

Program	Time Frame	Performance Indicator	Indication of Institutions/regions
14. Program to develop and disseminate the concept of and formulation of guidelines for archipelago and bioregion based biodiversity management	2003/05	There is an implementable concept for small islands and bioregion based biodiversity management	Inter-Dept, local govt., NGOs, BAPPENAS, universities, LIPI
15. Program for dissemination and communication of IBSAP documents	2003/05	IBSAP is known widely by communities and internalized into the development planning policy formulation process at the local and national levels	Adhoc team, BAPPENAS
16. Program for developing capacity in biodiversity valuation for local government apparatus	2003/04	The capacity of local government officials to conduct biodiversity valuation is enhanced	MoE, Inter-Dept, NRM, NGOs, local govt.
17. Program to enhance the negotiating capacity at international negotiations on biodiversity	2003/20	Greater involvement and more active participation of Indonesian delegation at negotiations by prioritizing national interests	Min. of Foreign Affairs, MoE, MoF, MMF, BAPPENAS, NGOs
18. Program to improve the coordination of CBD implementation, including coordination with relevant international agreements and programs on biodiversity (CITES, Ramsar, WHC, MAB)	2003/20	Improved synergy in the implementation of CBD and other relevant international programs in biodiversity	MoE, MoF, MMF, MoA, LIPI, NGOs, MIT
19. Program to develop institutional arrangements on sustainable development at the national and regional levels	2003/04	The National Council on Sustainable Development is established in 2003, followed by establishment of similar agency at provincial levels in 2004	MoE, Inter-Dept., NGOs, private sector, local govt.
20. Program formulate the minimum service standards to be provided by local government for the management, utilization, conservation, and rehabilitation of biodiversity at local and regional levels	2003/04	There is a standard for minimum service to be provided by the local government for the management, utilization, conservation, and rehabilitation of biodiversity	MoE, Min. of Internal Affairs, sectoral ministries, local govt., NGOs
21. Program for improvement of local government capacity in the implementation of regional autonomy in environmental and biodiversity management	2003/20	There are regular annual training programs to enhance the capacity of local government, measurable achievements	MoE, Bapedalda, Bappeda, relevant local agencies, Min. of Internal Affairs
22. Harmonization between IBSAP and provincial/district strategic plans on biodiversity, starting with West Nusa Tenggara and Papua	2003/04	Strategic plans for a holistic biodiversity management is adopted by regional governments	MoE, Bappeda, Bapedalda/ NTB, Papua, national

Program	Time Frame	Performance Indicator	Indication of Institutions/regions
23. Program to identify and develop traditional system/ adat agreement system for biodiversity protection	2005/08	There is a guideline for implementing traditional system and adat agreement in biodiversity protection, starting in Nusra in 2006	Local govt., NGOs, adat communities, adat/ Nusra, national

Table 6.5. Action plan for improving capacity in resolving conflicts over biodiversity, 2003-2020.

Objective 5	To achieve fair and balance of roles and interests of Indonesian society, as well as to reduce conflict potentials among all relevant sectors in a conducive, synergic, responsible, accountable manner in the sustainable use and conservation of biodiversity.
Policy Direction	To develop mechanisms for natural resources and biodiversity conflict resolution at local, national and international levels, which is consensus oriented, fair, mutually beneficial, transparent, responsible, and accountable (Point 8 in the Biodiversity Management Policy Direction).

Program	Time Frame	Performance Indicator	Indication of Institutions/regions
1. Compilation and codification of laws for resolving conflicts over natural resources and biodiversity	2004/08	There are laws and regulations for solving conflicts over biodiversity	Supreme Court, MoJ, MoE, communities, NGOs, private sector, lawyers association
2. Program to study the sources and cases of conflicts over natural resources	2004/20	There are reports on the analyses of conflicts over natural resources	MoE, Inter-dept, universities, NGOs, private sector, local govt., mass media
3. Program for the empowerment of organizations dealing with advocacy/mediation of conflicts over natural resources	2004/08	Establishment of independent arbitrary or advocacy institution in conflicts resolution over natural resources	MoE, MoF, MoA, MEMR, MMF, NGOs, lawyers association
4. Program for enhancing capacity in conflict resolution over natural resources	2004/09	In 2009 there are 200 skilled personnels for advocating the prevention of and finding solution to natural resources conflicts	As above
5. Program to develop a early warning system of potential conflicts over natural resources	2003/04	An early warning system and mechanism of potential conflicts over natural resources is established at national and local level by the end of 2004	As above

