



UNITED NATIONS ECONOMIC AND SOCIAL COMMISSION

FOR ASIA AND THE PACIFIC

AND

WORLD METEOROLOGICAL ORGANIZATION

REPORT OF THE TYPHOON COMMITTEE

ON ITS SEVENTH SESSION

**Manila, Philippines
8 - 14 October 1974**

ECONOMIC COMMISSION FOR ASIA AND THE FAR EAST
AND
WORLD METEOROLOGICAL ORGANIZATION

Typhoon Committee
Seventh session
8-14 October 1974
Manila

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26 July 1974

ORIGINAL : ENGLISH

**ECONOMIC COMMISSION FOR ASIA AND THE FAR EAST
AND
WORLD METEOROLOGICAL ORGANIZATION**

**Typhoon Committee
Seventh session
8-14 October 1974
Manila, Philippines**

ANNOTATED PROVISIONAL AGENDA

1. Opening of the session

The seventh session of the Typhoon Committee will be held at
..... (to be completed later), Manila from 8 to 14 October
1974.

2. Election of the Chairman and Vice-Chairman

Rule 6 of the rules of procedure of the Typhoon Committee states:

"The Committee shall, at its first meeting of the year, elect from its
representatives a chairman and vice-chairman who shall hold office until
their successors are elected. They shall be eligible for re-election".

3. Adoption of the agenda

The provisional agenda has been prepared by ECAFE and WMO, in
close consultation with the Typhoon Committee secretariat. Representatives
of participating Governments may propose additions to or changes in the
agenda if they so desire.

4. The Committee's activities during 1974

A tentative action programme was endorsed by the Committee at its
first session in December 1968. The activities of the Committee and its
secretariat since then have been reviewed annually at subsequent sessions.
A similar review of the activities undertaken in 1974 will be made under
this item on the basis of a report prepared by the secretariat (WRD/TC.7/4).

/The activities

The activities of the Committee will be reviewed in relation to the four components of its programme, namely: (1) meteorological component; (2) hydrological component; (3) community preparedness and disaster prevention; and (4) training and research. The Committee will thus be in a position to assess the progress made since its sixth session. Representatives may wish to comment on the activities undertaken in 1974, offer suggestions for accelerating those not completed and draw attention to those items calling for priority action. They may also wish to report on the establishment in their countries in 1974 of any relevant facilities not covered by the report.

5. UNDP technical support to the regional typhoon programme

Shortly after the sixth session of the Committee the inter-country project to provide technical support to the regional typhoon programme was approved by UNDP. Member countries subsequently indicated their acceptance of the project. Covering the three years 1974-1976 the UNDP contribution amounts to \$US662,000 in the form of expert services, equipment and fellowships. Government contributions will total the equivalent of \$US435,760. The progress made in the implementation of the project will be reported to the seventh session under this item.

One of the conditions of the project which was accepted by the Governments concerned is the provision of professional counterpart personnel. Apart from operating staff for pilot flood forecasting systems and for radar stations within member countries, the Governments are committed to the provision of professional counterpart staff for the Typhoon Committee secretariat (TCS) at Manila. Negotiations with the Governments have not, at the time of preparing this annotated agenda, resulted in any confirmed offers for the assignment of staff as institutional support.

In the light of this situation, the Committee will need to discuss the ways in which it can meet this obligation (WRD/TC.7/5). Consideration should also be given to arrangements for the continued staffing of TCS after the end of the project. Some proposals will be made in a document submitted to the session (WRD/TC.7/12).

6. Second Joint LRCS/WMO/ECAFE Mission on Community Preparedness and Disaster Prevention

At its sixth session the Committee decided to pursue its expanded activities in community preparedness and disaster prevention. It accordingly called upon LRCS, WMO and ECAFE to organize a second joint mission in 1974 to visit Japan and the Philippines, drawing up a detailed programme in close consultation with the countries concerned. The mission took place in May/June 1974 and the report on its findings will be submitted for consideration by the Committee in document WRD/TC.7/6. Representatives of the two countries visited will be invited to make statements at the seventh session on the action their countries have taken to follow up the recommendations agreed upon during the mission.

It will be recalled that the sixth session expressed the view that such visits should continue until all member countries had been covered. The report of the Second Joint Mission contains a recommendation that the round of visits made in 1973 and 1974 be completed in 1975 by visits to the remaining member countries. The Committee, in its discussion of this item, will no doubt wish to consider this proposal and to decide upon the programme of further activities in community preparedness and disaster prevention.

7. Co-ordination with the WMO Tropical Cyclone Project and other regional programmes

The developments in the WMO Tropical Cyclone Project and its associated regional programmes since the sixth session will be reported to the Committee under this item. A document prepared for the seventh session (WRD/TC.7/7) gives information on the activities under the Project itself, and on the Technical Conference on Typhoon Modification which is to take place in Manila immediately after the seventh session. Reference is also made to the Joint LRCS/WMO Mission on Community Preparedness and Disaster Prevention to three countries in the southwest Indian Ocean area in mid-1974, as well as to the second session of the RA I Tropical Cyclone Committee scheduled to be held in Reunion (France) in October 1974. The plans for the WMO/ECAFE Panel on Tropical Cyclones to hold its second session in December 1974 are also discussed and information is provided

/on the

on the outcome of the visit of an LRCS consultant to four countries in the Bay of Bengal area in March/April 1974 to survey the present disaster prevention arrangements.

