The July-December report should be accompanied by the updated AWP/B for the following Project Year (PY) for review and non-objection by the FAO PTF. The Budget Holder has the responsibility to coordinate the preparation and

finalization of the PPR, in consultation with the PMU/OP, LTO and the FLO. After LTO, BH and FLO clearance, the FLO will ensure that project progress reports are uploaded in FPMIS in a timely manner.

13. Annual Project Implementation Report (PIR): The PIR is a key self-assessment tool used by GEF Agencies for reporting every year on project implementation status. It helps to assess progress toward achieving the project objective and implementation progress and challenges, risks and actions that need to be taken. Under the lead of the BH, the NPC in consultation with the National Project Director and the Project Executive Members will prepare a consolidated annual PIR report covering the period July (the previous year) through June (current year) for each year of implementation, in collaboration with national project partners (including the GEF OFP), the Lead Technical Officer, and the FLO. The NPC will ensure that the indicators included in the project results framework are monitored annually in advance of the PIR submission and report these results in the draft PIR. The NPD will submit the final PIRs to the PSC and to the FAO Representation in Indonesia.

14. The BH will be responsible for consolidating and submitting the PIR report to the FAO-GEF Coordination Unit for review by the date specified each year. The FAO-GEF Funding Liaison Officer (FLO) reviews the PIR and discusses the progress reported with the BH and LTO as required. The BH will submit the final version of the PIR to the FAO-GEF Coordination Unit for final approval. The FAO-GEF Coordination Unit will then submit the PIR to the GEF Secretariat as part of the Annual Monitoring Review of the FAO-GEF portfolio.

15. Technical Reports: Technical reports will be prepared as part of project outputs and to document and share project outcomes and lessons learned. The LTO will be responsible for ensuring appropriate technical review and clearance of technical reports. Copies of the technical reports will be distributed to project partners and the Project Steering Committee as appropriate.

16. Co-financing Reports: The PMU/OP will be responsible for tracking co-financing materialized against the confirmed amounts at project approval and reporting. The co-financing report, which covers the GEF fiscal year 1 July through 30 June, is to be submitted on or before 31 July and will be incorporated into the annual PIR. The co-financing report needs to include the activities that were financed by the contribution of the partners.

17. Tracking and reporting on results across the GEF 7 core indicators and sub-indicators: As of July 1, 2018, the GEF Secretariat requires FAO as a GEF Agency, in collaboration with recipient country governments, executing partners and other stakeholders to provide indicative, expected results across applicable core indicators and sub-indicators for all new GEF projects submitted for Approval. During the approval process of the "Strengthening Capacities for the Management of Invasive Alien Species in Indonesia" Project, expected results against the relevant indicators and sub-indicators were provided to the GEF Secretariat. Throughout the implementation period of the project, the PMU/OP is required to track the project's progress in achieving these results across applicable core indicators and sub-indicators. At project mid-term and project completion stage, the project team in consultation with the PTF and the FAO-GEF Coordination Unit are required to report achieved results against the core indicators and sub-indicators used at CEO Endorsement.

18. Terminal Report: Within two months before the end date of the project, and one month before the Terminal Evaluation, the PMU/OP will submit to FAO Headquarters a draft Terminal Report. The main purpose of the Terminal Report is to give guidance at ministerial or senior government level on the policy decisions required for the follow-up of the project, and to provide the donor with information on how the funds were utilized. The Terminal Report is accordingly a concise account of the main products, results, conclusions and recommendations of the project. The target readership consists of persons who are not necessarily technical specialists but who need to understand the policy implications of technical findings and needs for insuring sustainability of project results.

MTR and Evaluation provisions

19. **Mid-Term Review:** As outlined in the GEF Evaluation Policy, Mid-Term Reviews (MTRs) or mid-term evaluations (MTEs) are mandatory for all GEF-financed full-sized projects (FSPs). The Mid-Term review will (i) assess the progress made towards achievement of planned results (ii) identify problems and make recommendations to redress the project (iii) highlight good practices, lessons learned and areas with the potential for upscaling.

20. The Budget Holder is responsible for the conduct of the MTR of the project in consultation with the FAO-GEF Coordination Unit halfway through implementation. He/she will contact the FAO-GEF Coordination Unit about 3 months before the project half-point (within three years of project CEO Endorsement) to initiate the MTR exercise.

21. To support the planning and conduct of the MTR, the FAO GEF Coordination Unit has developed a guidance document 'The Guide for planning and conducting Mid-Term Reviews of FAO-GEF projects and programmes'. The FAO-GEF Coordination Unit will appoint an MTR focal point who will provide guidance on GEF specific requirements, quality assurance on the review process and overall backstopping support for the effective management of the exercise and for timely the submission of the MTR report to the GEF Secretariat.

22. After the completion of the Mid-Term Review, the BH will be responsible for the distribution of the MTR report at country level (including to the GEF OFP) and for the preparation of the **Management Response** within 4 weeks and share it with national partners, GEF OFP and the FAO-GEF CU. The BH will also send the updated core indicators used during the MTR to the FAO-GEF CU for their submission to the GEF Secretariat.

23. **Terminal Evaluation:** The GEF evaluation policy foresees that all Medium and Full-sized projects require a separate terminal evaluation. Such evaluation provides: i) accountability on results, processes, and performance ii) recommendations to improve the sustainability of the results achieved and iii) lessons learned as an evidence-base for decision-making to be shared with all stakeholders (government, execution agency, other national partners, the GEF and FAO) to improve the performance of future projects.

24. The Budget Holder will be responsible to contact the **Regional Evaluation Specialist (RES)** within six months prior to the actual completion date (NTE date). The RES will manage the decentralized independent terminal evaluation of this project under the guidance and support of OED and will be responsible for quality assurance. Independent external evaluators will conduct the terminal evaluation of the project taking into account the 'GEF Guidelines for GEF Agencies in Conducting Terminal Evaluation for Full-sized Projects'. FAO Office of Evaluation (OED) will provide technical assistance throughout the evaluation process, via the OED Decentralized Evaluation Support team. In particular, it will also give quality assurance feedback on: selection of the external evaluators, Terms of Reference of the evaluation, draft and final report. OED will be responsible for the quality assessment of the terminal evaluation report, including the GEF ratings.

25. After the completion of the terminal evaluation, the BH will be responsible to prepare the management response to the evaluation within 4 weeks and share it with national partners, GEF OFP, OED and the FAO-GEF CU. The BH will also send the updated core indicators used during the TE to the FAO-GEF CU for their submission to the GEF Secretariat.

The evaluations will also assess how the OPA implementation and partnership agreement influenced the achievement and sustainability of results while contributing to enhance capacities of the OP/s. In doing so, the evaluation will consider the brief guidance note and evaluation questions OED has developed in consultation with the OPIM unit.

Disclosure

26. The project will ensure transparency in the preparation, conduct, reporting and evaluation of its activities, respecting UNDRIP through FPIC and IPPs for Masyarakat Adat as outlined in Annex J. This

includes full disclosure of all non-confidential information, and consultation with major groups and representatives of Masyarakat Adat, and local communities. The disclosure of information shall be ensured through posting on websites and dissemination of findings through knowledge products and events. Project reports will be broadly and freely shared, and findings and lessons learned made available.

10. Benefits

Describe the socioeconomic benefits to be delivered by the project at the national and local levels, as appropriate. How do these benefits translate in supporting the achievement of global environment benefits (GEF Trust Fund) or adaptation benefits (LDCE/SCCF)?

It is anticipated that the project will generate benefits to 2,260 women and men (in particular, Masyarakat Adat) in the form of improvements in the natural resource base on which communities depend such as access to improved quality and quantity of water; improved availability of NTFPs and other natural resources utilized by communities including medicinal plants and forage for livestock; reduced soil erosion; reduced chemical fertilizer and pesticide; use and increased landscape productivity through the implementation of IAS management measures, Conservation Agriculture and other sustainable practices. It is envisioned that improved IAS management will also contribute to improved levels of biodiversity, driving an increase in tourism and associated employment.

Specifically, as outlined in Annex A1 and the Gender Action Plan, the project has set a target of 50% women beneficiaries. The Project will also engage youth in the awareness and education activities under Component 3 and potentially the planning aspects of Component 2.^[1] Age-disaggregated data will be collected to monitor youth engagement, mostly for awareness and education activities under Component 3.

It is also envisaged that the Project will create jobs. It is anticipated that at least 60% of the jobs created will benefit women, and that they include Masyarakat Adat. The intention is to train and employ people to remove IAPS from the Project landscape, as well as establish nurseries to grow alternative species. The plan is to mainly employ Masyarakat Adat and local communities, the majority of whom will be women. In other words, the Project will have considerable benefits for Masyarakat Adat and local communities in terms of improving the natural resource base on which people depend, increasing awareness building capacity/knowledge, and job creation.

^[1] As mentioned above, the Project will not engage children nor youth below the age of 18 in any project-related work other than awareness/ education activities under Component 3 (and potentially the planning aspects of Component 2) to avoid any health and safety risks.

11. Environmental and Social Safeguard (ESS) Risks

Provide information on the identified environmental and social risks and potential impacts associated with the project/program based on your organization's ESS systems and procedures

Overall Project/Program Risk Classification *

| PIF | CEO Endorsement/Approval | MTR | TE |
|---------------------|-----------------------------|-----|----|
| High or Substantial | High or Substantial | | |

Measures to address identified risks and impacts

Elaborate on the types and risk classifications/ratings of any identified environmental and social risks and impacts (considering the GEF ESS Minimum Standards) and any measures undertaken as well as planned management measures to address these risks during implementation.