Program	Time Frame	Performance Indicator	Indication of Institutions/regions
6. Identification of cases and sources of conflicts between human being and wildlife, and the formulation of a guideline to resolving the problem	2004/09	There is a documentation of cases and sources of conflicts, and effort to resolve conflict between human being and wildlife	MoF, local govt., NGOs, local communities

Notes:

AGO	= Attorney General Office
Bapedalda	= Regional Environmental Impact Management Agency
Bappeda	= Regional Development Planning Board
BAPPENAS	= National Development Planning Agency
BKPM	= Investment Coordinating Board
BPPT	= Agency for Technology Assessment and Application
BPS	= National Bureau of Statistics
Bulog	= The National Logistic Agency
CRB	= Center of Research in Biology
DPR	= The National House of Representatives
DPDR	= Regional or Local House of Representatives
ICRAF	= International Center For Research in Agroforestry
KADIN	= Indonesian Chamber of Commerce
KNPN	= National Commission on Genetic Resources
LEI	= Lembaga Ekolabel Indonesia
LIPI	= The Indonesian Institute of Sciences
MA	= The Supreme Court
MEMR	= Ministry of Energy and Mineral Resources
MIS	= Ministry of Infrastructure and Settlement
MIT	= Ministry of Trade and Industry
MMF	= Ministry of Marine and Fishery
MoA	= Ministry of Agriculture
MoE	= Ministry of Environment
MoF	= Ministry of Forestry
MoJ	= Ministry of Justice
MoNE	= Ministry of National Education
MRT	= Ministry of Research and Technology
NBIN	= National Biodiversity Information Network
NGO	= Non-governmental organization
NRM	= Natural Resources Management Program
NTB	= Nusa Tenggara Barat (West Nusa Tenggara)
Nusra	= Nusa Tenggara
PSDA WG	= Working Group for Natural Resources Management Law



Mangroves are the natural pride of Nusa Tenggara. The flora and fauna diversity has prompted the government to protect this ecosystem.

7

CONDITIONS FOR IBSAP IMPLEMENTATION

The strategy and action plan as described in Chapters 5 and 6 provides an illustration of the efforts that Indonesia needs to undertake to implement its long-term biodiversity management in a responsible manner. Indeed, Indonesia has several relevant strategies and action plans, one of which is the National and sectoral Agenda 21 as mandated by the United Nations Conference on Environment and Development (UNCED) in 1992. The Indonesian National Agenda 21 was published in 1997 and it has a chapter describing sustainable biodiversity management plans and programs. However, a review of the Agenda 21 conducted ten years after the Earth Summit showed that most of the stakeholders were not yet aware of its existence, let alone its implications for national development. In other words, the National Agenda 21 has not been integrated into Indonesia's development programs (MoE 2002).

Given the above situation, and also based on similar experience with the 1993 BAPI, several important preconditions must be in place if IBSAP 2003-2020 is to be effectively implemented by various stakeholders.

This chapter presents the ideal and minimum preconditions for the effective implementation of IBSAP. Ideal preconditions are all those conditions which must be fulfilled. But that may not be possible within a short time due to various weaknesses in the information base, human and financial resources, and institutional capacity in management and law enforcement in Indonesia. Therefore, the stakeholders during the second IBSAP National Workshop, held in Jakarta, 14-15 November 2002, identified and recommended the minimum preconditions described in the second section of this chapter.

IDEAL PRECONDITIONS

Open and inclusive

The compilation and dissemination of IBSAP document must involve as many stakeholders as possible, at the national and local level. An effort to do this during the

preparation process was attempted through dialogues and workshops at the regional level (Sumatra, Kalimantan, Java-Bali, Sulawesi, Nusa Tenggara and Papua), small discussions at the national level and consultations through an electronic network. The next process, i.e. dissemination of IBSAP documents, must be made more open and inclusive through a range of media and methods. For instance, dissemination activities need to be conducted through electronic and print mass media as well as alternative media (non-conventional media published by NGOs or community groups, or media such as theatre and *wayang* or puppet show), particularly to ensure continuing participation and involvement of stakeholders. In addition, a better co-ordination with existing and ongoing biodiversity management initiatives at various levels will be needed for its implementation.

IBSAP dissemination should start in 2003 and be intensified during 2004-2009.

Authoritative and legally binding

IBSAP must become an authoritative document and a reference to which stakeholders can refer. This is a necessary condition to encourage stakeholders to implement IBSAP and may be achieved through two strategies. First, the document must be disseminated as widely as possible, followed by a consultation process on the contents of IBSAP and how to implement its programs, as outlined the first precondition above.

