

DEPARTMENT OF HUMANITARIAN AFFAIRS

INDONESIA

FOREST FIRES

September - November 1997

United Nations Disaster Assessment and Coordination Team

UNDAC

MISSION REPORT



United Nations

28 November 1997



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EXECUTIVE SUMMARY

In September-November 1997, parts of several countries in South-East Asia, including Malaysia, Singapore, Brunei, the Philippines, Thailand, and Indonesia, were affected by heavy air pollution, primarily caused by exceptionally large-scale forest fires in Indonesia.

These fires were reportedly started as of May-June 1997 (possibly as part of land clearing operations, either for plantations or agricultural land), and because of unusually dry weather the fires spread into other areas, including peat swamps which are dried out. The forest fires were found to be mostly in the Indonesian islands of Java, Sumatra, Kalimantan, Sulawesi and Irian Jaya (neighbouring with Papua New Guinea). This year, the El Niño effect delayed the onset of the monsoon, and the forest fires, with associated air pollution, persisted for several months. The disaster has brought significant damage to the environment, and it is felt that it will have substantial long-term effects on the social, economic, health and ecological sectors.

The national authorities were taking steps to cope with the emergency situation, but became clearly overwhelmed with this large-scale disaster. The Government of Indonesia declared a national emergency and, while not formally appealing for international assistance, confirmed that it would welcome such assistance, especially in the field of fire fighting.

DHA's Relief Coordination Branch, through its Joint UNEP/DHA Environment Unit, was closely monitoring the situation and staying in close contact with the national authorities. On 27 September 1997, a United Nations Disaster Assessment and Coordination Team (UNDAC) was urgently dispatched to Indonesia, at the request of the United Nations Resident Coordinator. The Team was led by the Chief, Relief Coordination Branch, and was tasked to ensure close links between national and international relief coordination efforts, and assess needs for international assistance in connection with this disaster. The UNDAC Team has been working in Indonesia, in close cooperation with the UN Resident Coordinator, the competent national authorities, local donor country representatives, UN agencies, and relevant international non-governmental organizations. Field assessment missions were conducted from Jakarta to different affected regions, to identify specific needs for assistance. DHA has prepared and disseminated several Situation Reports on this disaster.

As a result of joint efforts to mobilize international assistance, many countries, UN agencies, international organizations and NGOs have provided different types of help, both in cash and in kind, to Indonesia. On the basis of practical experience in carrying out this operation, the following conclusions and recommendations should be highlighted:

- This emergency has an important international dimension in relation to severe transboundary air pollution, and the large-scale destruction of unique aspects of the existing biodiversity which represents a world heritage.
- International assistance, provided to Indonesia, was substantial and significant. DHA has played an important role in mobilizing and coordinating international relief efforts.

- At the present stage, the peak of this disaster is over and a large number of surface fires having been extinguished. However, risks of further fires (including peat fires) are very great, and the current situation can not be considered as stable. Moreover, if the general national policy (banning the use of fire for land clearing) is not implemented fully, a repetition of the present emergency may take place next year.
- Appropriate preventive measures should be taken at the national level as an absolute priority. The only true solution to the problem should be seen in a different approach, and effectively limiting/renouncing the use of fire (slash and burn) techniques for land clearing.
- The national authorities should considerably improve their preparedness for combatting possible future fires. A National Contingency Plan for Environmental Emergencies is clearly needed.
- Public information awareness and sharing of relevant information between major actors at both national and international levels should be improved.
- It is strongly recommended to carry out a comprehensive assessment of environmental and other damage caused by this disaster, thereby duly involving the national authorities concerned.
- Early warning capacities, at both international and national levels, should be further developed and utilized. Appropriate emergency notification procedures should be introduced by the Indonesian authorities.
- The international community should improve its preparedness for possible future fires in Indonesia and other countries.
- DHA should continue monitoring the situation, and staying in close contact with relevant national authorities.

Apart from fires, the easternmost Province of Indonesia, Irian Jaya, has been hit by a drought which has resulted in a severe famine. The drought has also led to a significant decrease in water supplies. Within the overall emergencies two UNDAC field missions were sent to Irian Jaya to investigate the impact of the drought and the forest fires, as well as problems with regard to food security, water and health. To date, the international relief activities has been focused on immediate needs, combined with steps to alleviate the famine and break the cycle of vulnerability in the medium and long-term.

INTRODUCTION

Relevant background information on the country

Geography: Straddled across 13,700 islands and 5,000 kilometres of the equator, Indonesia's total land area is 1,919,445 square kilometres (740,905 square miles). The equatorial climate, combined with the rich volcanic soil of most islands, gives Indonesia a lush, fertile character.

Only 6,000 of Indonesia's 13,700 islands are inhabited, the main ones being Sumatra, Java, Madura, Bali, Sulawesi, Lombok, Moluccas and Timor as well as Kalimantan and Irian Jaya (the latter two being the only non-volcanic members of the group).

Population: With a population of over 200 million, Indonesia is the fourth most populous country in the world and is growing at 1.8% a year according to 1988 statistics, some 27% of the population is urbanised and 67% is under the age of 16.

The spread of the country's territory is reflected in the number of ethnic groups; the main ones being the Javanese, Sundanese, Batak, Buginese, Minangkabau and Balinese. The Chinese comprise the largest non-indigenous group.

Environment: Indonesia has about 143 million hectares of tropical forests and the largest area of rainforest after Brazil. Like Brazil, it is struggling with the delicate, difficult balance of the forests' commercial potential and their ecological importance. Numerous concessions to logging companies have alarmed conservationists. At present rates, the World Resources Institute estimates that Indonesia would lose 12.5% of its forest in the next decade. According to other sources, the total under threat is even higher.

During September and October 1991, a series of huge fires ravaged more than 200 square miles of tropical forests in southern Kalimantan and Sumatra. Environmentalists say that many of the fires broke out in areas degraded by excessive logging, where the debris left behind is easily combustible.

Background to the recent disaster

According to official Indonesian authorities, the land, bush and forest fires were initially started by new agribusiness concessions, such as large scale plantations, that were not complying with the land clearing regulations of the Forestry, Agriculture, and the Transmigration Departments. This regulation was in effect since 1995 and stipulated that land clearing was not to be conducted by methods of burning.

In the months of September and October 1997, numerous small-scale ground fires have been caused by farmers and others clearing the land in a traditional fashion, in anticipation of the rains. Due to the prolonged drought and the very dry climatic conditions, these fires have rapidly spread out of control. Numerous fires have been burning in the islands of Java, Kalimantan, Sumatra, Sulawesi, and Irian Jaya, causing heavy air pollution in several countries in South East Asia, including Malaysia, Singapore, Brunei, and Thailand. The smoke has reached as far north as the Philippines and south all the way to Australia (and Westwards reportedly to the Maldives).

The worst smog in Kalimantan has been coming from an extensive fire in a one million hectare area of peat being drained by the government for a massive rice planting project. The peat was emitting noxious carbon fumes which have triggered health alerts throughout the region. Peat fires are considered the most dangerous. Peat has accumulated in lowland areas for 7,000 or more years and may be as much as 20 feet deep. When undisturbed, it serves to store rain during the monsoon season, and slowly releases the moisture back into the air during drier times. When heavy rains occur, the peat prevents flooding by acting like a sponge.

When the peat is exposed, it quickly dries out. Once dry, it ignites easily. Once burning, sometimes the fire goes deeply into the earth and then cannot be extinguished, even by heavy rain. These fires can smoulder, like self-combustion, underground indefinitely.

On 25 September 1997, the President of Indonesia, through the office of the Secretary of State, proclaimed the land bush and forest fires a national disaster and ordered the mobilization of the people. The National Disaster Management Coordinating Board (BAKORNAS PB) then assumed the role of coordinating the implementation of national disaster management efforts.

Climatic factors, including El Niño and drought

The current effect of the El Niño phenomenon is considered to be different from others in this century for two reasons: Firstly, for the first time the National Weather Service has successfully predicted the start and scope of El Niño. Secondly, scientists predict that it could be the worst of the century, and potentially surpass the record-breaking appearance of El Niño in 1982-83.

The current El Niño has been classified as a "type one" which means that it is the strongest of the El Niño weather patterns, with a surface temperature change greater than 2 degrees Celsius. There have been eight "type one" El Niño years since 1949, with the present one being the ninth.

This year's El Niño covers an unusually large swathe of ocean, which has warmed more quickly than usual. Furthermore, the phenomenon, which often does not occur until Christmas, started much earlier than usual during this past year.

The World Meteorological Organization (WMO) has reported that the monsoon rains in Indonesia could be delayed by 2 to 3 months because of the El Niño phenomenon, which is disrupting weather patterns throughout the world.

Health-Related Consequences and Activities

In its surveillance of air quality in 11 provinces, the Ministry of Health has found that South Sumatra and Central Kalimantan have been the worst affected areas. The Ministry is therefore monitoring the health conditions of local residents through various clinics in these two provinces and tests are being conducted on individuals who have a history of asthma, TB and other respiratory problems. This monitoring program is planned to continue throughout the year in order to ascertain and deal with the longer-term effects of the haze.

Officials in Central Kalimantan have reported that 11 people have died from respiratory diseases between July and September at five health centres, while more than 23,000 others were suffering from respiratory problems. The province of Jambi has reported 35,368 cases of upper respiratory tract infections during the month of September 1997, an increase of 50% compared to the previous month. The province of South Sumatra has reported that the number of diarrhoea cases had risen to 1,000 in September, an increase of 20% compared to the previous month.

According to the Public Relations Bureau for West Sumatra, an estimated 47,565 West Sumatrans have suffered from acute respiratory tract infections during the month of September 1997. The highest number of incidents was in Padang with 22,690 people having been affected.

