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by

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**Minister of State for Research and Technology
Chairman, Agency for the Assessment and Application of Technology
Chairman, National Research Council
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to the

**INTERNATIONAL CONFERENCE ON SCIENCE
AND TECHNOLOGY FOR THE ASSESSMENT
OF GLOBAL ENVIRONMENTAL CHANGE AND ITS IMPACT ON
INDONESIAN MARITIME CONTINENT**

Jakarta, November 10-12, 1997

Excellencies
Distinguished Guests
Ladies and Gentlemen

It goes without saying that towards the closing of this tumultuous year I am so delighted to see so many distinguished and prominent scientists from all over the world and from Indonesia gathering here to discuss important issues with regard to climate. It is at such hour that I think I have not been abandoned by my fellow scientists. From all parts of the world and from institutions in Indonesia came responses to contribute either physically or intellectually to relieve us from the menace of El Nino. A large number of senior Government officials of Indonesia came spontaneous responses to participate in this event, scientists from the USA, Germany, Australia, Japan, France, and Canada.

A word of thanks and appreciation is long overdue. And I will take this opportunity to extend my warm welcome to all our friends from abroad and an apologize that due to El Nino the temperature outside is a very warm, uncomfortable, and the sky hazy.

Variability within the natural climate system is historically perhaps the single most fundamental environmental factor affecting the course of human development. Societies, economies and cultures throughout the world have been developed based in large part of their ability to adapt themselves to their climates. When temperatures and precipitation pattern depart significantly from historical means, the results, if unanticipated, can be catastrophic. Vulnerability to severe drought or extreme incidents of flooding has well-known social, economic and environmental impacts which belittle the dollar amounts we use to describe their magnitude.

The Past several years have seen a tremendous increase in our understanding of how central climate and climate variability are to a wide range of social, environmental, and economic issues across world populations especially for developing nations like Indonesia.

We know, for example, that the El Nino-Southern Oscillation (ENSO), is second only to the earth's annual cycle in terms of influence of climate around the globe. New scientific understanding of the dynamics of this shorter-term phenomenon has yielded predictive skill.

El Nino-based forecasts of impending climate variations can now be made for some regions up to year or more in advance. Through the use of numerical computer models,

scientists are able to input raw data-- such as wind speeds, ocean currents and shifts in temperature patterns, sea level, etc. -- and generate a picture of how the climate system will evolve over the next one or two years. From this information, researches are making experimental forecasts with promising accuracy.

Excellencies,
Distinguished participants
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Today in fact I will not be talking about the El Nino only. The objective of this whole gamut is to promote international cooperation and to strengthen Indonesia's capability in climate research in order to respond to future climate variability in a better way, for the short as well as for the longterm.

It is about a year ago when we held the international symposium on equatorial atmosphere observation in Indonesia.

Indonesia positions is very unique between two continents and two oceans and is called the Maritime Continent Indonesia. In fact the Maritime Continent in the geologic, oceanologic, and climatological sense comprises the whole island girdles of Southeast Asia together with the islands in the southwestern corner of the Pacific.

We are aware of the fact that Indonesia and the island further East have been identified as to be the spot on earth which plays a role in the global environmental changes and the El Nino Phenomena. The Asia Monsoon, the South China Surges, the Australia Monsoon, the West Australia Surges, the local features of the Indonesian islands it self, all play a role.

Due to the great variety of the phenomena, there is an urgent need to dig deeper into the root of the problem, like (i) unrevealing the cause as well as the process mechanism of the phenomena we face; (ii) recognizing and identifying the fore running indications of the event, in order to take necessary measures.

Of course this is not that simple. But it does mean that Indonesia needs a solid research program on climate variability and a climate prediction, capability including El Nino.

These, however, are longterm problems which have to be discussed in this conference and its workshops. A longterm research program has to be set up, and consequently a

kind of a research center has to be created dealing with climate change and climate prediction.

In the short term however, we need to assess the damages inflicted by the present El Nino and the forest fires which go with it.

In general terms, the annual cycle of precipitation over Indonesia can be described as follows : 1) some precipitation throughout the year; and 2) an especially wet season typically peaking in October through November for the western part of the region (including Malaysia and southern Burma), in December-April for central Indonesia, and as late as May-June for eastern Indonesia (New Guinea).

During an El Nino event, much drier conditions are seen in Indonesia, although the relationship between El Nino and drier conditions becomes less systematic in the extreme southwest part of the regions (parts of Sumatra and Java).

The current El Nino is expected to further intensify through December, and will probably be more intense than the 1982-83 event. Even without further intensification, the current episode will be a major episode, and will have major impact on the global climate.

For the 1997-98 El Nino event, Indonesia, eastern Australia, and New Guinea have been very dry since June. During the last several months, many areas of this region have experienced rainfall deficits of 16-20 inches, and significantly below-normal rainfall is expected across this region into early 1998.