Second, as a formal government document, IBSAP needs legality. The legal status of IBSAP must be formulated during 2003-2004, through the following possibilities:

- Enacting a Government Regulation (PP-*Peraturan Pemerintah*) under the Act No.5/1994 on Ratification of the UN Convention on Biological Diversity. As a Party to the CBD Indonesia has an obligation to formulate and implement biodiversity management strategy and action plan. Alternatively, the regulation may be enacted under Act No.5/1990 on Conservation of Natural Resources and their Eco-

systems. Either way, it must be completed by end of 2003.

- When the Bill on Natural Resources Management (RUU-PSDA) has been formulated and ratified, a revision can be attempted to bring IBSAP under the legal entity of the PSDA Act. The time schedule for this activity will conform to the process of the formulation of PSDA Act.
- Making an effort to integrate IBSAP into the State Guidelines (GBHN) 2004 or similar document. IBSAP might also be legalised through the Decree of the Peoples' Consultative Assembly (TAP MPR), by linking it to TAP MPR No. IX/2001 on Agrarian Reform and Natural Resources Management and TAP MPR No. VII/2001 on Indonesia's Future Vision, or similar high level policy. This effort should start in 2004, and hopefully an MPR Decree can be enacted by 2007. The new TAP MPR or similar high level policy must stipulate that IBSAP be integrated into the Proenas Act or similar development program every five years until 2020.

Financial and technological resources

The implementation of IBSAP requires adequate financial support. The main source of funding would be the national and regional budget (APBN and APBD). Thus it is imperative that IBSAP be integrated into the national, regional and sectoral development programs so that budget can be allocated for that purpose. Another potential source of funding is the Reforestation Fund in the forestry sector. It is true that the money from this fund can only be used for forest management, and therefore a different strategy needs to be sought for biodiversity management in nonforest areas.

It is necessary to mobilise funds outside of the state budget; such as in the form of foreign grants, community-based funds or taxes from biodiversity exploit. Various partnerships are another possible source of funding; each party involved in utilising biodiversity must contribute a certain part of the profits made for sustainable use of biodiversity.

At the international level, the Global Environment Facility (GEF) is a potential source of financial support. As is known, GEF was formed as a financial mechanism to support sustainable development, particularly in the areas of international waters, climate change and biodiversity. Given that GEF provided

grants to develop IBSAP, the government needs to immediately approach the GEF to seek partial support for its implementation.

Technological support is required in particular to develop basic and strategic information on the potential and condition of biodiversity. Thus there is a need to develop information technology, to undertake inventory on the potentials of biodiversity, and technology for classifying organisms at the species and genetic level. This needs to be linked to the development of relevant basic research.

Institutional arrangements and capacity building

The implementation of IBSAP requires institutional arrangements and capacity building. As described in Chapter 4, biodiversity management is currently undertaken by several sectoral agencies, with poor co-ordination among them. A new institution to undertake IBSAP implementation may not be necessary; instead the focus must be to strengthen the functions, tasks and authorities of existing institutions effectively. These institutions are among others, the MoE as the focal point for CBD, BAPPENAS as the national development planning agency, and sectoral departments such as Forestry, Agriculture, Marine and Fisheries, and others. Stakeholders of IBSAP think it is necessary to strengthen the position and authority of MoE as the agency charged with co-ordination of environmental management as a whole.

However, there are currently several initiatives in Indonesia that tend to establish new institutions. It would be better if the implementation of IBSAP is integrated into the these initiatives, as described below:

- **A new institution related to PSDA**, which is still at a very early stage of discussion. Once the initiative is completed, a new institution may be formed, or the authority of existing institutions will be enhanced; it is recommended that one of the tasks of this new institution would be to facilitate, co-ordinate, monitor and evaluate the implementation of IBSAP (see Box 4.8).
- **Establishment of the National Council on Sustainable Development (NCSD)** which is also an ongoing process. The establishment of NCSD is mandated by the 1992 Earth Summit and strengthened at the WSSD in Johannesburg in 2002 (see Box 4.8). The process to establish NCSD

has taken about two years and at present the draft Presidential Decree is being processed at the State Secretariat. Once established, NCSO can be charged also with the task of facilitating, co-ordinating, monitoring and evaluating IBSAP. A similar institution can be established in the regions up to the kabupaten level, if necessary.

- **The establishment of Clearing House on Biodiversity**, as described in Chapter 4, is one of the most important aspects of biodiversity management, given the weakness of information availability in Indonesia. The establishment of Clearing House is mandated by the CBD and was also agreed upon by stakeholders at the Biodiversity Forum in July 2001 (see Box 4.8).