The project has been screened against environmental and social risks and has been rated 'high risk' in line with FAO's Environmental and Social Safeguards. The E&S screening checklist, which was reviewed during the PPG phase, is presented in Annex I5 of the Project Document. The project is not designed or intended to impact negatively any protected area or people dependent on natural resources for their survival. Instead, it is expected to improve the goods and services provided by ecosystems by reducing the spread and impacts of IAS. The Project, however, is classified as high risk due to three risks factors outline below and that could entail potentially significant, irreversible and/or cumulative negative environmental and social risks and/or impacts:

? The project is located in critical habitats where project implementation can potentially impact negatively on ecosystem functions if not undertaking with due care and diligence.

? The project will demonstrate landscape-level approach to IAPS management which requires a precautionary approach as the Environmental and Social impacts of the IAPS control need to be properly assessed and managed. The limited experience, technical capacities and scientific resources for addressing IAS management challenges at the country level exacerbates this risk.

? The project area includes Indigenous Peoples (*Masyarakat Adat*). Their economic, social, and legal status may limit their capacity to defend their rights to, and interests in, land, territories and natural and cultural resources, and may restrict their ability to participate in and benefit from development projects.

A full environmental and social impact assessment (ESIA, for high risk) was undertaken by an independent external expert (Annex II), an Indigenous Peoples' Plan (IPP) prepared, and a process of Free, Prior and Informed Consent (FPIC) will be followed as described in Annex J. The risks were systematically screened during that phase and mitigation measures identified. The risks identified and mitigation measures proposed were incorporated into the project document and will be systematically monitored during project implementation to reduce the indirect, cumulative and associated impacts of the potential risks.

The following Environmental and Social Standards (ESS) of FAO are relevant to this project:

- ESS 1: Natural Resource Management (rated low risk, see ESS screening checklist in Annex I5)
- ESS 2: Biodiversity, Ecosystem and Natural Habitats (rated high risk due to the presence of protected areas)
- ESS 5: Pest and Pesticide Management (moderate risk)
- ESS 7: Decent Work (moderate risk)
- ESS 8: Gender equality (low risk)
- ESS 9: Indigenous Peoples and Cultural Heritage (high risk)

ESS 1 - Natural Resources Management

The Project has relevance because it supports the development of farming practices which will contribute to reduced pesticide and fertilizer use and reduce erosion. Practices such as cover cropping can reduce weed incidence, reducing the need for herbicides, and at the same time increasing crop yields per hectare. The use of nitrogen-fixing cover crops, such as legumes, also improve soil fertility, reducing the need for fertilizers. It is well known that fertilizer run-off into streams and lakes facilitates the growth of waterweeds, which impact on water quality. It is also known that waterweeds significantly increase water loss through evapotranspiration. Cover crops can also reduce soil erosion and maintain soil moisture. Soil erosion contributes to siltation, which facilitates the proliferation of waterweeds. Increased turbidity is known to have a negative impact on some biological control agents reducing their ability to effectively control waterweeds.

Invasive alien plants, especially woody weeds like *Acacia decurrens* and *Chromolaena odorata*, not only have a negative impact on biodiversity, but also water resources, as explained elsewhere. By displacing plants in the understorey, they can also contribute to increased erosion, with considerable knock-on impacts. Their control, and establishment of native plants, especially those that protect the soil will result in reduced erosion.

The Project team will not implement any activities without the free, prior and informed consent of Masyarakat Adat and local communities. All activities will be initiated at a small scale, in the form of demonstration trials, where various interventions will be trialled and monitored with direct involvement of communities, especially women, the youth and Masyarakat Adat. In other words, trials will be undertaken using various techniques/methodologies for comparative purposes, with communities having free and open access to the demonstration sites. This will be done in conjunction with capacity development and awareness raising activities, including community workshops. The final decision in terms of which intervention strategy should be more widely adopted will be taken based on community support, taking cognisance of the views of women and Masyarakat Adat, respecting the FPIC and rights to self-determined development of the Masyarakat Adat.

It is critical to note that all sites for demonstration trials will be selected based on the free, prior and informed consent of landowners/land users/resource users, and the community at large. No landowner or community member should be deprived of an income because of the established of these demonstration trials.

ESS 2 Biodiversity, Ecosystems and Natural Habitats

The Project has a major focus on ESS 2 because it includes activities that contribute to the management of IAS that have a detrimental impact on biodiversity, ecosystem goods and services and natural habitats. Many of the project interventions, especially regarding policy, coordination, and resources acquisition or cost-recovery under Component 1 will benefit all of Indonesia, whereas most activities under Component 2 will be more site specific, with a more hands-on approach to conserving biodiversity as a result of improved IAS management. Overall, the Project will support activities that contribute to improving the natural resource base on which Masyarakat Adat and other communities

depend, through improved management of IAS. The costs of IAS and the benefits of management are supported by many studies from around the world.

All precautions will be taken to ensure that any Project interventions, from policy level to the control of IAS at the Project sites, do not impact negatively on anyone, especially women and Masyarakat Adat. All intervention, especially those at the Project sites will be trialled and tested, with the involvement of communities. The results will be there for communities to see, and the results shared, so that communities can decide which intervention they would like to support. A rejection of all interventions will be respected, and followed by additional trials, and increased awareness and capacity development activities.

During project inception, additional consultations will be carried out to better understand the current formal and informal relationships and agreements between the communities and the PAs. A highly participatory consultation process will be implemented wherein the current uses and the proposed IAS management measures will be discussed. The Project will support collaborative management and benefit sharing to ensure that IAS management measures involve and are supported by both the PA management, Masyarakat Adat, and local communities, while respecting UNDRIP through FPIC and IPPs for Masyarakat Adat as outlined in Annex J.

It is critical to note that none of the project activities will result in the loss of biodiversity, other than the removal of IAS. The removal of IAS will benefit biodiversity conservation in the medium- and long-term as described elsewhere. The Project team will always follow the precautionary approach whenever implementing any Project interventions. No activities will take place in any sites without the consent of the protected area managers, Masyarakat Adat, and local communities, in respect of UNDRIP, FPIC and IPPs for Masyarakat Adat (see Annex J). Project activities will address current plant and animal invasions and reduce the risk of future incursions. It will address policies, create awareness, build capacity, and develop and implement best management practices which will inhibit further biodiversity loss to the benefit of conservation and livelihoods.

The project will not be involved in access and benefit-sharing for genetic resources (ABS) for research and development. In other words, there will be no research on potential useful compounds of similar in any of the IAS targeted.

ESS 5 Pest and Pesticides Management

The Project will involve the use of herbicides and biological control agents. International research has demonstrated that herbicides can reduce the burden of hand-weeding and other manual weed control interventions. However, there have also been considerable negative impacts associated with chemical use, to people and the environment. As such the costs of using a herbicide have to be weighed against the benefits that accrue from their use, in respect of the costs of IAS to people and the environment. The advantages of chemical control are:

- ? In many cases, there are no other effective options;
- ? In most cases, chemical control is more cost-effective than other methods, especially manual control;

- ? Results are quicker than with manual control, especially when compared with ring-barking or stripping;
- ? Use of the correct herbicides, applied according to label recommendations, has little to no negative impacts on the environment.

The disadvantages of chemical control are:

- ? The purchase of specialized equipment and the training of applicators are essential, and can add to costs;
- ? Herbicides can be expensive ? incorrect formulations can result in poor control, requiring repeated applications, which can add to costs;
- ? Target species must be ?healthy?, and weather conditions suitable, at the time of a herbicide?s application.
- ? Foliar application can affect non-target species;
- ? Herbicide misuse may cause environmental damage;
- ? Manual control of plants may be necessary before herbicide application (e.g., in cut-stump treatments) or in the spraying of re-growing or coppicing plants that were too tall to spray initially

All IAPS management interventions across a landscape will only be initiated based on the results of trials, as explained above in ESS 1 and 2. Demonstration trials where several interventions will be tested, and the results monitored, will be established in each of the project landscapes. For example, management of *Acacia decurrens* will be compared using various interventions ? ring-barking versus cut-stump treatment using various herbicides versus basal bark using various herbicides versus stem-injection using various herbicides versus frilling using various herbicides, etc. The impacts of each of these interventions on the target species will be monitored, together with impacts on non-target species and associated biodiversity recovery. Masyarakat Adat and communities will be able to make their own assessments, based on observations of the demonstration trials, supported by data accrued by researchers during the trials. The selection of the best technique will be made based on impacts on target species, non-target impacts, native species recovery, and costs.

Few herbicides are available and have been registered for use against environmental weeds in Indonesia. This does pose a challenge to the Project. However, the Regulatory Authority in the Ministry of Agriculture does allow for the issuance of temporary permits of pesticides for emergency use or for experimental purposes ? see Regulation No. 07/PERMENTAN/SR.140/2/2007 concerning conditions and procedures for pesticide registration. Once the target IAPS have been identified and approved by the communities, and PA staff at the two project sites, together with the trial use of herbicides, an application will be submitted to the regulatory authorities for temporary import permits for specific herbicides. These will be herbicides that have been approved for use in countries where the target species are being controlled. If the target species are not being controlled elsewhere, herbicides that are registered for use against congeners elsewhere will be trialled. These applications will require all of the necessary information for the authorities to make an informed decision. The Project Team will also apply for use to relevant experts in the FAO. All due diligence will be undertaken to ensure that no herbicides banned by the FAO and WHO are used. Every effort will also be made to ensure that the least toxic herbicide is used, if a number are registered for use elsewhere. For example, preference

should be given to herbicides with active ingredients other than picloram, especially in environmentally sensitive areas. Picloram is the most persistent member of its family of herbicides which does not bind strongly with soil particles and is not degraded rapidly in the environment, allowing it to be highly mobile and persistent. The half-life of picloram in soils can range from one month to several years. So, an analysis will be undertaken of what is available internationally and due diligence applied.

Whenever possible, the use of pesticides and herbicides in Natural protected areas will be discouraged. Awareness raising will take place to seek those local farmers and Masyarakat Adat using pesticides and herbicides in the project areas, substitute them by Integrated pest management and other forms of bio control. Training on pesticides and herbicides or any other agrochemical should be aimed at raising awareness about their risks both for health as well as for the biodiversity being protected in the two national parks.