The World Health Organization (WHO) warns of some rise in the number of haze-related deaths, particularly among the ill, the elderly and the very young. Nitrogen dioxide, sulphur dioxides and volatile organic compounds latch on to the suspended particulates, which go deep into the lungs because they are so fine.

Although the long-term consequences of haze have not yet been fully analyzed, over the short-term doctors state that smog can contribute to breathing discomfort and respiratory tract problems. Furthermore, this exposure can further complicate existing ailments.

THE INDONESIAN EMERGENCY RESPONSE SYSTEM

The Coordinating Minister for People's Welfare chairs the National Disaster Management Coordinating Board (BAKORNAS PB). Members of the board include: the Minister of Social Affairs, the Minister of Home Affairs, the Minister of Health, The Minister of Public Works, the Minister of Transportation, the Armed Forces Commander in Chief as well as the Governor whose province is struck by a natural disaster.

BAKORNAS PB was established in 1979 with the following responsibilities:

- (1) Formulating policy and providing guidelines and directives related to natural disaster management;
- (2) Coordinating disaster management before, during and after the disaster in an integrated manner;
- (3) Providing guidelines and directives on policy outlines and disaster management activities covering prevention, mitigation, response, rehabilitation and reconstruction.

On a daily basis BAKORNAS monitors the fire situation at the ground level through its provincial and district-level offices and coordinates the delivery of assistance. Daily reports from the Provincial Disaster Management Coordinating Unit are submitted to BAKORNAS summarising changes in the provincial situation and their requirements in terms of fire-fighting, medical and other assistance. Reports from the District Management Implementing Unit are also made directly to BAKORNAS. The Coordinating Minister for People's Welfare then prepares a daily report of the conditions throughout the archipelago which is submitted to the President.

A cadre of volunteers with direct linkages to POSKO BAPEDAL (see below) is also assisting BAKORNAS with logistical arrangements.

The State Ministry for the Environment Policy-Level Crisis Centre (POSKO LH) was established to gather and monitor all available data relating to the land, bush and forest fire situation and to provide policy advice regarding the mitigation of these fires. The State Minister for the Environment is responsible for the activities of POSKO LH and its sister organisation, POSKO BAPEDAL.

Throughout the course of the forest fire crisis POSKO LH has promoted the exchange of information between government departments and other organizations relating to policy implementation and ground and forest fire mitigation activities.

The Directorate General for Forest Protection and Conservation (PHPA) is the lead agency responsible for protecting conservation areas.

The National Institute for Aerospace and Aeronautics (LAPAN) is continuously accessing and reviewing NOAA 12 and NOAA 14 satellite images on potential and existing fire hot spots and transmitting data to the Environmental Impact Management Agency Crisis Center (POSKO BAPEDAL). Daily weather information is provided from the National Meteorological and Geophysical Agency (BMG). POSKO BAPEDAL, with the assistance of national experts and local volunteers, integrates this information with other spatial and baseline data using GIS/RS to develop a more complete analysis of daily developments. These data are then sent to local areas for verification and to BAKORNAS PB and other national departments and agencies. POSKO BAPEDAL also performs regular field visits to assess the ground situation in the different regions of concern.

The POSKO BAPEDAL global information system (GIS) to monitor and overlay fire hot spots with other data was developed in August 1997 with the assistance of national experts from across the country. The system was effectively monitoring and transmitting data within one week after installation.

LAPAN detects hot spots from the satellite some 850 kilometres high. Hot spots are determined according to their temperature; anything above 50 degrees Celsius is registered for further verification. POSKO BAPEDAL reports that the number of hot spots can vary significantly from day to day due to the fact that the fires may extinguish themselves or be extinguished by fire-fighters. Also thick smoke may make satellite imagery and data reports less accurate. BAPEDAL also reports that peat moss fires that burn underground may not be detected, while moving quickly and being able to easily spark a fire in a new area.

Weather modification activities have been coordinated by the Agency for the Study and Application of Technology (BPPT) in cooperation with the Indonesian Air Force and the Indonesian Navy. Air Force representatives from Malaysia and Singapore have also participated in these activities.

Over the course of the past three months, the capacity of POSKO LH, POSKO BAPEDAL, BAKORNAS PB as well as that of related ministries such as Home Affairs, Foreign Affairs, Forestry and Agriculture has been increased. Coordination and communications among the various Crisis Centres have improved and the distribution of aid - both domestic and international - has been done effectively.

Voluntary assistance by local youth organisations, environmental organisations, universities and other social institutions has been channelled to the appropriate regions. Furthermore, the Minister of Information has held briefings with international media reporters and correspondents.

THE ROLE OF THE UNITED NATIONS

In compliance with General Assembly resolution 46/182, the United Nations Department of Humanitarian Affairs (DHA), through its Relief Coordination Branch (RCB) in Geneva, has established an emergency response system for coordinating actions taken by the international community as a result of natural disasters and environmental emergencies, including technological accidents.

The Joint UNEP/DHA Environment Unit was set up in DHA's Relief Coordination Branch in 1994, following extensive consultations with Governments, which expressed a strong preference for a simple mechanism in the United Nations to expedite the delivery of international assistance, including a single entry point to the system, with regard to different environmental disasters.

The Joint Unit has been mandated to improve the international response to environmental emergencies by acting as a broker between affected and assisting countries, a clearing house for information and a switchboard for disaster notification and alert. This integrated United Nations response capacity of UNEP and DHA is bringing international assistance to countries facing environmental emergencies such as chemical and oil spills, industrial accidents, forest fires and other sudden-onset emergencies that cause, or threaten, environmental damage and which can have serious impacts on human health and welfare. The Unit - similarly to all other units in the Relief Coordination Branch - is available for urgent assistance on a 24-hour basis, 365 days a year.

The Joint Unit is financed by UNEP, while organizationally fully integrated in DHA's Relief Coordination Branch. DHA is providing the Unit with necessary support and backstopping, including office space and emergency response facilities. The Joint Unit carries out its activities in conformity with services traditionally provided by the Relief Coordination Branch, including arrangements for independent assessment of emergencies upon Governmental request. The joint UNEP/DHA initiative on environmental emergencies aims at improving and complementing the existing international response capacity to help countries in coping with sudden-onset disasters.

If required, and in consultation with the United Nations Resident Coordinator, DHA can field a United Nations Disaster Assessment and Coordination Team (UNDAC) to assist in emergency assessment and field coordination during the initial relief phase.

The UNDAC Team consists of qualified and specially trained national emergency management experts, as well as of RCB staff, who are on permanent stand-by. Team members can leave within hours, accompanied by a communications expert and/or with mobile satellite telecommunications equipment, as required.

In general, an UNDAC Team works under the authority of the United Nations Resident/ Humanitarian Coordinator. It cooperates with the local emergency management authorities in carrying out assessment and coordination tasks at a disaster site, and/or assists them in coordinating incoming and locally available assistance capacities in the capital, at no cost to the affected country. On request, DHA can also dispatch staff and/or experts to assist the United Nations Resident/ Humanitarian Coordinator's Office in the affected country in fulfilling its relief coordination mandate during the emergency phase.

DHA's Relief Coordination Branch, including its Joint UNEP/DHA Environment Unit, has been closely monitoring the situation in connection with the recent forest fires in Indonesia, and has been in close contact with the national authorities.

DHA has prepared and disseminated to the international community several Situation Reports on this disaster.

RESPONSE ACTIONS BY THE INDONESIAN GOVERNMENT AND NATIONAL RELIEF EFFORTS

The Indonesian authorities have been taking steps to respond to this disaster. National efforts are coordinated by the National Disaster Management Coordinating Board (BAKORNAS). Activities have been focused on fighting fires in the first place in Sumatra (provinces of Riau, Lampung and Jambi), and in Kalimantan.

The responses made in Indonesia include:

- i. Activating local disaster response task forces;
- ii. "Air cleaning", as done by the National Technology Research and Development Agency in Pekanbaru, Riau (increasing visibility but only helpful for a short time);
- iii. Cancelling land clearing licenses;
- iv. Mobilizing armed forces police, forest rangers and volunteers to fight fires on the ground including making trenches (which were not effective when applied to peatland as fire spreads underground);
- v. Inducing rain (not successful due to lack of moisture and shield of haze); and
- vi. Mobilizing medical personnel, health facilities and increasing health surveillance for respiratory, skin, eye, and diarrhoeal diseases.

The Indonesian Government determined the following geographical priorities in fighting the fire:

- i. 1st Priority: Central Kalimantan and Jambi;
- ii. 2nd Priority: West Kalimantan and Riau;
- iii. 3rd Priority: South Kalimantan and South Sumatra.

The Government of Indonesia has approached the large agribusiness companies and requested their cooperation and an increase in company efforts to combat the forest fires. The companies have been asked to guarantee the prevention of additional fires and to work with local communities to extinguish existing fires.

The President of Indonesia has instructed the national police to take further action on law enforcement.

The Ministry of Agriculture gave 242 plantation companies a fifteen-day time limit to prove their non-involvement in the burning of the forests. Twenty-nine (29) of these companies had not responded by mid-November, and the Ministry of Agriculture was to follow-up accordingly.