There is no certainty yet when the above institutions will be established and become functional. Therefore an *interim* arrangement is needed, given the fact that IBSAP activities will start in 2003. It is recommended to establish an independent and multistakeholder *ad hoc* team consisting of representatives from government, NGOs, academics and community leaders. The team should comprise of five or seven members and its mechanism of work must be established latest by mid-2003.

The institution must be independent, in the sense that it will be established and recognised by the government, but will function independently, beyond the interests of sectors and regional governments. It will also facilitate the dissemination of IBSAP, ensuring that IBSAP will have appropriate legal framework, and formulate mechanism for monitoring and evaluation of IBSAP implementation. To that end, it is recommended that the *ad hoc* team be established **latest by two months after IBSAP is published and needs to start working two months after the team is established.**

Sustainable development and good governance

The effective implementation of IBSAP needs a shift in the national development paradigm towards sustainable development, in which its three pillars, i.e. economic growth, environment protection and social welfare, are in equilibrium. In addition, development pattern and implementation must be people based, in conformity with the aspirations and capability of local communities.

Sustainable development cannot be achieved without good governance. This would

mean that the process of planning and implementing sustainable development must be undertaken in a clean (free of corruption, collusion and nepotism), transparent, participatory and accountable manner. Good governance should also be realised at various levels, national and regional/local, among government, the business sector and NGOs.

At the implementation level, good governance can be initiated by undertaking the following principles (adapted from UNDP, UNEP, WRI and World Bank, 2002):

- a. **Making decision at the appropriate level**, that keeps the balance between decision making at local and national levels.
- b. **Providing access to information, participation and justice**, i.e. communities must have access to information in order that decisions are transparent, and at the same time they are given opportunities to participate in the process of decision making, and justice is guaranteed
- c. **Mainstreaming biodiversity into all decisions relating to development.**

Performance indicator and mechanism for monitoring and evaluation

The implementation of IBSAP must be monitored and then evaluated for improvements in the future. It is recommended that monitoring be conducted annually while evaluation can be conducted prior to each national development program period so that its results can be incorporated into that period.

The mechanism and framework for monitoring and evaluation must be developed latest by end of 2003. An important aspect of such a mechanism would be establishing performance indicators to gauge the success of actors involved in the management of biodiversity, particularly relevant ministries and local governments. The performance indicators need to be formulated through a public consultation mechanism as part of the IBSAP dissemination and communication program, and then adopted by both national and regional governments.

Some indicators provided below can be used as a basis for analysing the performance of biodiversity management or sustainable development (adapted from UNDP, UNEP, WRI, World Bank, 2002):

- a. **Institution and law**: who formulates and implements regulation on the utilisation

- of biodiversity? What are the penalties for violating regulations?
- b. **The rights to participation and representation:** how can communities influence or protest regulations on biodiversity? Who represents them?
 - c. **Authority:** where does authority over biodiversity lie – at the village, district, regency, provincial, national or international level?
 - d. **Accountability and transparency:** how can those who control and manage biodiversity be held accountable for their decisions, and to whom? How open is the decision making process for the public?
 - e. **Tenure and ownership rights:** who controls biodiversity or has the legal rights to control it?
 - f. **Market and financial flows:** how do economic policies and practices as well as market behaviour influence authority over natural resources?
 - g. **Science and risk:** how are ecology and social sciences integrated into the process of decision making on biodiversity management to reduce risks to the communities and ecosystem, and how can science be used to identify new opportunities?
 - h. **Indicators for sustainability:** is there reduction in damage during a given period? What is the recovery level during a given period of time? Are communities increasingly conserving biodiversity and are they able to secure sustainable income?
 - i. **Target fulfilment:** at what level has the determined goals and objectives been achieved? What are the constraints and opportunities?

CIFOR has developed criteria and indicators to measure the success of sustainable forest management. These may also be applied for biodiversity management (CIFOR, The Criteria and Indicators Toolbox series No. 1-9 1999).

Dynamic

The IBSAP document must be dynamic, in the sense that it will be adjusted based on the local social, environmental and economic conditions. There is also a need for revision and renewal process in a given time period to accommodate changes in the society and in the national, local as well as global conditions.

Preparation of preconditions: IBSAP can only be implemented if the preconditions are well in place. Such a preparation must be conducted during 2003-2010, covering the following aspects: accurate information base that is accessible to the public, adequate human resources, strengthened policy framework, institution and law enforcement, empowerment of genuine people participation. Another important precondition is the resolution of conflicts among communities, particularly related to the use and management of natural resources.