The Project will, and this is critical, ensure that all community members, including women and Masyarakat Adat, support the use of herbicides, initially in demonstration trials, and elsewhere, if approved for wider use by the regulatory authorities. It should also be noted that all health and safety standards will apply during storage, application of the herbicide, cleaning of equipment, and disposal of empty containers and unused chemicals. All applicators will be trained in health and safety standards and will be issued with all of the required safety gear.

The Project will also introduce, if appropriate and approved, host specific and damaging biological control agents as part of integrated IAS management. This would be done only after initial assessment carried out that determines whether biocontrol is appropriate and feasible. Given the Project's defined resources and timeline, no agents will be sourced directly from the country of origin of the target IAPS. In other words, there will be no surveys for new potential agents for targeted IAPS. Only those IAPS for which there are known, tested, and established agents that have been officially released elsewhere in the world will be targeted for biocontrol. These are commonly known as 'off-the-shelf' agents. Some agents have been previously released and have established in parts of Indonesia ? these can also be considered for redistribution if the target species are present and EIA/related due diligence confirms their possible introduction in the Project landscapes. All agents selected and approved for introduction by communities, PA management, and other relevant stakeholders will be imported following all of the required regulatory procedures. These are being reviewed under Component 1 ? the revised procedures/protocols could be tested during the project period. It is important to reiterate that support for biocontrol will need to be gleaned from all community members, including Masyarakat Adat, residing in the Project landscapes. Support will hopefully be enhanced through targeted awareness creation and capacity development.

Integrated IAS management

There are three main strategies for controlling IAS: physical/mechanical, biological, and chemical. These strategies are often combined for effective IAS control. Integrated control refers to the use of a combination of two or more of these strategies. This is applied, in particular, to prevent large-scale impact, and is generally conducted in three steps: (1) Initial control: The drastic reduction of the IAS population; (2) Follow-up control: Control of seedlings, root suckers, and coppice growth; and (3) Maintenance control: Maintain low IAS population with regular control measures. More details on biocontrol agents are provided below.

Biocontrol agents

Biological control, or biocontrol, is a method of reducing the impact or damage caused by an introduced target pest or weed using a biocontrol agent, traditionally a predator, herbivore or pathogen. There are a number of forms of biological control; classical biological control is where host-specific natural enemies, from the native range of the target invasive alien species (IAS), are selected (based on clear evidence of host specificity and capacity to control the target determined during laboratory trials), and released into the environment.[\[1\]](#)

Classical biological control is used to manage a variety of IAS, including unwanted invasive plants (e.g. aquatic weeds, smothering vines, shrubs and trees) and invertebrates (e.g. mites, insects) negatively impacting on crop production, biodiversity and ecosystem services. A Summary for Policy Makers on 'The application of classical biological control for the management of established invasive alien species causing environmental impacts?' prepared by the IUCN Species Survival Commission Invasive Species Specialist Group (ISSG) in 2018 pointed out that biocontrol is a cost-effective and sustainable management technique that has the potential to mitigate the costs and biodiversity impacts of biological invasions and that should be explored by all governments.[\[2\],\[3\]](#)

In 2017, FAO published Guidelines for the export, shipment, import and release of biological control agents and other beneficial organisms.[\[4\]](#)

For example, host specific and damaging seed-feeding beetles were introduced to South Africa for the control of the invasive Australian tree *Acacia mearnsii*. To increase the impact on seed production they then introduced a flower-bud galler *Dasineura rubiformis*. A congener, *Acacia decurrens* is a problem in BTSNP where it is used for fuelwood ? South Africa has similar agents for this species which are effective and are able to reduce seed production and in so doing slow or even stop the spread, without impacting on the beneficial attributes of the tree.

The agent *Cecidochares connexa*, introduced for the control of the invasive shrub chromolaena is established in other parts of Indonesia and could be used in BTSNP and BBNP. If already present but not sufficiently effective, due to climate incompatibility or other factors, the introduction of additional host specific and damaging agents could be considered, agents that have been released elsewhere, especially in Africa.

One of the most effective agents for the waterweed salvinia has been released previously in Indonesia, so it is present in the country, but was never considered for re-distribution to Ranu Pani Lake. There are also known agents for tulip tree and lantana, two highly invasive plant species in BBNP ? a good agent on lantana, a flower-bud galling mite is very effective in Africa (although it only attacks some lantana biotypes, but research is ongoing to identify other biotypes of the same mite species that are effective against other lantana biotypes or varieties).

Biocontrol has the potential to resolve conflicts, where people utilize these IAPS. Biocontrol does not kill the target species ? in general agents reduce, among others, growth rates and seed production. So, people can still use the plants, but the agents ensure that the impacts of the IAPS on natural resources are much reduced. Biological control also reduces the costs of other interventions, such as physical and chemical control which are far more costly to implement than biological control. In fact, the benefit: cost ratios for biological control of invasive Australian trees, invasive succulents, and subtropical shrubs in South Africa were estimated to be 3,726:1; 2,731:1; and 50:1, respectively (De Lange and Van Wilgen, 2010). These findings are supported by studies in Australia which have found that every dollar invested in the weed biocontrol effort yielded a return of AUD 23.10 (Page and Lacey, 2006). There, the benefit: cost ratio for agriculture alone (in terms of both cost savings on control and increased production) was 17.4. If current annual expenditures on biocontrol research continue, it is expected that weed biocontrol projects in Australia may provide, on average, an annual net benefit of AUD 95.3 million, of which AUD 71.8 million is expected to flow into the agriculture sector (Page and Lacey, 2006).

The main benefits of biocontrol (Greathead, 1995) are:

ESS 7 Decent Work

Project implementation will involve the recruitment of many staff from National Project Coordinators to administrative staff. The Project also intends to employ community members in the management of IAPS at the Project landscapes. This may involve the active control of IAPS or even the mass rearing and dissemination of biological control agents. All employment initiatives will focus on developing decent rural employment and promoting fair treatment, non-discrimination and equal opportunities for all workers.

Much of the work generated through this project will be based on the Working for Water Programme, from South Africa, a Public Works Programme, which employed people to clear IAS^[5]. The Programme had the following targets:

- ? Create thousands of jobs per annum, for previously unemployed individuals;
- ? Allocate 60% of these jobs to women;
- ? Allocate 20% of the jobs to youth (persons under the age of 23 years);
- ? Allocate 2% (minimum amount) of the jobs to disabled persons;
- ? Ensure every worker receives a minimum average of two days of training per month;
- ? Ensure every project has a functional steering committee;
- ? Ensure every worker receives an hour of HIV-AIDS awareness training per quarter;
- ? Ensure every project allows for access to childcare facilities.

Many of these targets will also apply to this Project, especially in Project landscapes, where the focus will be on training and empowering women to manage IAS. To enhance income streams, there will also be a component of value addition in IAS management operations. In other words, there will be value addition to anything removed during clearing operations, such as woody biomass. This activity, if undertaken as envisaged, will result in the creation of additional jobs through harvesting and processing of plant material. The utilization will create opportunities for economic empowerment of women, Masyarakat Adat, and other marginalized groups.

Every effort will be made during the Project to ensure that all principles and practices are adhered to in order to ensure that there are no violations of international labour standards, and national employment and labour laws.

The focus throughout the project will not only be to create employment during the project period, but to put systems in place to ensure the creation of long-term employment opportunities. Every effort will be made to create better employment opportunities, especially for women and the youth.

Every effort will be made to prevent any discrimination against women, youth and Masyarakat Adat, especially in the Project landscapes where individuals will receive training and participate in IAS management activities.

All Health and Safety protocols will be adhered to, especially regarding the use of herbicides. All individuals applying herbicides will receive training on the safe use of chemicals and be supplied with PPE. The safety of all individuals, especially those managing IAS in Project landscapes will be paramount.

The Project will not engage children (nor youth below the age of 18) in any project-related work other than awareness/education activities under Component 3 (and potentially the planning aspects of Component 2) to avoid any health and safety risks, and will ensure that there is no forced labour nor child labour. It is hoped that community members will see the benefits of IAS management as a result of awareness creation campaigns and capacity development initiatives and contribute to their control in a meaningful way. IAS management will benefit communities.

ESS 8 Gender Equality

A Gender Analysis and Gender Action Plan (GAP) has been prepared for the Project (see Annex I4 of the Project Document). The Project will ensure that there is no discrimination against any sectors of society, especially women, and that all project participants receive equal access to capacity building initiatives; information on the presence, distribution, impacts and management of IAS; and employment opportunities. Inequalities should not be perpetuated.

The Project will ensure that there is equal opportunity, fair treatment and empowerment of women, girls and other often marginalized individuals in society, especially in the Project landscapes. Every effort will be made to identify any discriminative policies and practices, and to act to remedy them.

One of the most important activities in the Project will be an assessment of the costs and benefits of IAS, to men and women, including the costs and benefits of various management interventions. It is important to determine if targeted IAS impact equally on men and women, and of their management may benefit one gender above another. It is important for Project outcomes that all sectors of society see IAS management as a benefit.

As part of the M&E plan the Project will track and report on progress regarding gender mainstreaming and monitor changes over time. The M&E Specialist will record and analyse all data with regard to project related activities to ensure that women and men benefit equally from all activities.

ESS 9 Indigenous Peoples and Cultural Heritage

Two Masyarakat Adat Plans (IPPs) are to be developed since Masyarakat Adat live and have ancestral relations to both project areas (see Annex J of the Project Document). The project will ensure that the UN Declaration on the Rights of Indigenous Peoples and any other national laws pertaining to the rights of Masyarakat Adat are respected and implemented in all project activities. As such all *Masyarakat Adat* will be consulted, and approval sought with respect to all Project interventions in line with FAO's FPIC process. The Project will apply the principle of Free, Prior and Informed Consent (FPIC) of any Indigenous Peoples affected by the project.

