

INDONESIA AND THE GLOBAL ENVIRONMENT CHANGE

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Country Report

1. Indonesia is the largest archipelago in the world. It has 17,508 islands with more than 81,000 km of coastline. The seas cover about two thirds of its territory, an area of 3.1 million km². The 200 miles exclusive economic zone of Indonesia (EEZI) adds another 2.7 million km². The archipelago is located between the Asian and the Australian continents and between the Pacific and the Indian oceans. As such, the Indonesian archipelago is strongly governed by monsoons. Therefore, it is ideal site for studying the monsoons and their effects on agriculture, fisheries, and oceanographic features of the Indonesia as well as the adjacent seas.

The Indonesian archipelago also provides the only inter-ocean link between a reservoir of warm surface water of the Western Pacific ocean with the Eastern Indian Ocean. The heat flux and water mass transfer between the two oceans through this link is estimated to be considerable and has a large, perhaps even global scale, impact on the ocean climate. Another phenomenon as part of the Pacific-Indian oceans interaction is the "El-Niño: Southern Oscillation" or ENSO. This phenomenon generates adverse climate effects regionally, over the whole Pacific basin, and even also globally.

2. The marine and coastal areas of the Indonesian archipelago are among the most productive in the world. Their warm, humid tropical climate and high rainfall allow extensive coral reefs, dense mangrove and other ecosystems to flourish along the coastlines. These ecosystems are the most productive ecosystems but also very sensitive and vulnerable to environmental changes and pressures. In addition, Indonesia still has one of the largest areas of tropical forests in the region, estimated about 108 million ha (FAO, 1990).
3. In term of population, Indonesia is the 5th largest in the world, presently more than 180 million people. Despite the success of the Family Planning Programmes the annual growth rate is relatively still high, about 1.91 %. It is projected that the Indonesian population will reach more than 250 million people by the year 2020. Another feature of Indonesian population is the unequal distribution and density. The islands of Java and Bali are the most densely populated. While the rest of the islands range from moderate (Sumatra, Celebes) to sparsely populated (Kalimantan the Mullucas, West and East Nusa Tenggara and Irian Jaya). Due to the economic benefits that can be derived from the rich and diverse ecosystems, most of the Indonesian coastal areas are densely populated. Over 60 percents of the population lives in the coastal areas resulting in a rather high level of exploitation of the natural resources and the degradation of the environment. Indeed, population pressure associated with high economic activities has caused a large-scale destruction. Based on the above information, Indonesia is ideal for studying the regional and global climate change and the overall IGBP programme activities.
4. As we all know, in 1986 the International Council of Scientific Unions (ICSU) established The International Geosphere-Biosphere Programme: A Study of Global Change (IGBP). The importance of IGBP was recognized by the UN General Assembly that recommended governments (Resolution 44/207) to "increase activities in support of the World Climate Programme and the International Geosphere-Biosphere Programme". It further recommends that "the international community should support efforts by developing countries to participate in these scientific activities". The need to involve scientists from developing countries in the IGBP was also stressed in the report from the Working Group of the Intergovernmental Panel on Climate Change (IPCC). Indonesia as a developing country and member of the ICSU has been participating in various IGBP programmes and meetings. Indonesia plans to enhance its participation by coordinating efforts and assigns various agencies, laboratories and scientists to carry out IGBP and other related programmes.
5. Indonesia has established the National Committee for the IGEP, chaired by Prof. Dr. Harsono Wirjosumarto, chairman of the National Aeronautic and Space Agency (LAPAN). The National Committee is supervised and supported fully by HE the State Minister of Research and Technology (Prof. Dr. Dipl. Ing. B.J. Habibie), and HE the State Minister for Population and Environment (Prof. Dr. Emil Salim). The participating members include, among others, the Indonesian Institute of Sciences-LIPI, the Agency for Assessment and Application of Technology (BPPT), the Meteorological and Geophysics Agency (BMG), the National Coordinator for Survey and Mapping Agency (BAKOSURTANAL), Department of Forestry, Department of Agriculture and several other agencies, institutions and major universities in Indonesia. Some of the research facilities that can be utilized, among others are:

- Network of meteorological and geophysical monitoring stations of BMG.
 - Network of the tide gauges station and current meters of the Naval Hydro-Oceanographic Office and the ASEAN-Australia Regional Ocean Dynamic Project.
 - Three ocean going research vessels and at least 5 (five) coastal research vessels and fisheries research vessels.
 - Two satellite ground stations of LAPAN. One has been operated since 1986 in Pakayon, just outside of Jakarta, and another one will be constructed in Pare-Pare, the Celebes, and is expected to be operational by the end of 1993.
 - International Center for Equatorial Atmospheric Research located in Bukittinggi, West Sumatra. A Centre for atmospheric research operated jointly by Japan (Kyoto University) and Indonesia (BPPT, LAPAN, BMG). *This Center is now still under construction.*
 - Atmospheric radar stations of NOAA-LAPAN in Biak, Irian Jaya.
 - Marine Pollution Monitoring Center and its network of the Center for R and D in Oceanology (LIPI).
 - *The remote sensing, mapping and geographic information system (GIS) of BAKOSURTANAL.*
 - The reactor and nuclear research facilities of the National Atomic Energy Agency (BATAN).
 - Various research facilities, laboratories and able manpower of LIPI, Dept. of Forestry, other agencies, research institutions and universities in Indonesia.
6. Due to the strategic location, the readily available research facilities, laboratories and able manpower, Indonesia have proposed to establish START and the Regional Research Center (RRC) in Indonesia. *This interest has been expressed in a letter sent to Prof. Thomas Rosswall, IGBP Executive Director, by HE Minister of Research and Technology, Prof. B.J. Habibie. A temporary secretariat now has been established at LAPAN. The more permanent secretariat will be established in due time.*

**INDONESIAN RESEARCH INSTITUTES
AND THEIR POSSIBILITIES TO WORK ON THE GCTE RESEARCH PLAN**

NO	INDONESIA INSTITUTION GCTE RESEARCH PLAN FOCUS	LAPAN	LIPI	BMG	BPPT TANAL	BAKOSUR-	DISHIDROS	KLH	ITB	IPB	UNDIP	UGM	DEP. TAN BALIT BANG	DEP. HUT BALIT BANG	OTHERS
	FOCUS I Ecosystem Physiology														
1	Effects of Elevated CO2	*	*	*	*	*	*	*		*	*		*	*	*
2	Changes in Biogeochemistry		*		*			*							
3	Effect of Changes in Vegetation on Water and Energy Fluxes	*	*		*	*		*			*	*			
4	Integrating Activities		*					*							
	FOCUS II Change in Ecosystem Structure														
1	Patch-Scale Dynamics	*	*	*	*			*		*	*	*	*	*	*
2	Models from Patch to Region	*	*		*				*	*	*	*			*
3	Regional-to-Global Models of Vegetation Change for Element Cycles and Climate Feedback	*							*	*	*	*			*
	FOCUS III Global Change Impact on Agriculture and Forestry														
1	Effect of Global Change on Key Agronomic Species		*		*				*	*	*	*	*	*	*
2	Change in Pests, Diseases and Weeds		*		*				*	*	*	*	*	*	*
3	Effects of Global Change on Soils	*	*		*	*		*		*	*	*	*	*	*
4	Integrated Experimental and Modeling Programme on Multi-Species (Complex) Agricultural System		*					*		*			*	*	*
	FOCUS IV Global Change and Ecological Complexity(Proposed)														
1	Effect of Biodiversity and Ecological Complexity on Ecosystem Function	*	*		*			*		*					*
2	Interactive Effects of Global Change on Biodiversity and Ecological Complexity	*	*			*		*		*	*	*			*
3	Consequences of Global Change for the Viability of Isolated Populations		*			*									*