MINIMUM PRECONDITIONS

It would be unrealistic to expect that the implementation of IBSAP wait until the ideal preconditions mentioned above are fulfilled. Therefore, in the short term, there are four minimum preconditions that must be in place to ensure effective implementation of IBSAP, as follows:

Establishment of an *ad hoc* team

As described in point 3 of the Ideal Preconditions, an *ad hoc* team must be established within two months. Its main task is to maintain the continuity of the IBSAP process and to facilitate preparations for implementation. This team would be interim and semi-independent, and its function would be to realise the preconditions for the implementation of IBSAP. Several parties, such as BAPPENAS, MoE and the KEHATI Foundation or other agencies could undertake this initiative. The three next preconditions would be included into the tasks of the *ad hoc* team.

Dissemination, communication and socialisation of IBSAP

The first step to be taken by the *ad hoc* team is to design a program for the dissemination, communication and socialisation of IBSAP to all sectors of the community through the print, electronic and alternative media. The Regional co-ordinators who have been involved during the compilation of IBSAP can be asked to help in this program at the regional level. The program design must be inclusive, open and based on dialogs. The initial dissemination program will be conducted in connection with the establishment of the Conservation Training and Resource Center (CTRC), a collaborative initiative by The Nature Conservancy, CI, WWF, WCS, MoF, BAPPENAS, IPB,

CIFOR and SEAMEO-BIOTROP. One of the first programs of CTRC is to train the Bupatis and members of the regional House of Representatives (DPRD) and the curriculum would include introduction to the IBSAP document.

Legal status

This is an important precondition to ensure that all parties are willing to implement IBSAP and that budget is allocated for that purpose. The *ad hoc* team needs to complete this task by December 2003.

Developing stakeholders' commitment

The commitment of stakeholders can be developed if they feel a sense of belonging to the IBSAP document. Such a sense of belonging can be raised through the involvement of stakeholders at all stages of the compilation and implementation of IBSAP. The *ad hoc* team needs to design a program to build stakeholders' commitment; the basis already exists,

that is the participants of the regional and national workshops held in connection with the compilation of IBSAP. An important aspect would be to communicate the need for local or regional IBSAPS. The Directory of Stakeholders contains all participants involved in the IBSAP process.

The ideal and minimum preconditions mentioned above must be considered as an integral part of the implementation of IBSAP, not a separate entity. If the preconditions are not fulfilled, the implementation of IBSAP will face many constraints, and may perhaps not be implemented fully. In such a case, it will be more difficult to overcome biodiversity crisis, and the options of the future generation to achieve welfare will also be reduced, while the sustainability of the Indonesian nation depends on the sustainability of its biological diversity.



The beautiful beaches of Nusa Tenggara have attracted visitors, as reflected from the many recreational activities by local residents.

APPENDIX 1. Forest condition in Indonesia.

Table 1. Forest area based on function in Indonesia, per bioregion.

Forest Function/Bioregion	1993 (Ha)1/	2001 (Ha)2/	2002 (Ha)
I. Sumatra Bioregion			
1. Protected Forest	5,772,249.25	4,276,343.0	6,265,100.00
2. Conservation Forest	4,049,224.62	4,210,356.0	4,534,100.00
3. Limited Production Forest	6,179,561.15	1,057,321.0	5,067,100.00
4. Permanent Production Forest	6,695,415.00	4,500,399.0	6,878,200.00
5. Conversion Forest	3,785,104.00	620,791.0	5,731,000.00
Total	26,481,554.02	14,665,210.0	28,475,500.00
II. Java – Bali Bioregion			
1. Protected Forest	684,970.29	729,314	772,400.00
2. Conservation Forest	476,933.01	733,415	451,500.00
3. Limited Production Forest	7,650.44	394,316	366,700.00
4. Permanent Production Forest	2,020,534.56	1,562,773	1,668,200.00
5. Conversion Forest	-	-	-
Total	3,190,088.30	3,419,818	3,258,800.00
III. Kalimantan Bioregion			
1. Protected Forest	6,923,471	5,612,886	6,411,100.00
2. Conservation Forest	4,174,084	3,986,343	4,150,600.00
3. Limited Production Forest	11,347,825	7,214,218	11,103,400.00
4. Permanent Production Forest	14,229,084	8,076,372	13,753,400.00
5. Conversion Forest	1,793,420	779,988	4,978,000.00
Total	38,467,884	25,669,807	40,396,500.00
IV. Sulawesi Bioregion			
1. Protected Forest	4,475,015.0	4,837,056	4,732,200.00
2. Conservation Forest	1,394,368.2	2,257,513	1,525,400.00
3. Limited Production Forest	4,704,003.0	3,303,863	3,299,300.00
4. Permanent Production Forest	1,487,197.8	1,490,614	1,393,300.00
5. Conversion Forest	1,494,015.0	600,864	561,100.00
Total	13,554,559.0	12,489,910	11,511,300.00
V. Nusa Tenggara Bioregion			
1. Protected Forest	1,159,282.8	1,152,671	1,185,200.00
2. Conservation Forest	266,649.2	489,355	472,400.00
3. Limited Production Forest	621,665.5	531,659	538,300.00
4. Permanent Production Forest	502,267.7	554,638	482,900.00
5. Conversion Forest	181,370.0	101,830	112,900.00
Total	2,731,235.2	2,830,153	2,791,700.00