The Ministry of Forestry has announced that another 15 wood-use permits of plantation and timber companies have been revoked, after they failed to present documentation disproving allegations that they started land and forests fires. In total, the Ministry has now revoked 166 wood-use permits. The government has accused 176 companies of violating the strict laws against the burning of forests to clear land. The Ministry of Forestry has set aside Rp. 2.8 billion for the Agency for the Assessment and Application of Technology, which has been attempting to seed clouds to produce rain (and extinguish fires). The Ministry of Forestry is also using Rp. 3.1 million of their reforestation fund to handle the fires and, in cooperation with the Indonesia Forestry Society and the Association of Indonesian Forest Concessionaires, has provided more than 500,000 face masks to people in the affected areas. The Ministry of Forestry has reported that a reforestation program would be soon launched to replant 3,283 hectares of the 61,000 hectare Bukit Soeharto Grand Forest (East-Kalimantan), which was burned by fires in the past year. The Ministry has also reported that the forestry concession holders will be obliged to replant damaged areas. The Ministry of Forestry has organized fire brigades to lead fire-fighting activities since the beginning of this crisis and has mobilized equipment consisting of 73 bulldozers, 80 tractors, 77 trucks, 92 oil tankers, 225 water pumps, 94 chain saws, 1543 hand tools and 385 radio sets for communication.

The Ministry of Health has been taking a range of measures to deal with the health problems affecting some 240,000 people. For example, since early September, the Ministry has been distributing protective face masks to the regions and has been promoting the dissemination of information on the potential impacts of the haze and public safety measures that should be followed. The Ministry of Health (DEPKES) conducted a health assessment of several regions, which have been affected by fires. They started this assessment in Jambi Province, which is one of the worst smoke-affected areas in Indonesia.

The National Military Forces as well as the Forestry Administration and local government authorities have been involved in fire-fighting in Indonesia. The Indonesian Air Force and Navy have been conducting joint operations to reduce fires with the Malaysian and Singaporean Air Forces. These efforts were coordinated by the Agency for the Study and Application of Technology (BPPT) and included cloud seeding and smoke reduction strategies.

The following Indonesian personnel and equipment has reportedly been deployed in the field: 3,910 soldiers, 1,050 members of the Police force, 1,800 Forest Rangers, 30,700 voluntary civilians, 1 ship and 8 aircraft (including one U-610, three C-130 Hercules and one Transall) and miscellaneous equipment.

Fire fighting has not been fully effective due to the scope and type of the fires and the lack of appropriate technology to combat fires of this magnitude. One of the main difficulties in fighting the fires lies with the fact that the only truly effective way to extinguish these is to do so on the ground (even if efforts are duly facilitated by water-bombing operations) and that the necessary manpower needs to be mobilized-and trained-to that effect.

The Directorate General for Forest Protection and Conservation (PHPA) has been successful in mitigating the fires in a number of protected areas including Way Kambas, Lampung and Tanjung Putting, Central Kalimantan.

THE UNDAC MISSION

Terms of Reference

From 28 September through 18 November 1997, the UNDAC team was working out of a Coordination Centre established in the UNDP office in Jakarta, and providing support to the Resident Coordinator in assisting the Government of Indonesia with essential disaster assessment and coordination tasks. More specifically, the team was carrying-out the following key functions:

- making independent in-country assessments of the situation the team has visited several of the most affected areas including Lampung and Jambi provinces (Sumatra), South, East, West, and Central Kalimantan and Irian Jaya;
- drawing up immediate priority requirements for assistance;
- facilitating coordination through the establishment of specific technical coordination groups;
- acting as an information clearing house for the international community (and the media);
- establishing close links with the Government; and
- resource mobilization.

Composition of Basic Teams

<u>Name</u>	<u>Function</u>	<u>Arrival Date</u>	<u>Departure Date</u>
TEAM I			
G. Putman-Cramer	UNDAC Team Leader	28 Sept. 1997	13 Oct. 1997
R. van Hazebrouck	UNDAC Team Member	28 Sept. 1997	14 Oct. 1997
H. F. Morand	UNDAC Team Member	28 Sept. 1997	11 Oct. 1997
Joe Bishop	UNDAC Team Member	28 Sept. 1997	15 Oct. 1997
Kjell Madsen	UNDAC Team Member	02 Oct. 1997	
Jan-Erik Gustavsson	Fire Fighting Expert	02 Oct. 1997	
Timo Heikkila	Fire Fighting Expert	02 Oct. 1997	
TEAM II			
Sabine Metzner-Strack	UNDAC Team Leader	09 Oct. 1997	21 Oct. 1997
Kjell Madsen	UNDAC Team Member	02 Oct. 1997	20 Oct. 1997
Flemming Nielsen	UNDAC Team Member	15 Oct. 1997	28 Oct. 1997
Jan-Erik Gustavsson	Fire Fighting Expert	02 Oct. 1997	13 Oct. 1997
Timo Heikkila	Fire Fighting Expert	02 Oct. 1997	28 Oct. 1997

TEAM III

Vladimir Sakharov	UNDAC Team Leader	20 Oct. 1997	13 Nov. 1997
Nils Andreasson	UNDAC Team Member	20 Oct. 1997	01 Nov. 1997
Gilbert Greenall	UNDAC Team Member	22 Oct. 1997	04 Nov. 1997
Rudolf Mueller	UNDAC Team Member	05 Nov. 1997	

TEAM IV

G. Putman-Cramer	UNDAC Team Leader	11 Nov. 1997	18 Nov. 1997
R. van Hazebrouck	UNDAC Team Member	11 Nov. 1997	18 Nov. 1997
Rudolf Mueller	UNDAC Team Member	05 Nov. 1997	18 Nov. 1997
Bodil Leonsson	UNDHA Delegate	09 Nov. 1997	staying
Gordon Hurrell	UNDHA Delegate (fire fighting)	14 Nov. 1997	staying

ACTIVITIES OF THE UNDAC TEAM

Chronology:

Phase I: Assistance to the UN Resident Coordinator in:

- Assessments / Fact finding missions
- Establishing links with agencies, NGOs and donor representatives in-country
- Establishing links with national authorities concerned
- Establishing links between national and international relief activities
- Assessing priority needs for international assistance
- Establishing a Coordination Center in the UNDP Office, Jakarta
- Reinforcing technical expertise by deploying fire fighting experts (from Finland and Sweden)
- Responding to enquiries from donors (and the media) on the subject of the emergency at hand
- Initial resource mobilization.

Phase II: Assistance to the UN Resident Coordinator in:

- Assisting the Government in summarizing and prioritizing requirements as well as in resource mobilization and coordination of international assistance
- Establishing and chairing Joint Technical Coordination Group regarding purchase, transport and distribution of ground fire fighting equipment
- Consolidation, planning/organization of a coordinated, integrated international response (also with regard to health related requirements and to the specific needs of Irian Jaya).
- Monitoring the development of the situation.

Phase III: Assistance to the U.N. Resident Coordinator in:

- Implementing relief efforts, according to priorities jointly agreed upon with the national authorities/donor countries
- Developing a cost plan for the use of cash contributions, with tentative allocations
- Further assessment of need
- Focusing on additional information/data collection
- Preparations for a medium/longer term assistance strategy

Phase IV: Assistance to the U.N. Resident Coordinator in:

- Finalization of overall "cost plan"
- Finalizing procurement procedure for fire-fighting (basic) equipment
- Allocating funding for selected relief items and priority requirements for Irian Jaya, in the context of UNDP's overall assistance to Irian Jaya project (and thereby ensuring emergency relief actions are duly linked with medium/longer term strategy)
- Building down coordination center, duly itemizing equipment being returned to Geneva as well as equipment remaining with UNDHA Delegates
- Ensuring (supplementary) briefing and familiarization of UNDHA Delegates with ongoing activities (and with partners *in situ*)
- Finalization of Mission Report (29 Sept. - 18 Nov.) of UNDAC Team.

Support to the Government and the UNRC

UNDAC was providing support to the UN Resident Coordinator in Jakarta, as well as to the Indonesian Government, in assessing and prioritizing emergency relief needs and mobilizing appropriate international assistance. BAKORNAS PB has been designated as the principal Governmental contact point for related activities.

The UNDAC Team provided inputs to regular Situation Reports on the disaster, issued by DHA Geneva. These reports were posted on Internet (ReliefWeb), and distributed to more than 1,000 addressees around the world, as well as to the Indonesian Governmental organizations and relevant Embassies in Jakarta.

The UNDAC Team left Indonesia on 18 November 1997, but two DHA Delegates remain in Jakarta, until end-December 1997, to provide further support to the UN Resident Coordinator and the Indonesian Government, as required.

Field missions

The UNDAC Team has fielded several assessment missions to the most affected provinces in Indonesia. As a result of these missions, the Team has formulated, together with the Indonesian Government, a list of priority needs.

The purpose of field assessment missions was to obtain information on the development of the disaster situation at the local level and the response activities of the national authorities, to identify priority needs for international assistance and assess the local ability to receive and use such assistance, and submit relevant recommendations to the national authorities and the international community.

Field assessment missions implemented a number of specific tasks in the following major subject areas:

Fire Fighting

- a general overview of ongoing fire fighting operations
- evaluation of results/achievements
- identification of constraints/difficulties
- identification of gaps and priority needs
- assessment of the ability of local services/authorities to receive and use special equipment (including basic and peat fire fighting equipment)
- conclusions and recommendations

Health

- assessment of the general situation
- identification of major problems
- identification of possible shortages with regard to medicines and special equipment
- evaluation of priority needs
- conclusions and recommendations

Water treatment

- identification of problems
- evaluation of priority needs
- conclusions and recommendations

General matters

- assessment of various impacts of the disaster, including potential damage to transportation networks, human settlements, as well as environmental impacts (e.g. protected areas, such as forests, affected by fires)
- visual assessment of air pollution (haze)
- evaluation of risks of further fires (including peat and coal fires), and identification of potentially affected areas.
- assessment of impact of the drought situation and resulting needs in Irian Jaya, especially in the field of food security, water, health and logistics.

Composition of Field Teams

Field assessment teams included UNDAC Team members, staff of UNDP, BAKORNAS, fire fighting experts, and representatives of the donor community.