For November-December 1997, enhanced probabilities for below normal rainfall over most of the maritime sub-continent are expected, and a slightly enhanced probability for above normal precipitation over northern portions of Sumatra is expected.

For January-March 1998, shows for the data measured and predicted continued enhanced probabilities for below normal precipitation over the maritime sub-continent are expected with probabilities for below normal rainfall over the northeastern part of the maritime continent expected.

Against the backdrop of El Nino-related drought conditions, human activity associated with the preparation of agricultural lands and forestry practices has contributed to the widespread forest fires and persistent dense smoke and haze throughout the region.

The smoke plume hanging over our region has caused great concern for the health of its inhabitants, particularly its children. Health effects of the forest fires are related to the composition and density of particulate matter in the smoke plume, and the length of exposure to such emissions. A brief respite in the smoke and haze may bring a sunny sky temporarily, but the winds which will truly move the smoke off our shores are not expected to return until this El Nino begins to subside.

With drought often comes diseases due to poor water quality and diminished public sanitation. Mass movement of populations, often a secondary response to drought, can increase the potential for infectious disease by further increasing the number of people in already overcrowded urban areas.

El Nino conditions have exacerbated drought conditions, increasing the impact of smoke and fires from common forestry and agricultural practices. If the Government of Indonesia had advance warning of El Nino and its impact, it would have taken decisive actions to change those practices, reducing the health to Indonesian citizens and to her neighbors.

The maritime continent of Indonesia lies at the nexus of the climate system and is critical to unlocking its mystery. As such, the Government of Indonesia is uniquely poised to lead efforts which enhance our understanding of climate and help provide early warning of El Nino and its impact.

We need an action plan to remedy to environmental damages inflicted by the El, Nino and the fires.

All these events have to be filed very carefully so that we will not be surpassed anymore in the future as we are this year. Anticipative measures must be taken from now on including the hazards which will accompany the coming monsoon rains. I am afraid that for the time being we are too much occupied by the present draught and fires, and therefore completely forgetting the possible onslaught by the coming monsoon rain.

With regard to institutions, I am pleased to inform you that we do not start completely from scratch. Related to global changes there are some elements which start doing researches in this field such as the universities, the Bandung Institute of Technology, the Agricultural Institute in Bogor, Gajah Mada University, Hasanudin University in Ujung Pandang. f.i., BPPT (the National Agency for the Assessment and Application of Technology), LAPAN (the National Space Agency), LIPI (the Institute of Science, BMG (the National Bureau for Meteorology and Geophysics), BAKOSURTANAL

(the National Agency for Mapping Coordination), DISHIDROS (the Naval Hydrographic Service). Everybody is eager to do research.

Our problem is coordination. Based on their experience and tradition in this field our colleagues from abroad might be able to drop some words of advice as how things can be done in a cost effective way.

During their gathering in 1995 here at BPPT concerned Indonesian scientists have agreed to establish a Community on Atmospheric Dynamics.

The Government of Indonesia is deeply aware of the importance of global climate issues. Therefore Indonesia has signed the United Nations Framework on Climate Change in 1986. This is ratified in 1994, and the office of the Minister of State for Environment is the Indonesian focal point for the National Committee on Climate and the Environment. Therefore, the Community on Atmospheric Dynamics could participate positively by developing data assessment, modeling and analysis which will become valuable input for the policy formulations of the National Committee on Climate and Environment.

Excellencies
Distinguished Participants,
Ladies and Gentlemen

To date, atmospheric research activities in Indonesia are done, both independently as well as in collaboration with the International Scientific Community.

- BPPT and LAPAN, in collaboration with Kyoto University have established an Atmospheric Radar Observation in PUSPIPTEK (the National Center for Research, Science and Technology), and in Pontianak (West Kalimantan)
- LAPAN, in coordination with NOAA-USA has installed Wind Profiling Doppler Radar in Biak.
- BMG, in collaboration with WMO (World Meteorology Organization) has established Global Atmospheric Watch in West Sumatra.
- BPPT has also been operating four Research vessels and in cooperation with NRI (National Research Institute) of U.K. has installed ground station for collecting images from NOAA-USA.

- LIPI and DISHIDROS-AL in cooperation with ASEAN-Australia Economic Cooperation Program in Marine Science has installed seven tide gauges in the Western part of the Indonesian waters.
- LIPI and BPPT in cooperation with Columbia University (USA), Universite Pierre et Marie Currie in Paris, and CSIRO-AUSTRALIA have conducted Studies on ARLINDO (Arus Lintas Indonesia or the Pacific to Indian Ocean Throughflow).