Forest Function/Bioregion	1993 (Ha)1/	2001 (Ha)2/	2002 (Ha)
VI. Maluku Bioregion			
1. Protected Forest	1,550,356.00	1,809,634	1,356,900.00
2. Conservation Forest	440,955.76	443,345	451,300.00
3. Limited Production Forest	1,807,107.38	1,653,625	1,580,900.00
4. Permanent Production Forest	1,298,464.06	1,053,171	1,188,700.00
5. Conversion Forest	-	2,304,932	2,564,900.00
Total	5,096,883.20	7,264,707	7,142,700.00
VII. Papua Bioregion			
1. Protected Forest	8,648,610	10,619,090	NO DATA
2. Conservation Forest	8,311,820	9,704,300	
3. Limited Production Forest	4,732,360	2,054,110	
4. Permanent Production Forest	7,123,450	10,585,210	
5. Conversion Forest	11,775,420	9,262,130	
Total	40,591,660	42,224,840	

Sources: 1/ Dephut 1993; 2/ Badan Planologi Kehutanan 2002.

Table 2. Forest area and deforestation, 1985-1997 (GFW).

Island	1985 (WCMC Dataset Analyzed by GFW)			1997 (GOI/ World Bank Dataset Analyzed by GFW)			Forest Change 1985-199 (Ha)	% Forest Change
	Land Area (Ha)	Forest (Ha)	% Land Area	Land Area (Ha)	Forest (Ha)	% Land Area		
Sumatra	47,581,650	22,938,825	48	47,574,550	16,430,300	35	-6,508,525	-28
Java	13,319,975	1,274,600	10	13,315,550	1,869,675	14	595,075	47
Bali	563,750	96,450	17	563,150	76,700	14	-19,750	-20
Nusa Tenggara	6,645,625	686,775	10	6,639,925	450,450	7	-236,325	-34
East Timor	1,496,500	374,400	25	1,497,525	9,850	1	-364,550	-97
Kalimantan	53,721,675	39,644,025	74	53,721,225	29,637,450	55	-10,006,550	-25
Sulawesi	18,757,575	11,192,950	60	18,753,025	7,950,900	42	-3,242,050	-29
Maluku	7,848,175	5,790,800	74	7,846,600	5,820,975	74	30,175	1
Papua	41,405,500	35,192,725	85	41,403,850	33,382,475	81	-1,810,250	-5
Total	191,340,425	117,191,550	61	191,315,400	95,628,775	50	-21,562,750	-18

Quoted from FWI 2001, sources: Forest areas in 1985 are based on WCMC, 1996. Forest areas in 1997 are based on GOI/World Bank, 2000. GFW = Global Forest Watch.

Table 3. Natural forest, degraded forest, and deforested area, mid-1990s.

Province	Natural Forest Area (Unallocated) (Ha)	Degraded Forest (Ha)	Deforested Area (Ha)
Aceh	2,360,745	1,025,858	362,835
Bengkulu	834,968	171,422	34,771
Jambi	1,197,210	1,071,679	522,858
Riau	1,487,067	2,671,417	1,705,401
West Sumatra	1,784,572	498,107	139,780
North Sumatra	1,183,429	386,006	365,656
Lampung	551,872	6,915	87,423
Total Sumatra	9,399,863	5,831,404	3,218,724
West Kalimantan	3,928,582	2,644,665	545,685
South Kalimantan	667,951	599,666	266,169
Center Kalimantan	536,450	8,447,911	2,089,952
East Kalimantan	5,961,932	8,845,655	1,369,415
Total Kalimantan	11,094,915	20,537,897	4,271,221
South Sulawesi	2,090,449	558,778	79,184
Central Sulawesi	2,986,684	937,100	75,994
Southeast Sulawesi	2,402,327	0	34,347
North Sulawesi	998,230	510,384	14,145
Total Sulawesi	8,477,690	2,006,262	203,670
Bali	76,417	0	0
East Nusa Tenggara	874,752	0	0
West Nusa Tenggara	629,122	74,188	685
Papua	23,806,213	10,287,807	1,105,466
Maluku	3,142,390	2,707,486	101,210
TOTAL	65,979,052	43,451,306	9,104,646

Source: Forest Watch Indonesia, based on National Forest Inventory (IHN) 1996.