Team 1: Lampung and Jambi (1 - 6 October 1997)

(Juliet) Joseph Bishop, UNDAC
Kunikazu Nate, UNDP Programme Officer

Team 2: Irian Jaya (3 - 8 October 1997) - See Annex II

(Hotel-Foxtrot) Henri-Francois Morand, UNDAC
Friggia Aziz, UNDP Assistant Resident Representative
Jan-Erik Gustavsson, Swedish Rescue Services Agency
Tom Dolan, OFDA/USAID, (joined the team 5 Oct. 1997)
Vyrene Smith, 3rd Secretary, Australian Embassy, Jakarta
Ross Smith, Assistant Commissioner, NSW Rural Fire Service, Australia
Ian Dicker, Sr. Superintendent, NSW Rural Fire Service, Australia

- Team 3:** **West Kalimantan and Sarawak/Malaysia (3 - 9 October 1997)**
 (Romeo) Richard van Hazebrouck, UNDAC
 Kristanto Sinandang, UNDP Programme Manager
 Timo Keikilla, Finnish Fire Department Expert
 Stefan Seebacher, Health Coordinator, IFRC
 Iyang D. Sukandar, Head of Disaster Relief Division, Indonesia Red Cross (PMI)
- Team 4:** **Eastern and South Kalimantan (5 - 8 October 1997)**
 (Golf) Ravi Rajan, UNDP Resident Representative/UN Resident Coordinator
 Gerhard Putman-Cramer, UNDAC Team Leader
 Budhi Sayoko, UNDP Environment Programme Coordinator
- Team 5:** **Irian Jaya (28 Oct. - 2 Nov. 1997) - See Annex II**
 (Golf-India) David Lewis, Consultant, Eastern Indonesia Development Project (UNDP)
 Gilbert Greenall, UNDAC
 Friggia Aziz, UNDP Assistant Resident Representative
 Kristanto Sinandang, UNDP Programme Officer
 Suryana Prawiradisastra, Head, Mitigation Unit, BAKORNAS PB Secretariat
- Team 6:** **Central Kalimantan (Palangkaraya Region) (9 - 11 November 1997)**
 (Victor) Vladimir Sakharov, UNDAC Team Leader
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Field assessment missions comprised meetings with local authorities, fire fighters, medical personnel, academic institutions, representatives of UN agencies (if any), NGOs, and logging companies.

In many locations, the teams found evidence of vast scorched areas, including forests and plantations, damaged by fire. Serious problems, partly due to peat fires, persisted in Jambi, West Kalimantan and Central Kalimantan at the time of the visits. Fire fighting conditions were extremely difficult due to severe smoke and haze, difficult terrain, lack of suitable equipment and problems in sustaining continuous water supply to the fire ground. A considerable increase in haze-related respiratory diseases and, in some locations, also conjunctivitis and diarrhoea was reported to the teams.

Needs

As a result of an assessment by UNDAC, together with UNDP staff and a number of donor country representatives, and in consultation with the Indonesian authorities, the following emergency needs have been identified (in order of priority):

- a. Ground fire-fighting equipment and training
- b. Health care
- c. Drinking water
- d. Food, water, relief items and logistics (Irian Jaya) - See Annex II

a. Ground fire-fighting equipment and training

Fire fighting equipment and expertise was identified as the most pressing problem. In order to mobilize international assistance, detailed requirements have been prepared and disseminated among potential donors. A Joint Technical Coordination Group on Fire Fighting has been established by UNDAC in Jakarta, which brought together, Governmental bodies (such as BAKORNAS PB, Ministry of Forestry), UNDP, the European Union and representatives of the donor community (Australia, Canada, Germany, Japan, Finland, Russia, and the United States). This Group provided a forum for exchange of relevant information, and helped to avoid duplication of efforts.

The Provision of standard packages of ground fire fighting equipment as an immediate emergency support to the ongoing fire-fighting efforts in the affected provinces was considered as the highest priority. UNDAC developed the concept and the composition of standard packages, which was universally endorsed/accepted. According to BAKORNAS /UNDAC estimates, 43 basic response packages and 12 peat fire response packages were recommended as a minimum requirement for the provinces of Riau, Jambi, South Sumatra, Lampung, Kalimantan (West, East, South and Central) and Irian Jaya.

Following an initial cost estimate, about USD 1.24 million were required for the purchase of the equipment included in the 43 basic ground fire-fighting packages and 12 peat fire packages (which would equip about 1,000 firemen). This cost estimate did not include transport/distribution at the provincial level, where the equipment should be delivered and where training was to be conducted. Additional funding was required for this purpose.

After a generous response from a number of donors, 7 basic fire fighting packages and 1 peat fire fighting package were still needed, as of early-December 1997.

b. Health care

Provision of medicines for the treatment of respiratory infections, asthma, conjunctivitis and diarrhoea was recommended for those districts/provinces most severely affected and where immediate shortages exist. In Jambi Province, an immediate shortage of medicines was reported to the UNDAC team. Both hospital and health clinic attendances for respiratory tract infections and asthma have increased in Kalimantan and central Sumatra.

A list of medicines and medical supplies required has been prepared by the Indonesian Ministry of Health. This list has been reviewed in consultation with WHO. The Government recommended in-country procurement as the most viable option. The necessary steps were taken to purchase the needed drugs and other items, and to deliver them to hospitals. Some medical supplies have been also distributed through the Indonesian Red Cross.

c. Drinking water

The continued drought has raised concerns about the safety of drinking water in Irian Jaya, Kalimantan, Jambi and South Sumatra. With the exception of Irian Jaya, there have been no formal requests so far for emergency assistance, either through WHO or UNICEF. Prefabricated emergency type water treatment units are reportedly available on the local market and their distribution to the affected areas could be arranged. Also, one donor country (Germany) was requested to address - and was initiating the process of providing large scale in-kind contributions to assist in - the question of water purification.

INTERNATIONAL ASSISTANCE PROVIDED TO INDONESIA

A number of donors have provided important assistance to the Indonesian authorities concentrating on emergency needs in the field of fire fighting.

An Australian water bombing team carried out fire fighting operations in Indonesia. It included water bombing aircraft, essential control, command and support functions as well as other necessary equipment provision. The South Australian Country Fire Service was deployed in Lampung Province, and delivered water/foam on fires in the Lampung area.

In addition, a fire management team from the New South Wales Rural Fire Service undertook an expert assessment of the fire and haze situation, and a health assessment team carried out an expert assessment of the impact of the fire situation on health.

Canada sent ten basic fire fighting packages to Central Kalimantan, accompanied by professional instructors. Almost 300 hundred local personnel are being trained by Canadians in Banjarmasin and Palangkaraya districts. Canada has also agreed to co-fund 50 per cent of a CANDollars 2 million ASEAN Regional Forest Fire Cooperation project aimed at establishing a long term regional wild fire response strategy, information systems and action plans.

Fire fighting equipment donated by Japan was sent to Sumatra and Kalimantan. Two Japanese helicopters with infrared cameras were used in Lampung and Jambi provinces.

Malaysia sent two large contingents of firemen to Southern Sumatra and West Kalimantan to fight the fires. These groups were working side by side with the Indonesian Armed Forces, Police, Forest Rangers and local volunteers.

The US Airforce sent 56 personnel and 4 aircraft (3 Hercules C130 and 1 C141 Starlifter) to Indonesia to provide aerial support to fire fighting. Operations started in Tanjung Putting, Central Kalimantan, and continued in the area of Surabaya. The USA fire fighting team had two objectives since its arrival; one was water bombing, while the other was an assessment of the situation and the formulation of recommendations. The USA also equipped two Indonesian helicopters with water dropping devices. For the purpose of evaluating the different water bombing methods and to minimize the time of using the satellites, a USA expert in the field of satellite imagery interpretation participated in this operation.

The European Union response included a contribution of peat fire fighting equipment from Finland, and basic packages from France (both accompanied by professional trainers). Germany provided special expertise and equipment.

Other donors have also provided valuable services and contributions, or are considering to do so in the near future (see table page 17-19).

A summary of contributions for Indonesia (forest fires, as well as drought in Irian Jaya), reported so far to DHA by donors, is given below.

<u>United Nations System:</u>		<u>US Dollars</u>
DHA	Dispatch of an UNDAC team Emergency grant	++ 50,000
UNDP	Forest fire impact assessment and mitigation project	. 200,000
UNICEF	Provision of 21,650 face masks Water supply project Procurement of ARI drugs for children in Sumatra and Kalimantan	20,000 10,000 ++
UNESCO	Water supply project	5,000
WHO	Cash Purchase of High-Volume Air Respirable Particle Samplers Provision of health advisors	200,000 ++ ++
<u>IGO's:</u>		
EUROPEAN UNION	Technical assistance, including 4 basic fire fighting packages	363,028
OPEC	Cash through DHA	200,000
<u>Governments:</u>		
AUSTRALIA	Cash Cash for Water bombing Provision of two tractor water-bombing planes Cash Cash through ICRC Cash through DHA (Irian Jaya) 12 ground fire fighting packages, plus training Cash contribution towards a World Vision Indonesia project Relief assistance through a local NGO	720,000 720,000 ++ 211,276 352,112 352,112 ++ 212,000 18,000
CANADA	Co-funding (50 per cent) of a regional forest fire project aimed at establishing a long-term regional wild fire response strategy, information system and action plans Dispatch of 2 forest fire control specialists to assist the Indonesian National Environmental Impact Management Agency 10 basic forest fire fighting packages (estimated cost without transportation) Four fire fighting experts	719,424 53,956 266,187 82,733