The Project is not expected to have adverse impacts on culture or traditions, largely because IAS are recent introductions and have not been assimilated into cultural and traditional practices. However, due to the loss or reduction in abundance of native species due to over-exploitation, land transformation, habitat degradation or even the impacts of IAS, community members have resorted to utilizing some exotic and invasive species. By removing IAS and fostering the introduction and use of native replacement species, species that have been used in the past, it is hoped that many cultural and traditional practices will be rekindled and strengthened. In this respect the elders in each Masyarakat Adat community will be consulted, since they will still have knowledge on native species used in the past. However, there is always the prospect of communities rejecting the replacement of available exotic and invasive species with native alternatives. These issues will be addressed, and resolutions found through consultation, and access to information on the negative impacts of IAS and the benefits of management. No unilateral decisions on management will be undertaken. This is critical to ensure the sustained management of IAS.

| Social & Environmental Risks and Impacts | Mitigation measures | Responsible | Cost | Timeline |
|---|----------------------------|--------------------|-------------|-----------------|
| ESS 1: Natural Resource Management | | | | |

| Social & Environmental Risks and Impacts | Mitigation measures | Responsible | Cost | Timeline |
|--|--|-------------|---|-----------------------------------|
| <p>The project landscapes include, among others, woodlots, croplands, forests, lakes, rivers, and protected areas. All proposed interventions will contribute to protecting or enhancing the natural resource base. In other words, the management of IAS will contribute to sustaining or improving ecosystem health.</p> | <ul style="list-style-type: none"> ? No major mitigation measures will be required because project interventions are seen as being beneficial ? A highly participatory and consultative process will be employed by the project as described above, and agreements reached with Masyarakat Adat, and local communities, before implementing any project activities. ? No IAS will be used to reduce erosion or improve soil health. Many species introduced elsewhere for nitrogen-fixation are known to be invasive. Only benign nitrogen-fixing plants, that also contribute to food security, will be used as cover crops. ? To ensure that the removal of IAS, especially in dense infestations, do not contribute to increased soil erosion in the short-term, erosion control methods will be implemented such as contouring and diverting. ? The project will not result in any changes of tenure. However, unclear land tenure or tenure conflicts may exist in the project area. The Project's Masyarakat Adat Experts and Gender and Safeguards Specialist will work closely with stakeholders to address any tenure conflicts that may arise in the project areas. | PMU/OP | <p>USD 71,450 for EIAs</p> <p>USD 60,000 for Biodiversity Specialist</p> <p>USD 150,000 for risk assessments</p> <p>See Annex 3 for community participation process</p> | <p>Years 1-2</p> <p>Years 1-5</p> |
| ESS 2: Biodiversity, Ecosystems and Natural Habitats | | | | |

| Social & Environmental Risks and Impacts | Mitigation measures | Responsible | Cost | Timeline |
|--|--|-------------|----------|-----------|
| <p>All Project activities under Component 2 will be in two PAs, BTSNP and BBNP. However, it is unlikely that the project will have any negative effect on biodiversity, ecosystems and natural habitats, as it is widely acknowledged that the management of IAS will contribute to improved biodiversity conservation and ecosystem health. Initial interventions, especially the use of herbicides may have very short-term negative impact on some species, especially soil microbes. However, the majority of papers report negligible impacts of herbicides on soil microbial communities and beneficial soil functions when applied at recommended field-application rates (see ESS 5 for more on pesticide use)</p> | <p>? No major mitigation measures will be required. However, all IAS management interventions will be aligned with international best practice.</p> <p>? All individuals involved in IAS management activities will be trained to ensure that all interventions are properly implemented, ensuring that non-target impacts are kept to a minimum. For example, the felling of invasive alien trees may damage native species, including endangered species. In these situations, the trees will be ring-barked or herbicide applications will take the form of stem injections or basal-bark applications ? this will result in the tree dying standing, with reduced non-target impacts.</p> <p>? Specific management interventions will always consider the situation in which the IAS is growing ? in other words adaptive management will be the order of the day with the types of interventions linked to the site characteristics.</p> <p>? Additionally, no interventions will take place on (or indirectly affecting) Masyarakat Adat land or territories without their free, prior and informed consent through the FPIC process.</p> <p>? A highly participatory and consultative process, respecting UNDRIP through FPIC and IPPs for Masyarakat Adat as outlined in Annex J, will be employed by the project as described above, and agreements reached with Masyarakat Adat and local communities, before implementing any project activities.</p> | PMU/OP | As above | Years 1-5 |

| Social & Environmental Risks and Impacts | Mitigation measures | Responsible | Cost | Timeline |
|---|---|-------------|------|----------|
| ESS 3: Plant Genetic Resources for Food and Agriculture | | | | |
| n/a | <ul style="list-style-type: none"> ? The project will not introduce plant species or varieties previously not grown. ? In case the project would provide any seeds/planting material for cultivation, prior clearance by the FAO Lead Technical Officer (LTO) is required. The LTO will consult with relevant FAO HQ technical division as applicable. ? The project does not foresee any activities that involve the importing or transfer of seeds or planting material for cultivation or research and development. | PMU/OP | n/a | n/a |
| ESS4 ? Animal ? Livestock and Aquatic Genetic Resources for Food and Agriculture | | | | |
| n/a | <ul style="list-style-type: none"> ? It is not foreseen that the project will introduce non-native or non-locally adapted animal species, breeds, genotypes or other genetic material to an area or production system or modify in any way the surrounding habitat or production system used by existing genetic resources. ? The potential introduction of biocontrol agents is covered under ESS 5 below. | PMU/OP | n/a | n/a |
| ESS 5: Pest and Pesticide Management | | | | |

| Social & Environmental Risks and Impacts | Mitigation measures | Responsible | Cost | Timeline |
|--|--|-------------|----------|-----------|
| <p>The Project may utilize herbicides for IAS removal/ control as explained in the narrative above (depending on priorities and methods identified in consultation with stakeholders including local communities and Masyarakat Adat). It is widely acknowledged that the incorrect use of herbicides, including issues around storage and disposal of unused chemicals, can have significant negative impacts on the environment. It should also be noted that in croplands the Project will encourage the reduced use of herbicides and fertilizer by promoting the use of nitrogen-fixing cover crops. The Project will also utilize host specific and damaging biological control agents. If correct procedures regarding testing (confirming host specificity) are not met they may have non-</p> | <ul style="list-style-type: none"> ? All herbicides that will be required for use will be vetted by the FAO and the regulatory authorities in Indonesia. In fact, it is known that many herbicides registered for use against some of the proposed targets are not available in Indonesia. As such the PMU or Project Technical Advisor (PTA) would apply to the regulatory authorities for importation of selected chemicals for use on a trial basis ? temporary import permit. Prior clearance by FAO's Lead Technical Officer is required for any procurement of herbicides and biocontrol agents. ? Imported and locally available herbicides will be tested at the Project landscapes prior to roll-out across the wider landscape. In other words, all IAS management interventions will be trialled in demonstration plots to identify the most effective herbicide, which has the lowest non-target impacts. In summary trials will be undertaken in the Project landscape to determine the most cost-effective management intervention. ? Demonstration trials will be undertaken with the full support of the Masyarakat Adat and other communities, who will also monitor the trials, in collaboration with researchers, and contribute to a decision regarding future use. See above narrative for more details. ? An awareness campaign will be developed and implemented to make all Project participants, Masyarakat Adat, and communities are informed of the risks and benefits of herbicide-use. ? All of those individuals applying herbicides will be trained in the risks, and safe-use of herbicides, including the safe disposal of used containers and unused herbicides. ? All herbicide applicators will also receive training on the correct way to mix and apply herbicides. All trainings will be undertaken by a professional Pest Control Operator (PCO) ? All herbicide applicators will be required to wear PPE. ? Any biocontrol agents selected for introduction and possible release must be tested to ensure that they are host specific and pose no threat to crops, native and indigenous plants. An environment risk assessment will be conducted before the release of any biocontrol agent. Additionally, the Project will make sure that Government support is available for implementation of biological control. FAO's guide on classical biological control^[1] also provides guidance on how to mitigate potential risks of introduction of biological control agents. | PMU/OP | As above | Years 1-5 |

| Social & Environmental Risks and Impacts | Mitigation measures | Responsible | Cost | Timeline |
|---|--|-------------|----------|----------|
| ESS 7: Decent Work | | | | |
| <p>It is envisaged that the Project will create jobs and will train and employ people to remove IAPS from the Project landscape. There is always a risk that employment may fail to comply with national and international labor standards as enshrined by the ILO and national regulations. There is also the risk that certain sectors of society may be discriminated against.</p> | <ul style="list-style-type: none"> ? A key aspect of the Project will be to provide training to Project staff and communities to improve their access to better jobs, with improved remuneration. This is especially relevant in Project landscapes where communities, especially women and the youth, Masyarakat Adat, and other often marginalized individuals, will receive training on various IAS issues, which they can then utilize in the field during IAS management interventions. ? All forms of remuneration for communities, including Masyarakat Adat, in Project landscapes will comply with international best practice as set out within the ILO Conventions on Equal/Fair remuneration, Discrimination against women and Prohibitions against Child workers. ? Risks concerning the possibility of engaging children or underage workers (youth below the age of 18) will be avoided by ensuring that all national legislation is followed ? In terms of remuneration the PMU will be cognizant of Government Regulation No. 36 of 2021 (GR 36/2021), which has eliminated the sectoral minimum wage while establishing a provision for hourly pay for part-time workers. ? Note: FAO holds a zero-tolerance policy toward child labour. The project will ensure compliance with FAO's Framework on Ending Child Labour in Agriculture.[6] The Project will engage youth in the awareness and education activities under Component 3. As mentioned above, the Project will not engage children nor youth below the age of 18 in any project-related work other than awareness/ education activities under Component 3 (and potentially the planning aspects of Component 2) to avoid any health and safety risks. The Project will also ensure that there is no forced labour nor child labour. ? Internationally, youth is typically defined as age group between 15-24 years. The Youth Law of Indonesia (No. 40/2009) defines youth as 18-30 years old.[7] The project will collect age-disaggregated data to monitor youth engagement. | PMU/OP | As above | Year 1-5 |
| ESS 8: Gender Equality | | | | |