APPENDIX 2. Coastal, marine and small islands ecosystems.

Table 1. Maximum sustainable yield (MSY), rate of exploitation and development potential of each marine fish groups in selected fishery centers.

Resources (10 ³ ton/year)	Fisheries Management Area									Indo- nesian Seas
	1	2	3	4	5	6	7	8	9	
Large Pelagic Fish										
Sustainable yield	27.67	66.08	55.00	193.60	104.12	106.51	175,26	50,86	386.26	1,166.36
Production	35.27	35.16	137.82	85.10	29.10	37.46	153,43	34,55	188.28	736.17
Exploited (%)	>100	53.21	>100	43.96	27.95	35.17	87,54	67,93	48.74	63.17
Small Pelagic Fish										
Sustainable yield	147.30	621.50	340.00	605.44	132.00	379.44	384,75	468,66	526.57	3,605.66
Production	132.70	205.53	507.53	333.35	146.47	119.43	62,45	12,31	264.56	1,784.33
Exploited (%)	90.15	33.07	>100	55.06	>100	31.48	16,23	2,63	50.21	49.49
Demersal Fish										
Sustainable yield	82.40	334.80	375.20	87.20	9.32	83.84	54,86	202,34	135.13	1,365.09
Production	146.23	54.69	334.92	167.38	43.29	32.14	15,31	156,80	134.83	1,085.50
Exploited (%)	>100	16.34	89.26	>100	>100	38.33	27,91	77,49	99.78	79.52
Coral Fish for Consumption										
Sustainable yield	5.00	21.57	9.50	34.10	32.10	12.50	14,50	3,10	12.88	145.25
Production	21.60	7.88	48.24	24.11	6.22	4.63	2,21	22,58	19.42	156.89
Exploited (%)	>100	36.53	>100	70.70	19.38	37.04	15,24	>100	>100	>100
Penaeids shrimp										
Sustainable yield	11.40	10.00	11.40	4.80	0	0.90	2,50	43,10	10.70	94.80
Production	49.46	70.51	52.86	36.91	0	1.11	2,18	36,67	10.24	259.94
Exploited (%)	>100	>100	>100	>100	0	>100	87,20	85,08	95.70	>100
Lobster										
Sustainable yield	0.40	0.40	0.50	0.70	0.40	0.30	0,40	0,10	1.60	4.80
Production	0.87	1.24	0.93	0.65	0.01	0.02	0,04	0,16	0.16	4.08
Exploited (%)	>100	>100	>100	92.86	2.50	6.67	10,00	>100	10.00	85.00
Cuttlefish										
Sustainable yield	1.86	2.70	5.04	3.88	0.05	7.13	0,45	3,39	3.75	28.25
Production	3.15	4.89	12.11	7.95	3.48	2.85	1,49	0,30	6.29	42.51
Exploited (%)	>100	>100	>100	>100	>100	39.97	>100	8,85	>100	>100
Total Fish Resource										
Sustainable yield	276.03	1,057.05	796.64	929.72	277.99	590.62	632,72	771,55	1,076.89	6,409.21
Production	389.28	379.90	1,094.41	655.45	228.48	197.64	237,11	263,37	623.78	4,069.42
Exploited (%)	>100	35.94	>100	70.50	82.19	33.46	37,47	34,14	57.92	63.49

Source: Fishery stock assesment team in Dahuri 2002.

Note:

- 1. Malaka Strait, 2. South China Sea, 3. Java Sea, 4. Makasar Strait, 5. Banda Sea, 6. Seram Sea and Tomini Bay, 7. Sulawesi Sea and Pacific Ocean, 8. Arafuru Sea, 9. India Ocean.
- *Maximum sustainable yield* is the amount of allowable catch to ensure that fish stock can regenerate sustainably.
- > 100 shows that catch exceeds MSY, or indicating an overfishing.

Table 2. Economic value of coastal and marine resources of Malaka Strait in Indonesia, Malaysia and Singapore.