CHINA	Supplies/goods	120,000
DENMARK	Cash contribution for the purchase and installation of water pumps, pipes, tanks and containers for clean drinking water supply in Kuyawage	38,000
FINLAND	Dispatch of fire-fighting/management expert	24,500
	Fire fighting equipment (pumps, engines etc) (1 Peat fire fighting package)	32,000
FRANCE	Dispatch of 3 fire-fighting experts	++
GERMANY	Dispatch of fire fighting experts	++
	Provision of one UNDAC team member	++
	Provision of training for 100 armed forces personnel in East Kalimantan	58,139
JAPAN	Cash	77,500
	Cash for Irian Jaya (famine relief project)	33,750
	Dispatch of a 6-member disaster relief team	145,193
	Provision of 300 portable fire extinguishers, plus transport	147,372
	Water cannons	144,781
	Provision of relief goods: 50 portable fire pumps, 300 portable fire extinguishers, 50 portable megaphones, 50 portable transceivers, plus transport	623,470
	Dispatch of a 43-member disaster relief team (II), monitoring by helicopters	1,874,072
REP. OF KOREA	Cash	100,000
MALAYSIA	Dispatch of 1,257 fire fighters to Sumatra and 196 firefighters to West-Kalimantan and medical personnel as well as ground fire-fighting instruments (and aircraft for cloud-seeding)	++
	Provision of three C-130 planes	++
NEW ZEALAND	Cash through DHA	128,205
NORWAY	Cash for Irian Jaya through DHA	30,000
	Provision of one UNDAC team member	++
	Cash through	141,242
	Protective clothing and boots through DHA	149,882
RUSSIAN FEDERATION	Dispatch of 3 fire-fighting experts	17,000
SINGAPORE	Provision of one C-130 plane	++

SWEDEN	Dispatch of fire-fighting/management expert	48,355
	Financing of a relief coordination expert for a period of 2-3 months	33,240
	10 basic fire fighting packages, 10 peat fire fighting packages, plus trainers and transport	121,409
SWITZERLAND	Provision of one UNDAC team member	++
THAILAND	Fire-fighting equipment. Provision of 10-persons fire-fighting team	49,453
UK	Cash through DHA	90,000
	Provision of two UNDAC team members	++
	Financing for one fire fighting expert for a period of 2-3 months	40,000
USA	Cash through DHA	25,000
	Deployment of three C-130 aircraft to provide aerial support to fire fighting operations, plus medicines, water purification, relief items and transport	5,000,000
	Provision of satellite data on active-fire areas	++
	Deployment of an assessment team to Irian Jaya for 1-2 weeks	++
<u>Private Organizations:</u>		
CALTEX P.I.	4 million heavy duty respiratory masks	++
PLASTEC (Norway)	100 U-bags (for testing - Irian Jaya)	++
<u>Other Organizations:</u>		
Asian Disaster Preparedness Centre	Dispatch of 1 expert	++
Chamber of Commerce of Taiwan	100,000 masks	++
	Cash	57,143
Care International	Food aid. Dispatch of two doctors for two months	++
Catholic Relief Services	Cash	50,000
++ = value of contribution not specified		
TOTAL		13,945,534

A number of countries and organizations made available in Internet relevant satellite data and interpreted information. In particular, the Canadian Forest Service has made available, through the World-Wide-Web, a prototype ASEAN Fire Weather Information System which provides daily fire weather and fire-danger indices and maps of the region (www.nofe.forestry.ca/fire/asean/inputs-e.html).

The United States assisted by providing satellite data on active fire areas (scale: 1 inch=10 km) in Indonesia as well as specialist advice on the receipt and most effective use of these data. These images are available on Internet (<http://www.fs.fed.us/eng/indofire>).

As part of its continuing effort to provide scientifically credible and timely information on the extent of the problem, the United Nations Environment Programme (UNEP) has requested the World Conservation Monitoring Centre (WCMC) to make available (on the Internet) materials that highlight the potential impact of the fires on the biodiversity of the region - one of the richest in the world. The address for this site is <http://www.wcmc.org.uk/latenews/>. WCMC also compiled the following information in order to highlight the potential impact of the fires in South-East Asia on the biodiversity of the region: locations of fires, natural ecosystems, biodiversity, protected areas, published material, other internet sites and maps. This information is available on the Web site of WCMC at the following URL: <http://www.wcmc.org.uk/emergency/>. In September 1997, UNEP made available on the Internet a series of satellite images that show the growing spread of the smoke throughout the region's atmosphere. These images can be viewed at <http://grid2.cr.usgs.gov/indofire/start.html>.

The European Space Research Institute (ESRIN) of the European Space Agency (ESA) has informed DHA that some NOAA images of the Indonesian fires can be found on-line at the following address: <http://www.manipal.org.my/manipal/haze/html>. Images of the Along Track Scanning Radiometre (ATSR) (works in infra-red) can be accessed at: <http://earth1.esrin.esa.it:8080/ew/>, and <http://pooh.esrin.esa.it/ew/>.

RESULTS OF RESPONSE ACTIVITIES

National efforts vis-a-vis international assistance

The Indonesian authorities have taken steps to respond to this emergency, by involving professional fire fighters, military personnel, forest rangers, police officers and local volunteers. Relevant Governmental bodies, scientific establishments and NGOs have taken part in fire fighting operations. However, due to the scale of this disaster, the national authorities became clearly overwhelmed.

It is recognized that primary responsibility to deal with the emergency lies with the Government, and that international assistance would supplement national efforts. At the same time, taking into account the exceptional proportions of this disaster, international help has played an especially important role.

Effectiveness of fire fighting, including water bombing

Fire fighting has not been fully effective due to the scope and type of the fires and the lack of technology to combat fires of this magnitude. One of the main difficulties in fighting the fires lies with the fact that the only truly effective way to extinguish the fires is to do so on the ground (even if efforts are duly facilitated by water-bombing operations) and that the necessary manpower needs to be mobilized and trained to that effect.

Cloud seeding has been undertaken to induce rain and reduce dust and fires, but reportedly it has not been very successful.

Water bombing is the most expensive type of fire fighting, and its effectiveness in this particular case was questionable.

DEVELOPMENT OF THE SITUATION

Hot spots

In early-October 1997, fires were burning in three provinces in Sumatra, two provinces in Java, three provinces in Kalimantan, one province in Sulawesi and Irian Jaya. At that time, the Ministry of Environment and the Ministry of Forestry have estimated 96,693.34 hectares of forest to have burned, consisting of: 10,552.30 ha of protected forest; 70,259.20 ha of production forest; 3,896 ha of natural conservation forest; 1,724 ha of recreational forest; 10,222.09 ha of national park forest; 5 ha of provincial recreational forest; and 34.75 ha of other forest. The financial loss from Timber Plantation Estates is estimated to be equivalent to Rp. 45.7 billion.

In the beginning of October 1997, NOAA satellite readings indicated that 45.95% of the hot spots were located in agricultural and plantation areas, 24.27% in bush and peat soil areas, 15.49% in productive forests, 4.58% in protected areas, 8.51% in timber estate areas and 1.20% in transmigration sites. Smoke prevailed over the southern part of Sumatra; however, as the wind was blowing from east to west the smoke was heading towards the Indian Ocean. Smoke also accumulated in Southern and Central Kalimantan, and was moving towards West Kalimantan and the South China Sea.

The Ministry of Environment and the Ministry of Forestry have reported that efforts to extinguish the land, bush and forest fires in many parts of Indonesia were beginning to show results; the number of hot spots consequently dropped and visibility improved at a number of airports. However, new hot spots continued to be detected in West Java, South Sulawesi and East Java and there is some ambiguity about the number of hot spots in Kalimantan. This information was obtained from the satellite images of Indonesia's National Institute of Aeronautics and Space (LAPAN), field staff reports from the sites of the forest fires and data from the American National Oceanic and Atmospheric Administration (NOAA).

In mid-October 1997, data from the Environmental Impact Management Agency (BAPEDAL) indicated that the number of hot spots, or fire locations, increased in various regions of Sumatra, Kalimantan, Sulawesi and Java. Satellite images indicated that the number of hot spots in Kalimantan, Sumatra, Sulawesi and Java were 35, 23, 2 and 2 respectively. BAPEDAL projected that the increase in the number of hot spots may have been caused by the absence of rain on most of the islands.

Visibility was reduced on the island of Sumatra and the haze forced a number of airports to close down. The Centre for International Forestry Research (CIFOR) reported that there was continued problem with aboveground growth fires in the Jambi and Riau areas of Sumatra and peat fires in Central Kalimantan. Reports from Malaysia and Singapore also indicated that the haze has returned to these areas after a week of clearer skies and lighter showers.

According to information detected by Satellite NOAA 14, on 16 October 1997, smoke ranging from medium thick to thick was covering parts of Central Kalimantan, East Kalimantan, Central and South Sumatra as well as parts of North Sumatra. The total number of cities covered by haze rose from 22 to 41, with at least 4 airports shut because of poor visibility.

In the second part of October 1997, the Environmental Impact Management Agency (BAPEDAL) reported that there were 18 hot spots in Kalimantan. Visibility in many areas remained low (less than 2 kilometres) and the airports of Riau, Pekanbaru, Padang and Kota Jambi were closed. Visibility improved in both Banjarmasin and Balikpapan, and was estimated between at 5 and 7 kilometres. The airports in Samarinda and Palangkaraya remained closed with visibility less than 500 meters. There was one fire reportedly burning in the region of Kediri, East Java.

By October 28 1997, BAPEDAL reported a total of 30 hot spots throughout the archipelago. Based on NOAA 14 Satellite data, thick to moderately thick smoke continued to cover South Kalimantan, Central Kalimantan, West Kalimantan and a large part of Sumatra. Four airports were closed in Jambi, Palembang, Padang and Palangkaraya. In Sumatra, visibility was lowest in Jambi (0 km) and Rengat (0 km) and highest in Pangkal Pinang (8 km). In Kalimantan visibility was lowest in Palangkaraya (500 m) and highest in Samarinda (7 km) whereas in Irian Jaya visibility was lowest in Timika (100 m) and Nabire (100 m) and highest in Sentani (8 km).