| Social & Environmental Risks and Impacts | Mitigation measures | Responsible | Cost | Timeline |
|---|--|-------------|--------------|-----------|
| <p>The Project could potentially reinforce discriminations against women, especially with regard to the updating and or development of policies, capacity development, awareness creation, and job opportunities, especially in Project landscapes. Also, important to recognize that women are most affected by IAS, yet they are also known to utilize IAS, for example fuelwood from IAPS, or even medicinal plants. Interventions could therefore limit women's ability to use IAS. In that respect it is important to consider different roles and positions of women and men in accessing environmental goods and services. There is also the possibility that benefits from the Project will not accrue equally between individuals and communities across the landscape. This applies</p> | <ul style="list-style-type: none"> ? A Gender Action Plan has been developed and resolves to include a minimum of at least 50% women in all capacity development training workshops. ? The Communication Strategy will be updated and take cognizance of the fact that men and women may respond differently to awareness material, and awareness creation activities in general. To this end the Project will ensure that there is no bias in the Communication Strategy with equal opportunities for men and women to benefit and learn from any awareness campaigns. ? The Project will endeavor to provide specific training to ensure that women are able to attain more senior positions in biodiversity conservation, especially regarding IAS management. ? Gender inequalities are often more evident in poorer communities. As such the Project will, whenever possible, help to counter the counter the impacts of traditional practices and beliefs on male domination at the community level. ? The Project will ensure that there are equal opportunities for men and women, in terms of employment, in the Project landscapes. At least 60% of jobs, if possible, will be reserved for women at these Pilot Sites. ? The Project will engage a Gender Expert who will ensure that all activities take cognizance of the needs and rights of women. The Gender Expert will liaise with all relevant stakeholders to collect gender-specific information to furnish the PMU with sex desegregated data on all activities. | PMU/OP | See Annex I4 | Years 1-5 |

| Social & Environmental Risks and Impacts | Mitigation measures | Responsible | Cost | Timeline |
|---|--|-----------------------------------|-------------|-----------|
| ESS 9: Indigenous Peoples and Cultural Heritage | | | | |
| <p>Masyarakat Adat may be negatively affected by project interventions, especially where they have started to utilize IAPS for building materials, fuelwood, or medicinal purposes. Management of IAS by some landowners, and not others, may negate interventions at a landscape level increasing the risks of re-invasions in cleared areas. Benefits of IAS management by some landowners will also accrue to others, who have not invested in IAS management. This lack of social cohesion in IAS management may lead to conflict between various landowners or community groups.</p> | <p>? To address any issues that may arise during project implementation an Indigenous Peoples (Masyarakat Adat) Plan has been developed. Please refer to separate Annex J.</p> <p>? Most importantly the proposed management of IAS within the Project landscape needs the approval and support of all Indigenous Peoples/Masyarakat Adat ? relevant process has been included in the project design. Through the FPIC, the Masyarakat Adat can choose to withhold their consent to be involved in any activities if they decide to do so.</p> <p>? Project interventions should not impact negatively on people?s culture and traditions. The close relationship that the Tenggerese people have with nature is evident, and as such any activities which improve ecosystem services and biodiversity conservation will be supported. In South Sulawesi, Masyarakat Adat have their sacred sites inside the national park where the project will operate.</p> <p>? An intensive awareness campaign will be undertaken to inform communities about the risks of IAS. This will be supported by the establishment of demonstration trials so that communities can see for themselves the costs and benefits of IAS control.</p> <p>? Alternative native species to those IAS currently utilized by communities will be identified by researchers in collaboration with communities. Nurseries will be established to grow and disseminate these species.</p> <p>? The establishment of Coordination Units at each of the Project landscapes, with representation of community leaders and women?s groups, will go a long way to ensuring support from all landowners for the management of IAS.</p> | PMU/OP /PSUI/ FAO-RAP focal point | See Annex J | Years 1-5 |

| Social & Environmental Risks and Impacts | Mitigation measures | Responsible | Cost | Timeline |
|--|---|-----------------------------------|-------------|-----------|
| Cultural heritage | <ul style="list-style-type: none"> ? The target areas include areas of cultural significance as described in Annex J. ? The possibility of chance finds of previously unknown heritage resources during removal of IAS is considered unlikely. Nevertheless, in case chance finds occur, all project activities in the respective site will be immediately suspended and the relevant authorities and stakeholders informed to identify the next steps. | PMU/OP /PSUI/ FAO-RAP focal point | See Annex J | Years 1-5 |

^[1] <https://www.cbd.int/doc/c/0c6f/7a35/eb8815eff54c3bc4a02139fd/cop-14-inf-09-en.pdf>

^[2] <https://www.cbd.int/doc/c/0c6f/7a35/eb8815eff54c3bc4a02139fd/cop-14-inf-09-en.pdf>

^[3] https://www.cabi.org/wp-content/uploads/projectsdb/documents/32771/Benefits_CBC.pdf

^[4] <https://www.fao.org/publications/card/en/c/e4e617ae-db1b-4aed-b676-36d1f3b1b321/>

^[5] <https://www.dffe.gov.za/projectsprogrammes/wfw/socialdevelopment>

^[6] FAO (2020). FAO Framework on Ending Child Labour in Agriculture.

<http://www.fao.org/3/ca9502en/CA9502EN.pdf>

^[7] https://indonesia.unfpa.org/sites/default/files/pub-pdf/Indonesian_Youth_in_the_21st_Century_%28Youth_Mapping%29.pdf

Supporting Documents

Upload available ESS supporting documents.

| Title | Module | Submitted |
|---|--------------------------------|-----------|
| Annex I5 FAO_ES_Screening_Checklist_22 March | CEO Endorsement ESS | |
| Annex I3 Grievance Redress Mechanism | CEO Endorsement ESS | |
| Annex J Masyarakat Adat and FPIC_31Mar2022 | CEO Endorsement ESS | |
| Annex I1 ESIA REPORT_31Mar2022 | CEO Endorsement ESS | |
| _IAS Risk Certification 674044 | Project PIF ESS | |

ANNEX A: PROJECT RESULTS FRAMEWORK (either copy and paste here the framework from the Agency document, or provide reference to the page in the project document where the framework could be found).

| Results chain | Indicators | Baseline | Mid-term target | Final target | Means of verification | Assumptions | Respons ible for data collectio n |
|---|------------|----------|-----------------|--------------|-----------------------|-------------|---|
| Objective: To safeguard globally significant biodiversity and ecosystem services through improved management of invasive alien species (IAS) in Indonesia. | | | | | | | |

[illegible]

| Results chain | Indicators | Baseline | Mid-term target | Final target | Means of verification | Assumptions | Responsible for data collection |
|--|--|---|--|--|--|---|---------------------------------|
| <u>Outcome 1.1:</u> Inclusive policy and regulatory frameworks enabling more effective and comprehensive IAS management | (i) Availability of updated NISSAP with targets, budgets and timelines (ii) Number of NISSAP targets/actions funded and implemented | Indonesia does have a NISSAP, but targets are poorly defined with no associated budgets and timelines | (i) Draft of updated NISSAP prepared, accepted, and vetted by all relevant stakeholders (ii) n/a | (i) Revised NISSAP finalized and adopted (ii) At least two | NISSAP documentation Project/program documents | GoI willing to adopt revised NISSAP Stakeholders recognize the need for a revised national strategy and broad partnership towards its formulation and implementation | PMU |
| - | (iii) Availability of overarching and comprehensive IAS legislative framework, developed and submitted for adoption by all stakeholders (IAS National Biosecurity Framework) | No comprehensive overarching regulations to regulate the introduction and spread of IAS (detailed review to be conducted during implementation) | (iii) Draft legislative framework/ IAS National Biosecurity Framework developed, in line with latest international norms and standards | (iii) Legislative framework/ National Biosecurity Framework developed and submitted for adoption by all stakeholders (including consultations with women and Masyarakat Adat), in line with latest international norms and standards | Reports of consultations IAS National Biosecurity Framework completed and evidence of submission for adoption | GoI willing to endorse/promulgate revised regulations Stakeholders recognize the need for an IAS National Biosecurity Framework | PMU |

| Results chain | Indicators | Baseline | Mid-term target | Final target | Means of verification | Assumptions | Responsible for data collection |
|---------------|---|---|---|---|---|---|---------------------------------|
| - | (iv) Number of national/regional/local policies, legislation, and associated regulations developed, adopted and implemented, especially for local government responsible for the two selected pilot sites | Inadequate national policy and regulation on IAS management No IAS policies, legislation and regulations at local government level | (iv) At least 2 draft policies and associated legislation and/or regulations developed. | (iv) At least 3 draft policies and associated legislation and/or regulations enacted or submitted for enactment at national, regional and local level, especially at the two selected pilot sites | Policies, legislation and/or regulations published in the local legal gazettes or submitted for enactment | Local government officials willing to support the promulgation of IAS legislation | PMU |