Ecosystem	Economic Value	Malaysia	Indonesia	Singapore
Mangrove	Value	US\$/Ha	US\$/Ha	US\$/Ha
	Use Value			
	<i>Direct Use</i>			
	Fuelwood	344	-	-
	Mangrove crab	4,800		
	Recreation	424	169	547.01
	Traditional utilisation and recreation fishing		33	
	<i>Indirect use</i>			
	Nursery grounds for fish and prawn			
	Carbon sink	1,810/year		
	Protection from erosion	221,333.74 /km/year	195,294.47 /km/year	1,810/ha/year
	<i>Alternative use</i>			
	Biodiversity value	15/ha	15/ha	15/ha
	Non-use value			
	Existence	11,040/ha	2,156/ha	76,499/ha
Coral reef				
	Indirect use			
	Carbon sink	180/ha/th	180/ha/year	180 /ha/year
	Protection from erosion	221,333.74 /km/year	532.13 /ha	1,810 /ha/year
	<i>Alternative use</i>			
	Biodiversity value	15 /ha	15 /ha	15 /ha
Seagrass				
	Indirect use			
	Carbon sink	423.4 /ha/year	423.4 /ha/year	423.4 /ha/year
	<i>Alternative use</i>			
	Biodiversity value	7.5 /ha	7.5 /ha	7.5 /ha
Sea weed				
	Indirect use			
	Carbon sink	180 /ha/year	180 /ha/year	180 /ha/year
	<i>Alternative use</i>			
	Biodiversity value	7.5 /ha	7.5 /ha	7.5 /ha

Source: Processed from GEF/UNDP/IMO 1999.

APPENDIX 3. Important wetlands area in Indonesia.

Bioregion	Important Area	Flora and fauna description
Sumatra	<ul style="list-style-type: none"> • 30 lakes, mostly natural and formed due to volcanic process (Toba, Maninjau, Kerinci lakes, etc.) • Sembilang, Kab. Musi Banyuasin, S. Sumatra • Lebak in Ogan Komering Ilir, S. Sumatra • Berbak National Park, Ramsar Site, Jambi • Kerumutan Baru Nature Reserve, Riau 	<p>Mammal – 225 species Water fowl – 24 species Reptile – 69 species Amphibian – 18 species, 12 endemic Fish – 249 species (30)</p> <p>Flora: Meranti, <i>Shorea</i> spp. Ebony, <i>Dyospyros</i> spp. Gelam, <i>Melaleuca</i> spp. Ramin, <i>Gonystylus bancanus</i> Jelutung, <i>Dyera costulata</i> Damar, <i>Agathis</i> spp. Rattan, <i>Calamus</i> Durian, <i>Durio zibethinus</i> Cinnamon, <i>Cinnamomum burmani</i></p>
Kalimantan	<ul style="list-style-type: none"> • Danau Sentarum Wildlife Reserve, Ramsar Site • Lahan Rawa Kubu-Padang Tikar • Muara Kendawangan Nature Reserve (all in West Kalimantan) • Have international significance as important fish habitat, particularly Asian bonytongue (<i>Scleropages formosus</i>), and the mahakam porpoise (<i>Orcaella brevirostris</i>), endemic mammal in East Kalimantan 	<p>Mammal – 158 species (11), 40 in Red List IUCN Water fowl – 80 species, 17 in Red List IUCN Reptile – 28 species, 13 in Red List IUCN Amphibian – 100 species Fish – 394 species (149)</p> <p>Flora: Ramin, <i>Gonystylus bancanus</i> Jelutung, <i>Dyera costulata</i> Capot, <i>Camposperma</i> Kenari, <i>Canarium</i> Kempas, <i>Koompasia</i> Sago, <i>Metroxylon sagu</i> Gelam, <i>Melaleuca cajuputi</i> Waterlily, <i>Nelumbo nucifera</i> Water spinach, <i>Ipomoea aquatica</i> Velvet leaf, <i>Limnocharis</i> Taro, <i>Colocasia esculenta</i> <i>Cyrtosperma chamissonia</i></p>
Java-Bali	<ul style="list-style-type: none"> • 13 lakes and 34 dams in Java; major lakes are Rawa Danau, Rawa Pening, Danau Lamongan • 4 lakes and 1 dam in Bali; major lakes are Buyan, Bratan, Batur. • Dam has multifunction for aquaculture, flood regulator irrigation and hydroelectricity 	<p>Migrant birds – 56 species Reptile – 57 species Amphibian – 14 species Endemic freshwater fish – 12 species Endemic mammal – 8 species</p> <p>Endemic flora: Rotan bakau, <i>Calamus ciliaris</i>, Katulampa, <i>Elaeocarpus macroceros</i> Pulai gabus, <i>Alstonia spathulata</i> Figs, <i>Ficus retusa</i>, Cinnamon, <i>Cinnamomum burmani</i> Wild mango, <i>Mangifera gedebe</i> Bungur, <i>Lagerstroemia</i> sp.</p>