On 5 November 1997, LAPAN detected 13 hot spots in Sumatra and 35 hot spots in other areas (Kalimantan, Sulawesi, and Nusa Tenggara Timur). Thick to medium-thick haze prevailed over most of Sumatra (with the exception of Aceh province) and parts of Kalimantan (Central, South and West Kalimantan). Eight airports were closed in Jambi, Pekanbaru, Padang, Palembang, Lampung, Samarinda, Palangkaraya and Bengkulu.

Fewer forest fires were detected in early-November 1997, with a total of 7 hot spots reported. However, thick to medium-thick smoke continued to engulf a large part of Sumatra including the provinces of Riau, Jambi, South Sumatra, Lampung and Bengkulu. In Kalimantan, thick to medium-thick smoke continued to prevail in Central, South and West Kalimantan. Parts of Irian Jaya were covered with a thick haze, reducing visibility at different times to less than 100 meters.

Satellite pictures showed the pall of smoke from Sumatra drifting out into the Indian Ocean as the winds were blowing from east to west, keeping the unhealthy pollution away from neighbouring Singapore and Malaysia. The Department of Environment in Malaysia reported that the Air Pollutant Index readings in most regions were below 50, indicating that most of the country had been enjoying good quality air for the first time in 3 months.

PRESENT SITUATION

The number of forest fires detected by satellite, in mid-November 1997, remained low, with only four hot spots reported. Much of the smoke previously reported in Sumatra appears to have cleared with only parts of Kalimantan (Central and South) continuing to report the presence of a medium-thick haze. Visibility has improved throughout the archipelago and most airports remained open.

The worst smog in Kalimantan has been coming from an extensive fire in a one million hectare area of peat being drained by the government for a massive rice planting project. The peat was emitting noxious carbon fumes which have triggered health alerts throughout the region.

Peat fires are considered the most dangerous. Peat has accumulated in lowland areas for 7,000 or more years and may be up to 20 feet deep. When undisturbed, it serves to store rain during the monsoon season, and slowly releases the moisture back into the air during drier times. When heavy rains occur, the peat prevents flooding by acting like a sponge. When the peat is exposed, it quickly dries out. Once dry, it ignites easily. Once burning, sometimes the fire goes deeply into the earth and then cannot be extinguished, even by heavy rain. They may smoulder underground indefinitely.

The action of burning forests (or even clearing them) may have local, regional, and global effects. Forests act to hold carbon and, when the forest is destroyed, the result is more carbon dioxide and greenhouse gases in the atmosphere. Removing forests heats up the local area somewhat. In the case of huge releases of carbon by burning peat, the regional and global climates may be affected.

It is possible that, when the monsoon comes, it will cause flooding or acid rain. The monsoon may possibly be delayed because of El Niño.

Impact on wildlife, forests and agriculture

According to WCMC, the fires in Indonesia have been threatening at least 19 protected areas, all internationally important, including a World Heritage site (Ujung Kulon in Java), Ramsar Wetland (Berbak in Sumatra) and Biosphere Reserve (Tanjung Puting in Kalimantan). These areas are protected partly because they hold biodiversity riches. The fauna of Indonesia is considered at particular risk as the country is home to more than 100 threatened animal species including the highest number of threatened mammals and the second highest number of threatened birds of any country in the world.

The region is also notable for the wide variety of its plant life and 500 tree species were considered under threat of extinction even before the current fire tragedy. Unique forest ecosystems such as heath forest and peat-swamp forest are particularly vulnerable to fire, which destroys their fragile soils.

According to forestry officials, more than 165,000 hectares (407,000 acres) of Indonesia's national forests have been destroyed by the fires.

The Coordinating Minister for People's Welfare and Chair of BAKORNAS PB, has reported that the fires have damaged some 74,000 acres of land and ignited underground peat and coal deposits that are particularly difficult to extinguish.

Reports also indicate that besides the substantial loss of flora and fauna, the forest fires could potentially release up to one billion tonnes of carbon dioxide if they continue for the next 6 months, and destroy more than one million hectares of forest.

The amount of carbon these extensive peat fires can throw up into the atmosphere is enormous, exceeding that of what Europe emits in a year. The emissions may also impact global warming in a positive feedback loop - they will also make the forest burn more. When forests and peat marshes are normal, they are a good carbon "sink," i.e., they keep a lot of carbon from being in the atmosphere, helping to prevent global warming. The burning puts more carbon dioxide and other greenhouse gases in the air, putting more pressure on climate change. Climate change can lead to still stronger weather phenomena, including El Niños.

The State Minister for the Environment informed reporters in Denpasar on 7 November 1997 that it will take a long time to overcome the damage caused by this year's forest fires and drought. According to the Minister, the forests may be restored as absorbers of carbon dioxide within a 3 to 4 year period; however, complete restoration could take as long as 500 years.

According to the Centre for Agriculture Policy Studies, some 450,000 hectares of rice fields have already been affected by the drought. Production statistics tracking the El Niño phenomenon over the past two decades indicate that harvested rice areas could fall by at least 4%, while coffee production could be reduced by as much as 25%.

It should be noted, however, that there is no comprehensive information on the impact of the recent Indonesian fires. Hence, an independent assessment of the situation, and recommendations on appropriate short, medium and longer-term response measures, are clearly needed.

Impact on Tourism Industry

According to the Indonesian Minister of Tourism, Post and Telecommunications, about 5.19 million tourists will visit Indonesia this year, far below the initial projection of 5.3 to 5.7 million tourists. The forest fires in Kalimantan and Sumatra are being blamed for the drop in tourism as many travellers and tour groups from European and Asian nations have cancelled their trips to the country.

The growth rate would need to reach at least 5% to meet the target of 5.3 million, however, data from the first 9 months of 1997 indicate that arrivals are only up 3.7 percent. The decrease has also affected Bali, the country's most popular destination, where tourist arrivals fell 10% in October, the largest decrease ever experienced by the island.

In spite of the drop this year, the Pacific Asia Travel Association (PATA) predicts that Indonesia will remain one of the 10 key tourist markets in the Asia-Pacific region in 1998.

Meteorological forecast

Indonesia continues to show very strong signals of the freak El Niño weather pattern, which is forecast to continue suppressing delayed Monsoon rains for the immediate future. Recent sporadic rainfall in parts of Indonesia was only intermittent. According to WMO, scientific models show no evidence of a persistent and coherent rainfall in Indonesia in the immediate future.

The National Meteorology and Geophysics Agency (BMG) has warned Indonesians that significant rains may not come until December - or even later. Although sporadic rain fell in late October, the Agency said that dry winds from Australia are still forcing back seasonal clouds from the South China Sea and Indian Ocean and delaying the onset of the monsoon rains.

In his opening remarks on Monday, 10 November 1997 at the International Conference on Science and Technology for the Assessment of Global Environmental Change, President Soeharto said that besides the drought, the people of Indonesia must prepare for floods in the coming rainy season. Flooding has already become a problem in certain areas of the archipelago. For example, more than one thousand hectares of rice fields were flooded on 7 November 1997 in the province of Northern Aceh.

The Centre for the Study of Natural Disaster at Gadjah Mada University reports that the peak of the rainy season for the provinces of Central Java, Yogyakarta and East Java will be between the months of January and February 1998. Reports indicate that heavy flooding could be expected at this time, as the soil will already be saturated by the sporadic November and December rains.

CONCLUSIONS

- The 1997 forest fires in Indonesia have turned out to be an environmental emergency of exceptional proportions. It is a man-made disaster, aggravated by climatic factors.
- The disaster has brought significant damage to the environment, and it is felt that it will have substantial long-term effects on the social, economic, health and ecological sectors.
- Fires have affected a number of special protected areas and national parks, such as Tanjung Puting in Central Kalimantan, and Way Kambas, Lampung.
- Some human settlements have been damaged by fires.

- Infrastructure, including transportation networks, are not affected.
- Risks of further fires (including peat fires) are very great.
- This emergency has an important international dimension in relation to severe transboundary air pollution, and the large-scale destruction of a unique biodiversity which represents a world heritage.
- The national authorities became clearly overwhelmed with this disaster. While welcoming international relief efforts, the government never formally appealed for international assistance.
- The lack of special fire fighting structures, equipment and expertise was evident. In this connection, international assistance became especially important.
- DHA has played a significant role in supporting the Indonesian Government in mobilizing international help. As a result, many countries and organizations have provided different types of help, both in cash and in kind, to Indonesia. Among them are Australia, Canada, China, Denmark, Finland, France, Germany, Japan, Republic of Korea, Malaysia, New Zealand, Norway, Russian Federation, Singapore, Sweden, Switzerland, Thailand, United Kingdom and USA. Australia and the United States have provided packages of aerial water bombing assistance.
- A number of UN agencies and other organizations are also involved in assisting Indonesia, in particular, UNDP, UNEP, UNICEF, UNESCO, WHO, the ICRC, the International Federation of the Red Cross and Red Crescent Societies, OPEC, and ASEAN.
- Fire fighting operations were carried out under extremely difficult conditions. Many hot spots in mountainous areas are difficult, if not impossible, to reach. Peat fires may burn for months, and special equipment is needed to put them out.
- Water bombing is very expensive and its effectiveness in these circumstances questionable.
- Fire fighting operations brought certain results, and it is now felt that the peak of this disaster is over. However, the current situation can not be considered as stable. If drought continues, an aggravation of the situation may be easily expected.
- If the general national policy on the use of fire for land clearing, slash-and-burn techniques, etc. is not implemented more forcefully, a repetition of the present emergency may take place next year.