| Results chain | Indicators | Baseline | Mid-term target | Final target | Means of verification | Assumptions | Responsible for data collection |
|---------------|--|--|---|---|--|---|---------------------------------|
| - | (v) Classical Biological Control (CBC) protocol developed in line with international norms and standards | Protocol for the introduction of host specific and damaging weed biocontrol agents are inhibitory and cumbersome | <p>(v) CBC protocol developed and agreed</p> <p>Target IAS agreed, and agents identified</p> <p>Application for import of agents made</p> | <p>(v) CBC protocol for the importation, testing and release of agents adopted and supported by all stakeholders, especially those in agriculture and the environment</p> <p>Two biocontrol agents introduced from outside Indonesia, and two agents already present in Indonesia redistributed</p> | Risk Assessment (RA) for introduction of CBC agents Import and release permits Agents present in areas of introduction | GoI issues permits for the introduction and release of weed biocontrol agents Information on safety and efficacy of CBC agents is adequate | PMU |

| Results chain | Indicators | Baseline | Mid-term target | Final target | Means of verification | Assumptions | Responsible for data collection |
|---|--|--|---|---|--|---|---------------------------------|
| <u>Outcome 1.2:</u> Coordination for IAS management strengthened | (i) National Biosecurity Task Force within the Coordinating Ministry for Maritime and Investment Affairs (KEMENK O MARVES) established and operational | Insufficient coordination between various agencies regarding the management of IAS ? quarantine and control functions scattered over different government entities | (i) National Biosecurity Task Force established with tasks and associated budgets | (i) National Biosecurity Task Force operational especially regarding implementation of NISSAP Facilitate/co-manage IAS activities in two Project landscapes (BTSNP & BBNP) | TOR for National Biosecurity Task Force National Biosecurity Task Force Annual Reports Government budget | Government willing to restructure and finance IAS management activities Government Departments receptive to changing mandate and functions Stakeholders willing to participate and coordinate activities recognizing long term benefits of IAS management | PMU |
| - | (ii) Classical Biological Control (CBC) Working Group, supported by all stakeholders, established and operational | Lack of coordination and cooperation between relevant sectors hampers efforts to introduce weed CBC agents | (ii) National Biocontrol working Group established | (ii) National Biocontrol working Group established and operational (including representation of women) | TOR for National Biocontrol Working Group Meeting minutes | Support for CBC among all stakeholders Potential conflicts of interest can be minimized | PMU |

| Results chain | Indicators | Baseline | Mid-term target | Final target | Means of verification | Assumptions | Responsible for data collection |
|---|--|--|---|---|---|--|---------------------------------|
| <u>Outcome 1.3:</u> Increased financial resources and mechanisms for IAS management in Indonesia | (i) Cost-benefit analyses (CBA) completed for IAS of highest concern including ?conflict? species present in agro-ecosystems within PAs leading to positive change, allocations, safeguards or policy, to reduce or prevent promotion and further spread | No evaluations have been undertaken on the costs and benefits of some species utilized by communities (?conflict? species), especially those promoted for agro-forestry. | (i) Cost-benefit analysis methodology agreed and stratified for gender access, use, benefits and costs. | (i) Results of CBA species of highest concern, including that of 5 ?conflict? species reported, and results: (a) communicated with > 3 key national agencies; (b) incorporated in NISSAP action plan; and (c) incorporated in at least 2 PA management plans. | Report on costs and benefits of selected species NISSAP PA management plans | Sufficient information available on costs and benefits of selected species Agro-forestry industry makes information available on the benefits of intentionally introduced agro-forestry species | PMU |

[illegible]

| Results chain | Indicators | Baseline | Mid-term target | Final target | Means of verification | Assumptions | Responsible for data collection |
|--|--|--|---|--|--|---|---------------------------------|
| <u>Outcome 2.1:</u> Existing and new management plans/mechanisms in place to enable landscape level management of IAPS in consideration of FPIC and Masyarakat Adat Plan[4] as outlined in Annex J - | (i-a) Number of Masyarakat Adat Plans developed and FPIC agreements signed. (i-b) Number of spatial maps completed for project landscapes | No maps showing the presence and/or distribution of IAPS in the two project landscapes | (i-a) 2 (1 per site). (i-b) Surveys to determine the presence and distribution of IAPS, including habitat types invaded completed | (i-a) 2 (1 per site). (i-b) At least 2 maps showing the distribution of all IAPS, including biodiversity hotspots at risk of invasion, and sources of invasion (vectors and pathways) | Documenta- tion of Masyarakat Adat Plans and FPIC process and agreements Maps of two project landscapes | PA staff and communities are willing to share information on presence and distribution of IAPS, and how they were introduced into the landscape | PMU |

| Results chain | Indicators | Baseline | Mid-term target | Final target | Means of verification | Assumptions | Responsible for data collection |
|---------------|---|---|--|--|---|---|---------------------------------|
| - | (ii) Number of landscape level IAPS management plans finalized and under implementation | No ecosystem management plans to address IAPS within the two project landscapes Control practices have been applied for a few species but there is too little information available on best IAP management practices | (ii) At least 2 landscape level IAPS management plans developed and endorsed by PA management and Masyarakat Adat leaders living within project landscapes (including agreed IAS control intervention areas and control measures designed through partnership with Masyarakat Adat, and local communities, national and international experts, respecting UNDRIP through FPIC and IPPs for Masyarakat Adat as outlined in Annex J) | (ii) At least 2 landscape level IAPS management plans developed and endorsed by PA management and community leaders (including Masyarakat Adat) living within project landscapes and integrated into PA management plans | Landscape-level management plans PA management plans Project progress reports | Conflicts of interest can be resolved Support for IAS management plans is maintained by PA staff and communities At least some control trials effective Sufficient funds for IAS management | PMU |

| Results chain | Indicators | Baseline | Mid-term target | Final target | Means of verification | Assumptions | Responsible for data collection |
|--|--|---|---|--|---|--|---------------------------------|
| <u>Outcome 2.2:</u> Diverse stakeholders within project landscapes with enhanced roles and capacities to engage in IAPS management. | (i) Number of multi-stakeholder IAPS coordinating mechanisms, one in each project landscape, established and operational | Little to no collaboration/ cooperation between PA staff and communities on IAPS management | (i) PA and community representatives identified, and participatory meetings being held Agreement on participatory IAPS control interventions | (i) At least 2 multi-stakeholder IAPS coordinating mechanisms established and operational (including Masyarakat Adat representatives) (PA staff and community members meet at least three times annually to discuss IAS issues) | Coordination mechanism Minutes of meetings | PA staff and adjoining communities willing to work together on IAPS management | PMU |

| Results chain | Indicators | Baseline | Mid-term target | Final target | Means of verification | Assumptions | Responsible for data collection |
|---------------|--|---|---|---|---|--|---------------------------------|
| | <p>(ii-a) Number of local inhabitants (sex- and age-disaggregated) participating in IAPS management activities within PAs, FMUs, production and other relevant landscapes</p> <p>(ii-b) Number of local inhabitants (sex- and age-disaggregated) benefiting from jobs^[5] created or other livelihood benefits (tbd)</p> | Little community involvement in IAPS control | <p>(ii-a) 1,000 community members (of which 50% women) actively involved in IAPS control at the two project landscapes (including Masyarakat Adat, youth^[6])</p> <p>(ii-b) At least 100 (60% women) (including Masyarakat Adat, youth)</p> | <p>(ii-a) 2,260 community members (of which 50% women) actively involved in IAPS control (including Masyarakat Adat, youth)</p> <p>(ii-b) At least 226 (60% women) (including Masyarakat Adat, youth)</p> | IAS management plans Project progress reports | Support for IAS management plans is maintained by communities | PMU |
| | (iii) Area of 4 priority IAPS reduced | No large-scale clearing has taken place at the two project landscapes to date | <p>(iii) Area of 4 priority IAPS reduced by 50 ha.</p> <p>i) BBNP: 35 ha (terrestrial);</p> <p>ii) BTSNP: 24.5 ha (terrestrial) and 0.5 ha (aquatic)</p> | <p>(iii) Area of 4 priority IAPS reduced by 187.2 ha.</p> <p>i) BBNP: 129 ha (terrestrial);</p> <p>ii) BTSNP: 57 ha (terrestrial) and 1.2 ha (aquatic)</p> | <p>Maps</p> <p>Images of before sites were cleared followed by images of cleared sites</p> <p>GEF METT scores</p> | <p>Support for control</p> <p>Herbicides and other equipment available</p> | PMU |

| Results chain | Indicators | Baseline | Mid-term target | Final target | Means of verification | Assumptions | Responsible for data collection |
|--|--|---|--|--|---|--|---------------------------------|
| Outputs for Component 2: 2.1.1 ? Spatial planning and assessments of IAS pathways completed 2.1.2 ? Landscape-level management plans for IAPS created and under implementation 2.1.3 ? IAPS management integrated into protected area management plans 2.2.1 ? Community and private participation in IAPS prevention/control approaches enhanced, and approaches integrated into existing forestry/agricultural production systems | | | | | | | |
| Component 3: Strengthened knowledge and awareness of IAS issues among key stakeholders, and project monitoring and evaluation based on adaptive management principles | | | | | | | |
| Outcome 3.1: Understanding, awareness and capacity of IAS issues increased and supporting improved management in Indonesia | (i) Availability of updated national IAS Communication Strategy/Public Awareness Strategy (ii) Increased stakeholder awareness and related activities of risks and impacts of IAS | National IAS Communication Strategy not implemented resulting in low levels of IAS awareness among a range of stakeholders, including PA staff and communities residing within PAs Baseline IAS awareness levels of PA staff and communities living within and adjacent to BTSNP and BBNP set at Inception | (i) IAS Communication Strategy updated and endorsed by all stakeholders (ii) Communities reached with communications (including gender-sensitive topics such as weeding, wood harvesting) | (i) IAS Communication Strategy updated and endorsed by all stakeholders (including women, youth and Masyarakat Adat), and implemented (i) Surveys show increased average awareness of 50% over baseline | Awareness baseline & end-of-project impact survey report Updated Communication Strategy Communication products and materials | Communication strategy supported and implemented by all stakeholders Communications received positively, resulting in behaviour change | PMU |