So, the elements are there. We must start from here, and not from scratch. In line with climate research activities throughout the world, the WCRP (World Climate Research Program), in 1995 initiates a 10 year research program called TOGA to study “Interannual Variability” driven by “the Coupled Tropical Ocean Atmosphere System” in which the particular focus was El Nino of this Tropical and Sub Tropical Pacific. These findings have enable prediction of El Nino events in the tropical Pacific and associated changes in many different parts of the world in terms of heavier rainfall; draught, and above or below normal temperature up to a year in advance.

I take note that climate scientist from around the world have for a number of years advocated the establishment of an International Research Institute for Climate Prediction (IRI) to build on the scientific breakthrough of model-based forecasting.

The International Research Institute for Climate Prediction (IRI) initiative has at its heart the establishment of dedicated research activities to accelerate progress in understanding the detailed prediction to build on the scientific breakthrough of model-based forecasting.

The International Research Institute for Climate Prediction (IRI) initiative has at its heart the establishment of dedicated research activities to accelerate progress in understanding the detailed predictability of ENSO-related and other transient climatic variations. The International Research Institute for Climate Prediction (IRI) Core is to be one of a series of research centers in a distributed International Research Institute for Climate Prediction (IRI) network tasked specifically with the systematic production of experimental forecasts on seasonal to interannual time scale. In addition to supporting observations, advanced process research and model-based activities, the network will include training activities, forecast dissemination, the study of consequences of and responses to climate variability and activities designed to facilitate the incorporation of climate information into decision-making.

As proposed, the International Research Institute for Climate Prediction (IRI) would be a multinational network that includes a centralized activity in the area of research on

climate predictability and the production of experimental forecasts. These forecast would be disseminated to regions throughout the world where the information would be refined for more localized use and made available to decision-makers in climate-sensitive sector, with considerable interpretation.

Climate forecasts produced by the International Research Institute for Climate Prediction (IRI) would have the effect of “early warning” information providing insight into rainfall and temperature in the coming season. Used effectively, this information has already in some instances resulted in more efficient use of water and more effective agricultural practices. The Indonesia government is seriously considering becoming one of the sponsoring member of the International Research Institute for Climate Prediction (IRI)-Corefacility and is looking forward that other countries around the Pacific, Europe especially South East Asia Nations (ASEAN) will also strengthening the International Research Institute for Climate Prediction (IRI) by becoming sponsoring member.

The International Research Institute for Climate Prediction (IRI) initiative effectively places the production and application of ENSO based climate forecasts at the nexus of broader concerns regarding economics and development, environmental change, and technological progress. Climate applications activities will in turn contribute to the development of scientific and technical capacity building within many countries as well as provide a tangible and meaningful demonstration of how effective information distribution can result in more efficient use of natural resources and potentially ease the economic shock of unanticipated variation in rainfall and temperature.

Individual governmental-level commitments to this multinational institution is a tangible demonstration of our collective societal commitment to identifying opportunities to alter the way humans interact with the Earth system.

The ability to predict climate variability offers us the opportunity not only to prepare for its consequences, it affords us a chance to redirect the relationship between human societies and the earth’s natural processes. Climate prediction is indeed a “technology” with critical application for economic development and environmental stewardship.

If we do not learn how to make symbiotic the economic and environmental needs of today’s population, the task will be exponentially more difficult in coming decades as world population continues to climb dramatically. The initiative to launch an International Research Institute for Climate Prediction (IRI) for climate prediction aims to increase our understanding of the natural system as well as the vulnerabilities to

natural perturbations within socio-economic systems crucial to efforts to achieve sustainable development.

There is another aspect which is closely related to climate change, especially prolonged draught, and that is the water issue.

In many places in Indonesia water has become a precious commodity. Many Indonesians have no access to clean drinking water, therefore water research related to climate will have to be intensified also, in cooperation with IRI :

- Effect of El Nino on precipitation in Indonesia
- Mesoscale atmospheric modeling of precipitation
- Weather Nowcasting
- Analysis of precipitation's enhancement potential
- Surface run off modeling

All these have to be done so that water resources, both ground water and subsurface water together, with water from the atmosphere (precipitation) could be properly managed.

Excellencies

Distinguished Participants

Ladies and Gentlemen

It is now realized that we all recurrently face up Global Environmental Changes and its impact in terms of both excessive rainfall that brings about heavy flood or less rainfall that induces long severe draughts.

Climate also demonstrate long period variability. The variation of annual rainfall here in Indonesia and the forest fire occurrences in Sumatra and Kalimantan are examples of how longer-term climate variation can affect our live and prosperity.

I believe that the next steps in climate research would require a unified effort of all scientists around the world. I am hoping that existing collaboration within different agencies both at the national and at the international level could be strengthened. It is also my sincere hope that this conference will live up to the expectations of the organizers and the participants to a better cooperation in the future to solve problem in our hand.

I thank you for your attention and I wish all of you a pleasant and successful conference.

Jakarta, 10 November 1997

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