RECOMMENDATIONS

- Appropriate preventive measures, including awareness building, should be taken at the national level as absolute priority.
- The only true solution of the problem should be seen in a different approach whereby the use of fire techniques in land clearing is effectively prevented.
- The national authorities should considerably improve their preparedness for combatting possible future fires.
- It is strongly recommended to carry out a comprehensive assessment of environmental and other damage caused by this disaster.
- Special fire fighting equipment (for both ground and peat fires) is clearly needed. Potential donors could be approached with a request to provide such equipment. It should be underlined that this equipment should obligatorily be accompanied by professional training.
- It is recommended to review the activities of the University of Palangkaraya in fighting fires, with a view to using this experience (also in awareness raising), if appropriate.
- It is recommended to approach potential donors with regard to a possible construction of a water retaining dam in Tanjung Puting.
- A National Contingency Plan for Environmental Emergencies is clearly needed. The national authorities may wish to use Guidelines for the preparation of a model Contingency Plan, that had been elaborated by the Joint UNEP/DHA Environment Unit, Relief Coordination Branch, DHA and endorsed by an international Advisory Group on Environmental Emergencies.
- Early warning capacities, at both international and national levels, should be further developed and utilized.
- Appropriate emergency notification procedures should be introduced by the Indonesian authorities. In this connection, the national authorities may wish to use a special Notification/Request form elaborated and tested by the Joint UNEP/DHA Environment Unit, Relief Coordination Branch, DHA.
- The international community should improve its preparedness for possible future fires in Indonesia and other countries. A strong need for special peat fire fighting equipment should be taken into account. Cost-effectiveness of water bombing in specific Indonesian conditions should be critically reviewed.
- DHA should continue monitoring the situation, thereby staying in close contact with relevant national authorities.
- It is recommended that DHA should review the experience learnt from the use of the UNDAC mechanism in this type of emergencies, and draw lessons for future improvement/adaptation of the UNDAC system and methodology, if required.

ACKNOWLEDGEMENTS

The members of the UNDAC Team would like to take this opportunity to express their gratitude to all those officials of the Government of Indonesia, central, provincial and local authorities, and to the United Nations Resident Coordinator in Indonesia and his staff, who extended important support, took the time to provide extensive background information and enabled visits to the affected areas.

The UNDAC Team would also like to thank the diplomatic community of the donor countries represented in Indonesia, UN agencies, international organizations and NGOs for their cooperation and important assistance.

ANNEXES

- I. Maps
- II. Drought in Irian Jaya
- III. List of officials and contacts



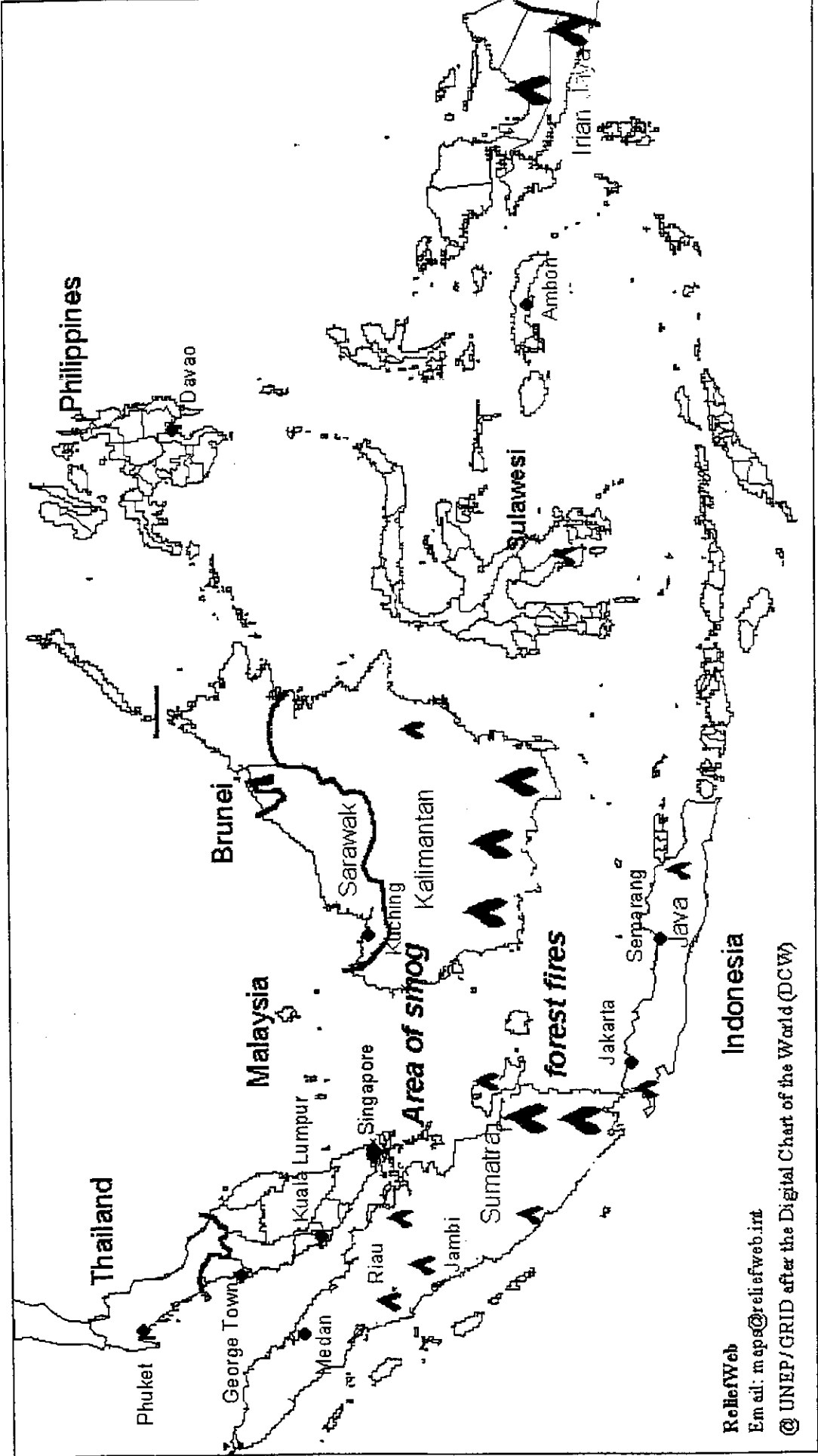
Map provided by ReliefWeb <<http://www.reliefweb.int/>>

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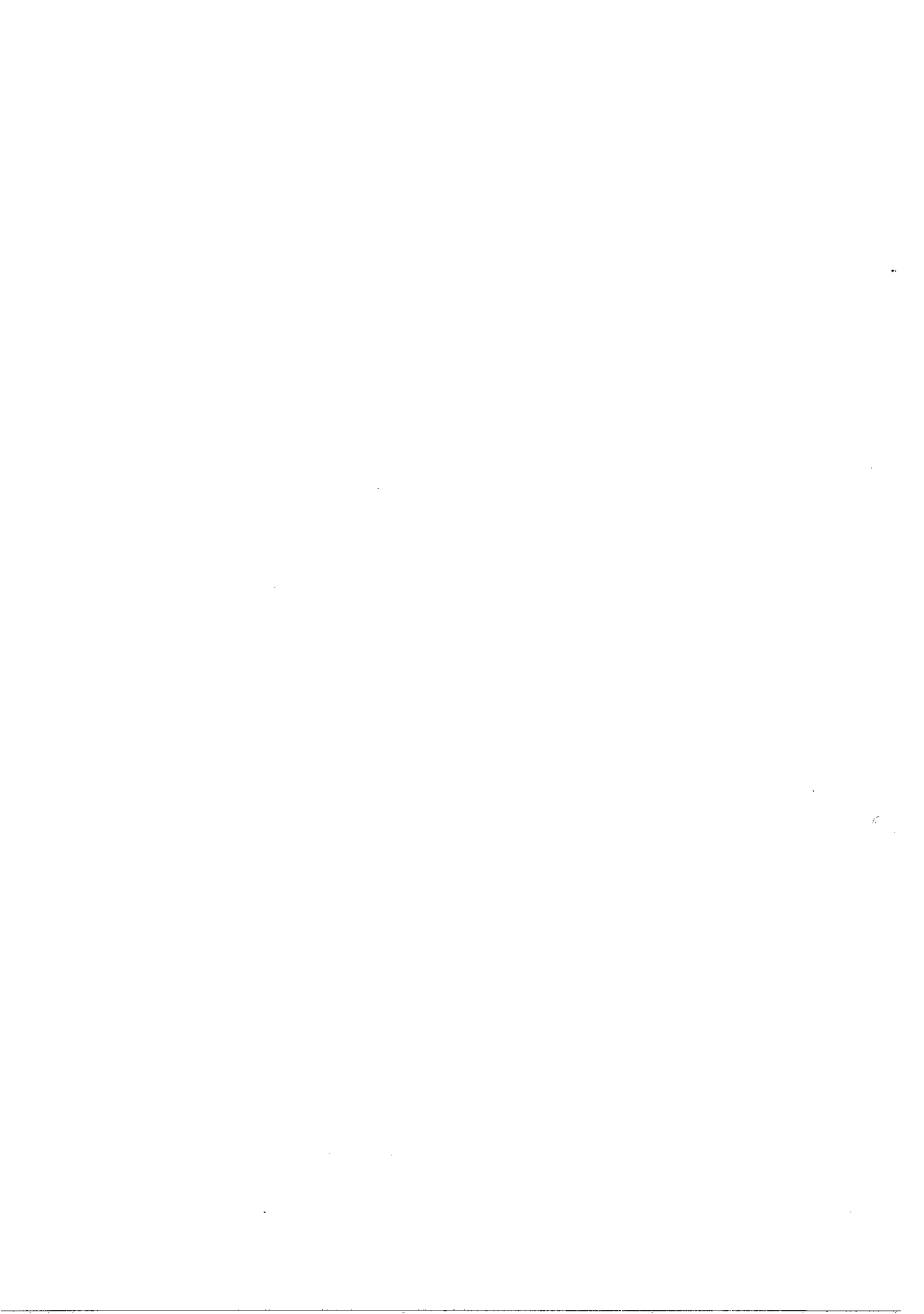
Indonesia forest fires and smog

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DROUGHT IN IRIAN JAYA

Large areas of central Irian Jaya continue to be severely affected by a drought that is creating major food shortages. The annual dry season, that usually spans the months of June and July, began in May this year and has continued almost uninterrupted to date. Even if the rains were to begin immediately, current food stocks would be depleted well before the next harvest.