| Results chain | Indicators | Baseline | Mid-term target | Final target | Means of verification | Assumptions | Responsible for data collection |
|---------------|---|---|--|---|---|---|---------------------------------|
| - | (iii) Improved sharing and dissemination of information on IAS identification and management | Limited to no sharing of information, particularly on best IAS management practices between PAs staff | (iii) Communities reached with communications Information on best IAS management practices shared with staff in 35% of protected areas | (iii) Information on best IAPS management practices shared with staff in 60% of protected areas in Indonesia | Awareness materials Publications Technical reports Conference and workshop proceedings Trip reports | Project participants willing to share information | PMU |
| - | (iv) Updated national list of IAS of highest concern | No national IAS database, especially regarding some taxonomic groups. Also, no prioritization of taxa according to distribution and impacts | (iv) National IAS database created, which includes data on distribution and impacts | (iv) Database continually updated and linked to international databases like the Invasive Species Compendium (ISC) and Global Invasive Species Database (GISD) | Technical reports Published database Websites | Stakeholders are willing to share information Expertise available to compile and analyse list Funding for updates is guaranteed | PMU |

| Results chain | Indicators | Baseline | Mid-term target | Final target | Means of verification | Assumptions | Responsible for data collection |
|---------------|--|--|--|--|---|--|---------------------------------|
| - | (v) Knowledge of stakeholders on IAS risks, impacts, prevention and management | <p>Quarantine staff have limited knowledge on preventing the introduction of exotic species, especially plants, that may impact on biodiversity ; high risk pathways and their management; and the undertaking of risk analyses to support their efforts.</p> <p>Local forestry and agricultural extension staff, PA and forest managers, and policy makers have limited knowledge on IAPS management, especially control.</p> <p>No IAS training plans or modules</p> | <p>(v) Training modules developed and implemented, including those for integration into school and university curricula.</p> <p>Measured increase of at least 30% in knowledge of >100 staff (at least 50% women) in specific IAS issues such as identification and management of high-risk pathways, prevention, risk analyses, and control.</p> | (v) Measured increase of at least 30% in knowledge of >200 trained staff (at least 50% women) in specific IAS issues | Report on training strategies Training modules Training impact assessment | Trained staff recognise shortcomings and open to additional training Trained staff stay in post and use new knowledge | PMU |

| Results chain | Indicators | Baseline | Mid-term target | Final target | Means of verification | Assumptions | Responsible for data collection |
|---------------|---|--|---|--|--|--|---------------------------------|
| - | (vi) EDRR system strengthened | Insufficient tools available to assist stakeholders in the early detection of exotic species that may become invasive | (vi) Tools, including an interactive mobile phone app developed (or existing tool enhanced) to aid in the identification of exotic and invasive species | (vi) Mobile phone app tested and being used | Mobile phone app | Presence and distribution of all IAS in Indonesia known Individuals can access app in remote areas | PMU |
| - | (vii) IAS issues integrated into school or university curricula | IAS issues not integrated into school or university curricula Few students currently undertake post-graduate studies on IAS ? baseline will be determined at initiation of project | (vii) Post-graduate students registered and undertaking research on priority IAS | (vii) Schools and universities identified ? IAS issues integrated into existing school curricula, and IAS courses included in curricula of at least 5 universities | School and university curricula Theses Course certifications | School and university authorities supportive Sufficient university students available or interested to undertake studies on IAS | PMU |

| Results chain | Indicators | Baseline | Mid-term target | Final target | Means of verification | Assumptions | Responsible for data collection |
|---|--|----------|--|---|---------------------------------------|-------------|---------------------------------|
| <u>Outcome 3.2:</u> Project implementation is supported by an M&E strategy based on measurable and verifiable outcomes and adaptive management principles | (i) M&E deliverables (reports, MTR, TE, etc. as outlined in the ProDoc) are submitted on time. (ii) Project exit strategy is developed and agreed with key stakeholders | n/a | (i) M&E deliverables / reports submitted on time (ii) n/a | (i) M&E deliverables/ reports submitted on time (ii) Exit strategy is available and agreed with key stakeholders | Evidence of M&E documents and reports | | PMU |
| Outputs for Component 3: 3.1.1 ? Awareness and understanding of IAS issues increased 3.1.2 ? Information and information management systems on IAS strengthened 3.1.3 ? Capacity of staff at various institutions to manage and prevent the spread of IAS in the landscape/seascape enhanced while respecting UNDRIP through FPIC and IPPs for Masyarakat Adat as outlined in Annex J 3.1.4 ? Development of training modules and curricula on IAS management for students, Masyarakat Adat, local forestry and agricultural extension staff, PA and forest managers, and policy makers 3.1.5 ? IAS management practices/lessons learned captured, documented and disseminated while respecting UNDRIP through FPIC and IPPs for Masyarakat Adat as outlined in Annex J. 3.2.1 ? Project monitoring and evaluations strategy implemented | | | | | | | |

^[1] Bromo Tengger Semeru National Park (BTSNP) and Bantimurung Balusaraung National Park (BBNP).

^[2] Minus 94,026 ha from Core Indicator 1 to avoid double-counting.

^[3] Consisting of 78,757 ha of productive landscape around the BBNP and 24,341 ha of productive landscape around the BTSNP. This target will be achieved through direct interventions under Component 2 as well as indirect benefits from the improved prevention and control of IAS in the target landscapes.

^[4] Free, Prior and Informed Consent (FPIC) and Indigenous Peoples' Plan (IPP).

^[5] Including temporary jobs for IAS removal.

^[6] 18-30 years.

ANNEX B: RESPONSES TO PROJECT REVIEWS (from GEF Secretariat and GEF Agencies, and Responses to Comments from Council at work program inclusion and the Convention Secretariat and STAP at PIF).

| Council comments at PIF stage | Responses |
|-------------------------------------|-----------|
|-------------------------------------|-----------|

**Germany
comments:**

Under component 1, output 1.3.1 ? Financing mechanisms to support IAS management developed and tested would benefit from a more specific description of objectives and means of implementation. With a view to the long-term sustainability and ongoing financing of project activities, it would be very important to understand better how the financing mechanisms will work.

Further information has been elaborated during PPG and is included in the CEO Endorsement Request. The exact mechanisms will be elaborated on during project implementation.

Under Output 1.1.3, the National Planning Agency (BAPPENAS) will lead the development of a long-term financing plan for IAS prevention and management in Indonesia, which will be used to strengthen technical and human resource capacities within key institutions, including the National IAS Biosafety Task Force in KEMENKO MARVES, MoEF, the Ministry of Marine and Fisheries and the Ministry of Agriculture. The plan will include cost-benefit analyses (CBA) to demonstrate that the benefits of IAS management outweigh the costs, data which will be used to garner increased government budgetary contributions; fees/levies on key sectors; and payments for ecosystem services that can contribute to IAS management.

The Directorate of Biodiversity Conservation on Species and Genetic within MoEF, in consultation with the National Planning Agency (Bappenas) and the Ministry of Finance, is also currently drafting a mechanism to support national funding for biodiversity conservation (including IAS management). Among the elements under consideration is a mechanism for levies on trade, tourism, travel and transport (the ?4 Ts?), which are key pathways for IAS introduction and spread. The project will support efforts to promote this mechanism, including the results of cost benefit analyses that will help to justify its importance on economic and social grounds.

Finally, the project will assess the potential for Payments for Ecosystem Services (PES) from the private and public sector to support funding of IAS management activities. Payments for Ecosystem Services (PES) will be developed by experts during project implementation, based on successful PES models developed and implemented elsewhere. For example, studies in South Africa have demonstrated that invasive alien plants, especially woody weeds, have a significant negative impact on water resources. To protect precious water resources, it is imperative that these invasive plants be managed, but there are cost implications in doing so. As such the Government has placed a levy on water-use, which generates considerable funds to finance invasive alien plant management.[1]

The concept of PES is not new to Indonesia. There have been some PES pilot projects in Cidanau (Banten Province), Brantas (East Java), and West Lombok Regency (West Nusa Tenggara). Following these three pilot projects, other PES-like schemes were established in Sumber Jaya, Lampung; in Sungai Wain, East Kalimantan; in Cirebon-Kuningan, West Java; and in other locations. Most PES schemes in Indonesia are established in the areas of forest and watershed management. It is important to note that PES is supported under Indonesian Law on Environmental Protection and Management. This law, Law No. 32/2009, recognizes two different categories of environmental management schemes: (1) payment for environmental services (PES) and (2) compensation for environmental services (CES).

PES schemes in Indonesia are driven by various initiatives within communities, private institutions (e.g., electricity companies, steel industries, and drinking water companies), national and international nongovernmental organizations (NGOs), and the local government. They are established for different purposes and schemes. For example, a national steel industry located in Banten Province, Java, initiated PES schemes within Masyarakat Adat and, local communities in the upstream area to protect the water supply for this industry. Similarly, a state hydropower company used its own corporate social responsibility fund (CSR) to establish a PES scheme in the forested area of Lampung.

Other income streams can be sourced through from tariffs and levies on imports. In Australia the following was proposed in order to generate funds to fund biosecurity systems:

? Implementing a per-container levy on incoming shipping containers of \$10 per

United States comments: We recommend greater clarity at the next phase of project development on how the NISSAP work with the Omnibus Law's Horticultural import/export regulations.

? The introduction of exotic species, to control other exotic species, seems very risky in terms of further contributing to the problem. The safeguards are not sufficiently clear nor strong to ensure that the introduction, testing, and use of exotic Biological Control Agents would not further harm biodiversity.

Under Output 1.1.1, the Project will review current legislation/regulations at national, regional and local level, and identify gaps to strengthen existing legislation and regulations. With reference to the Omnibus Law the government aims to encourage exports by introducing a new mandate to issue policies to increase and develop national innovative products for export.

Regarding exports and imports, there are some new provisions targeting businesses. Many are still unclear in the Omnibus Law or the Job Creation Law no. 11 of 2020. The regulations also make provisions for the import of horticultural products that must now adhere to additional import requirements. All policies related to the export and import of horticulture products will be managed by the Ministry of Agriculture through the product export and import division. The NISSAP will also be a referenced when plants, animals and other living organism for several related sectors such as agriculture, marine and forestry are imported or exported.

There are several follow-up actions contained in the previous NISSAP, namely:
 ? Update & Review of the National Strategy and Action Plan for Invasive Species Control and the legal protection (for example, there is a mandate in the Presidential Regulation on the Indonesian Marine Policy Action Plan 2021 ? 2025, Presidential Regulation no. 34 of 2022)

? Evaluation of Achievements of Aichi Biodiversity Target 9

? Develop database on IAS

? Strengthening Quarantine Institutions

? Coordination and Networking Mechanism

? Socialization to the parties

? Monitoring and evaluation as well as Law Enforcement

The project will contribute significantly to strengthening quarantine institutions and supervision of import/export regulations in collaboration with the Ministry of Trade. All IAS prevention and control measures must be integrated into a collective regulation developed by the interested sectors that can be referenced by all ministries/agencies. This process can take lessons from the issuance of a Presidential Regulation on the Indonesian Marine Policy Action Plan which was published after the Omnibus Law

As noted in *Section 5. Risks* of the Project Document[2], only those IAPS for which there are known, tested, and established agents that have been officially released elsewhere in the world will be targeted for biocontrol. These are commonly known as off-the-shelf agents. Some agents have been previously released and have established in parts of Indonesia ? these can also be considered for redistribution if the target species are present in the Project landscapes. All agents selected and approved for introduction by communities, PA management, and other relevant stakeholders will be imported following all the required regulatory procedures.

It should be noted that biological control of invasive alien plants has been practiced for over 100 years with few recorded non-target impacts. Most of those non-target impacts were predicted prior to release of the agent. It is still regarded as the safest and most cost-effective intervention, especially for Low- and Middle-Income Countries (LMIC) that often cannot afford the costs associated with conventional control interventions. It should also be noted that the Project will not endeavour to develop new biological control agents but will use existing agents that have been developed and released on shared weeds. For example, the agent *Heteropsylla spinulosa* has been released, and is now widely established in Australia where it is very effective in the control of the invasive alien plant *Mimosa diplotricha*. *Mimosa diplotricha* is also highly invasive in Indonesia, and as such the agent could be released here. The decision to release would be based on data from host range trials that were undertaken in Australia prior to release, data on potential non-target impacts after release, supported by data from its host range in its country of origin.

| STAP comments at PIF stage | Responses |
|---|---|
| <p>? STAP welcomes the multi-level approach, and the adoption of a landscape level approach for the design of interventions; and the capitalizing of prior project experiences and learning ? from the region and elsewhere.</p> <p>STAP recommends consideration of behavioral insights (cultural norms, traditions, perceptions and values) in designing interventions driven by the assumption that ?local-level stakeholders will realize tangible ecological, social and economic benefits from improved IAS management, thereby providing them with incentives to support IAS management post-project changing behaviors.?</p> | <p>Considerations of behavioural insights and perceptions of Masyarakat Adat, and local communities have been included during the project preparation phase and can be found in Annex I1 (ESIA report). These will be given due consideration in the planning and implementation of the site-level interventions under Component 2, as well as awareness and capacity building under Component 3. Potential benefits to Masyarakat Adat, and local communities are described in the Project Document and will be discussed with the communities during project implementation.</p> |
| <p>? Furthermore, STAP recommends a broader use of geospatial technologies (GIS, remote sensing) in support of activities related to outputs 1.2.1, 1.2.2, 1.2.3, all outputs of component 2, and output 3.2.1, and the linking of activities to the country?s existing land administration or land use planning system. In this regard, the scientific conceptual framework for land degradation neutrality (LDN) and STAP LDN guidelines offer good practice guidance on how this could be done in de-centralized land use planning systems as the one of Indonesia.</p> <p>The GEBs mentioned are global and related to the 3 Rio Conventions. STAP recommends including the 3 LDN core indicators a part of the set of indicators that will enable to measure the GEBs.</p> | <p>A note has been added in the Project Document that geospatial technologies (GIS, remote sensing) will be used where applicable, together with ground truthing, as part of mapping the distribution of IAPS. It should be noted that many IAS/weeds do not lend themselves to being ?identified? through remote sensing technologies especially if they thrive in forest understoreys or have reflectance values like those of native species.</p> <p>Enhancing capacities for monitoring will be an integral part of Component 3. Using the 3 LDN indicators for assessing project impact will be considered under Output 3.2.1.</p> |
| <p>? STAP notes that the climate risk of this project is high, and therefore strongly recommends the project considers all the recommendations arising from the Climate Risk Screening during PPG phase.</p> | <p>Consideration of climate risks has been incorporated into the project design, as outlined in <i>Section 3) Alternative scenario</i> and <i>Section 5. Risks</i> of the Project Document. Recommendations from the climate risk screening have been considered. For example, the early detection and rapid response (EDRR) systems developed under Component 1 will take into consideration climate risks. Furthermore, the awareness and capacity building activities under Component 3 will also involve awareness raising on climate risks in relation to IAS.</p> |

| | |
|---|---|
| <p>? While the PIF identifies projects and legal instruments relevant to the baseline scenarios, STAP recommends the PPG identify indicators and associated metrics to make possible quantification of the project benefits. Such indicators can be multi-scale, and a mix of qualitative and quantitative (e.g. use the SMART principles).</p> | <p>A detailed results framework with indicators and targets was developed during PPG and is included as Annex A1 of the Project Document (Annex A of the CEO Endorsement Request). Additional biophysical and socio-economic indicators will be identified during the inception phase, and baseline and annual M&E surveys will be carried out, as explained in <i>Section 3) Alternative scenario</i>.</p> |
| <p>? The risk section mentions insufficient funding to continue necessary IAS management after the project ends as a moderate risk, hence the PPG should revise if all of the projected benefits are to be attained in the project lifetime, and identify activities that generate benefits that may require timeframes longer than the project lifecycle to be realized (and correct the claimed benefits accordingly). For instance, evidence of benefits of land restoration from conservation agriculture may take longer than the project lifecycle.</p> | <p>The indicators and targets to be achieved during project implementation are elaborated in the results framework. The assumptions of long-term benefits resulting from the project interventions are described in the Theory of Change in <i>Section 3) Alternative scenario</i>. For example, the full benefits of biological control agents may only be realized many years after release and establishment.</p> <p>Additionally, Component 3 will enhance information systems and monitoring capacity to enable monitoring of changes beyond the project's lifetime.</p> |

^[1] The water charge levied for catchment management in South Africa does not distinguish between richer and poorer consumers per se, but it is superimposed on a stepped pricing system that does. Water resource management charges include a charge for the control of invasive alien plants as well as charges for activities such as planning and implementation, pollution control, demand management, water allocation and water use control. Millions of USD has been raised through these water tariffs.

^[2] Corresponding to Section 11 on Environmental and Social Safeguard (ESS) Risks of the CEO Endorsement Request.

ANNEX C: Status of Utilization of Project Preparation Grant (PPG).

(Provide detailed funding amount of the PPG activities financing status in the table below:

| PPG Grant Approved at PIF: USD 150,000 | | | |
|---|------------------------------------|-----------------------------|-------------------------|
| <i>Project Preparation Activities Implemented</i> | <i>GETF/LDCF/SCCF Amount (USD)</i> | | |
| | <i>Budgeted Amount</i> | <i>Amount Spent to date</i> | <i>Amount Committed</i> |
| Consultants | 62,000 | 27,415 | 34,585 |
| Contracts | 28,000 | 104,638 | (76,638) |
| Travel | 15,000 | 3,041 | 11,959 |
| Training | 33,000 | 3,466 | 29,534 |
| GoE | 12,000 | 0 | 12,000 |
| Total | 150,000 | 138,560 | 11,440 |

ANNEX D: Project Map(s) and Coordinates

Please attach the geographical location of the project area, if possible.

See Part II, Section 1b for maps.

ANNEX E: Project Budget Table

Please attach a project budget table.

ANNEX F: (For NGI only) Termsheet

Instructions. Please submit an finalized termsheet in this section. The NGI Program Call for Proposals provided a template in Annex A of the Call for Proposals that can be used by the Agency. Agencies can use their own termsheets but must add sections on Currency Risk, Co-financing Ratio and Financial Additionality as defined in the template provided in Annex A of the Call for proposals. Termsheets submitted at CEO endorsement stage should include final terms and conditions of the financing.

n/a

ANNEX G: (For NGI only) Reflows

Instructions. Please submit a reflows table as provided in Annex B of the NGI Program Call for Proposals and the Trustee excel sheet for reflows (as provided by the Secretariat or the Trustee) in the Document Section of the CEO endorsement. The Agencies is required to quantify any expected financial return/gains/interests earned on non-grant instruments that will be transferred to the GEF Trust Fund as noted in the Guidelines on the Project and Program Cycle Policy. Partner Agencies will be required to comply with the reflows procedures established in their respective Financial Procedures Agreement with the GEF Trustee. Agencies are welcomed to provide assumptions that explain expected financial reflow schedules.

n/a

ANNEX H: (For NGI only) Agency Capacity to generate reflows

Instructions. The GEF Agency submitting the CEO endorsement request is required to respond to any questions raised as part of the PIF review process that required clarifications on the Agency Capacity to manage reflows. This Annex seeks to demonstrate Agencies? capacity and eligibility to administer NGI resources as established in the Guidelines on the Project and Program Cycle Policy, GEF/C.52/Inf.06/Rev.01, June 9, 2017 (Annex 5).

n/a