The total population of Irian Jaya is 1.6 million (according to a 1990 population census). Although little information is available on the situation in the other districts, the impact of the drought is reported to be most acute in the remote interior district of Jayawijaya which has a total population of 450,000. The population is almost wholly dependent on the sweet potato crop. As a result of the severe drought, and crops being destroyed by frost in villages above 6,000 feet, some 90,000 people in Jayawijaya district alone are reported to now face a major famine. Alternative sources of food from the forest have been destroyed by the fires. More than 400 people have already died, either directly from starvation or related illness.

As a result of the drought many people have to walk long distances for water. As water sources have become polluted, there has been an increase in water-related disease. The drought has improved the habitat for mosquitoes and malaria has become commonplace in villages up to 6,000 feet.

With the decrease in infant mortality over the last two decades, the population has been increasing and malnutrition has become endemic. The present crisis is affecting a society that already has little or no reserves.

Geographically, Jayawijaya is a landlocked district comprising a mountainous area at altitudes between 1,500 and 4,000 m above sea level. The majority of villages are only accessible by the smallest of light aircraft (payload 400 kgs) and smoke from the forest fires has restricted flying. Some of the villages can only be reached after a walk of more than one week. The district capital Wamena has no road access to the coast and the 450,000 residents of the district are wholly dependent on an air bridge with Jayapura.

National Response

The Government of Indonesia's (GOI) response to the drought is coordinated by the National Coordinating Board for Disaster Management (BAKORNAS PB). The Ministry of Social Affairs (DEPSOS) is the lead ministry in providing disaster response. The GOI is providing rice and fuel for transport and has mobilized the army to transport relief goods. The Head of Wamena District has activated the District Disaster Management Task Force (SATLAK PB), involving the church and non-governmental organizations. A drought response plan has been prepared to cover a period of 8 months from October 1997 to May 1998. SATLAK receives and channels assistance to affected areas and dispatches medical and agricultural teams to carry out surveys and monitor the situation.

Assessment of needs

A first mission to Irian Jaya, led by the United Nations Disaster Assessment and Coordination (UNDAC) team, took place on 3-8 October 1997 to investigate the impact of the drought and the forest fires. It became clear that the main problem in Irian Jaya was the impending famine. The fires were one of several factors that were contributing to the famine and the situation was rapidly deteriorating. A second mission was undertaken from 28 October to 2 November 1997 with participation of BAKORNAS PB, UNDAC, UNDP and an Eastern Indonesia Development Project Consultant.

The mission investigated current problems regarding food security, water and health and developed a strategy to address immediate emergency relief needs combined with steps to alleviate the famine and break the cycle of vulnerability in the medium and longer term.

a. Food Security

There is a consensus that an additional quantity of a balanced diet of 5,000 MT of food will be required over the next 8-12 months for what is estimated to be the most affected population (90,000). Planting will not be possible until the rains come, as the drought has prevented the land from being prepared. The rains may still be 2-3 months away, and the first crops will not be ready for another 6 months after that. The GOI appears to have adequate quantities of rice but, to provide a balanced diet, beans and cooking oil will be required also.

Distribution and storage are the main constraints. Over 30 MT a day need to be delivered by air, not only to Wamena, but also to the isolated villages. The task and cost of achieving this should not be understated, especially as at present there are only 15 light aircraft/helicopters available and smoke from the forest fires is restricting flying. Although there are storage facilities of 7,000 MT in Jayapura and two stores in Wamena (1,200 and 3,600 MT), there are no storage facilities in the mountains where 4 small warehouses have to be erected and 4 school/church buildings need to be refurbished to serve as warehouses/secondary distribution centres.

Rice is not the traditional food, and the people do not have cooking pots. These will have to be supplied. High energy famine biscuits would be easier to transport by air and should make up part of the diet.

b. Water

The present water problems have resulted from local water supplies drying up and the concentration of people at, and pollution of, alternative sources. The incidence of diarrhoea and scabies has increased over the last three months. The rains will bring a possible deterioration, as pollution is washed into water courses, followed by a rapid improvement. The present situation would be much improved by the provision of water containers/jerrycans (10 litres) to fetch water from distant sources and of cooking pots to boil water. This latter activity should be encouraged by schools and missionaries, but is likely to have only a limited impact.

c. Health

The prolonged dry season has led to an increase in both vivax and falciparum malaria. They are reportedly being treated effectively with chloroquine. Diarrhoea, scabies and respiratory tract infections are also common in the most vulnerable groups already weakened by an inadequate diet. Government health clinics, even in the remote mountain villages appear to have reasonable stocks of suitable medicine. Scabies (poor hygiene) and diarrhoea (contaminated water) would be much improved by the provision of household water containers and cooking pots for boiling water. An adequate diet will be more important than the provision of medical teams and supplies, also given the constraints on transport.

Immediate emergency relief needs

A number of actors have already started to provide relief assistance in order to supplement the GOI's efforts (see paras 16 to 24 below). Based on the recommendations of the UNDAC/UNDP/BAKORNAS PB assessment mission, and taking into account assistance already provided, the following immediate needs have been identified and are herewith presented to the international community for funding.

a. Food: It is assumed that the Government will continue supplying the necessary food and will deliver it with military aircraft to Wamena. In order to supplement the diet and support supplementary feeding programmes, donors are encouraged to provide in-kind contributions of high-protein biscuits.

b. Transport: Transport of food, medicines, other relief supplies and personnel from Wamena to the secondary distribution points and onward to the villages is coordinated by Mission Aviation Fellowship (MAF). Additional helicopters may be made available by the military to assist with the distribution. Transport costs are extremely high (30 MT/day at USD 500/MT) and some USD 3,750,000 would be required for 250 days. Donor contributions are sought to cover part of the transport costs and delivery of relief supplies.

Initial coverage of light aviation transport cost and fuel USD 940,000

c. Relief supplies: Purchase of 10-litre plastic water containers/jerrycans, large cooking pots (2 per household) and of 24 supplementary feeding kits (equipment) for health centres and churches (3 per distribution centre for 200 women and children).

12,000 jerrycans (at USD 2) USD 24,000

12,000 cooking pots (at USD 5) USD 60,000

24 supplementary feeding kits (at USD 500) USD 12,000

d. Warehouses: While storage in Wamena is available, construction of 4 secondary stores and refurbishment of a further 4 stores is required for distribution from Wamena to 8 secondary food distribution centres (Holowan, Borme, Nalea, Apalapsili, Saradala, Kuyawage, Najab and Bomela) by larger light aircraft carrying 32 MT a day (twin Otter/Cessna caravan). Further delivery will take place by the smallest light aircraft and final distribution by church organizations.

Construction of 4 new small warehouses at Borme, Apalapsili, Saradala, Najab
(at USD 5,000 each) USD 20,000

Cash for upgrading 4 existing facilities (at USD 2,500 each) USD 10,000

e. Radio communications: Radio communications are required to link secondary distribution centres to Wamena.

10 HF single sideband radios - 10 units (at USD 1,500 each) USD 15,000

f. Health inputs: It is essential that baseline surveillance of the nutritional and health status of the population and vulnerable groups is continued and expanded in order to monitor the famine, indicate the quantity of food aid required, and provide medical assistance where needed. A new project for this purpose will be implemented by the International Committee of the Red Cross (ICRC) and the Indonesian Red Cross (PMI).

g. Agricultural implements: Once the rains come, seedlings will be required. Most of the present sweet potato crop is now dying and this may affect the availability of seedlings. Distribution of spades for agricultural work will increase the area planted.

10,000 agricultural spades (handles can be fitted locally) at USD 5 USD 50,000
Support to Wamena District seed bulking programme USD 25,000

h. Management support: It is recommended to deploy a Relief Coordinator to be based in Wamena to assist the GOI with logistics and distribution and eight United Nations Volunteers to be based at the 8 secondary distribution centres

Relief Coordinator (6 months) USD 30,000
8 UNVs (6 months) at USD 15,000 per UNV USD 120,000

Total USD 1,306,000

UNDP Jakarta activities

The UN Resident Coordinator in Jakarta, in consultation with the GOI, has established a coordination group to monitor the situation in Irian Jaya and facilitate the coordination of the international response with national relief efforts.

A meeting, under the chairmanship of the UN Resident Coordinator and with participation of the national authorities, the UN-Disaster Management Team (UN-DMT), diplomatic missions, ICRC, PMI and non-governmental organizations, took place on Tuesday, 18 November 1997.

Based on the recommendations of the UNDAC/UNDP/BAKORNAS PB mission, UNDP is planning a project to complement immediate emergency relief activities with medium and longer-term action in order to alleviate the impact of the famine and break the cycle of vulnerability in Irian Jaya. The project document is under preparation and will soon be submitted to the donor community.

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