WMO has submitted to UNEP a proposal for a project on disaster risk evaluation with respect to the meteorological, storm surge and hydrological (flood) aspects of tropical cyclones. Information on this project will be presented and the possibility of the participation of the member countries of the Typhoon Committee in the second phase of this project will be discussed.

The document is mainly intended to provide information on these activities in other tropical cyclone areas. However, because of their close relationship to the programme being carried out by the Typhoon Committee, it is felt that the Committee may wish to review the effectiveness of the present arrangements for the co-ordination of such activities and the exchange of information thereon.

8. Programme for 1975

The action programme adopted at the first session continues to guide the main lines of the Committee's activities. In addition, the UNDP project contains a planned work programme for the years 1974-1976. It has become the practice in recent years for the Committee, at each session, to make a selection of specific items of work on which it wishes to concentrate during the following year. Since the selection of priority items depends to a large extent on current developments in the execution of its programme, it is thought that the Committee will wish to continue this practice. To assist the Committee, a tentative programme of work for 1975 is submitted for consideration in document WRD/TC.7/8.

9. Dates and place of the eighth session

Rule 1 of the Committee's rules of procedure states: "The Committee shall hold at least one session annually. The venues and dates of its sessions shall be decided by the Committee".

FOR PARTICIPANTS ONLY

WRD/TC.7/3
21 August 1974

ORIGINAL : ENGLISH

ECONOMIC COMMISSION FOR ASIA AND THE FAR EAST AND WORLD METEOROLOGICAL ORGANIZATION

Typhoon Committee
Seventh session
8-14 October 1974
Manila

NOTES FOR THE INFORMATION OF PARTICIPANTS

Schedule of meetings

1. The seventh session of the Typhoon Committee will be held at Manila, Philippines, from 8 to 14 October 1974. It will open at 1000 hours on Tuesday, 8 October 1974, in the Ambassador Hotel, Manila, where all meetings will be held.
2. Subject to confirmation by the Committee, the daily schedule, except for the opening meeting, will be as follows:

Monday through Friday	0930 to 1230 hours 1430 to 1700 hours
Saturday	0930 to 1300 hours

Registration

3. A registration desk will be located outside the committee room. Participants are requested to be in the lobby outside the committee room between 0900 and 0945 hours on the opening day, in order to allow time for registration.

Badges

4. On obtaining their identification badges after registration, participants are requested to wear them at all meetings and official functions.

Reception on arrival

5. Provided that advance notice is given, participants will be met on arrival at Manila International Airport by officials of the Philippine Government,

Government, who will assist them in going through the customs and immigration formalities. Arrangements will also be made for transportation to their respective hotels.

6. To facilitate reservation of hotel accommodation and to arrange for reception on arrival, participants are requested to furnish the following particulars at least seven days in advance to:

Mr. FERNANDO TIENZO
Liaison Officer
PAGASA, 1424 Quezon Blvd. Ext., Quezon City

- (a) Name of participant
- (b) Country/organization represented
- (c) Airline by which travelling
- (d) Flight number
- (e) Expected date and time of arrival in Manila
- (f) Whether hotel accommodation is required and, if so, at which hotel and from what date
- (g) Names of family members accompanying participant
- (h) Whether entry visa is required on arrival (please see also paragraphs 11-13)
- (i) Two passport size photographs for the use of the reception committee

7. The above information is requested in addition to the official notification by Governments and organizations to the Executive Secretary of ECAFE, Bangkok, of the composition of delegations.

8. Participants are advised to mark their baggage clearly for the purpose of easy identification, so as to avoid any inconvenience or possible delay at the airport on arrival. It is suggested that, in addition to the participants' names, the baggage labels should include the words "TYPHOON COMMITTEE, MANILA" in block letters.

Hotel accommodation

9. Hotel accommodation will be reserved upon request at any of the hotels listed in the attached information sheet. The rates quoted are for air-conditioned rooms. Charges for meals are additional.

10. Participants wishing the secretariat to reserve rooms for them at these hotels are requested to fill in the attached form ("Attendance information") and send it as soon as possible to:

Mr. FERNANDO TIENZO
Liaison Officer
PAGASA

Immigration requirements

11. Participants are requested to obtain, before their departure, entry visas for the Philippines from the Philippine diplomatic or consular missions in their countries. Where there is no such mission, participants are advised to make a brief stopover at a convenient place to obtain the required visas. These missions have been advised by the Government of the Republic of the Philippines to issue entry visas expeditiously on application. Participants are, however, advised that wherever possible their applications for entry visas should be submitted through their respective Governments or organizations, or else accompanied by a certificate of their participation in the meeting to facilitate the verification of their identity and the speedy issue of entry visas. Participants are also requested to obtain, where necessary, transit visas for places en route to Manila before commencing their journey.

12. Participants who come from countries where the Republic of the Philippines has no consular establishment and who find difficulty in applying for their visas while en route are advised to cable at least 10 days in advance so that a request can be made to the officials concerned for a waiver of visa requirements before their arrival and the Bureau of Immigration informed of the arrangements agreed upon. Such requests should specify the names of the participants, nationalities, the kinds of passport (ordinary, special, diplomatic) and the numbers of their passports or travel documents.

13. The names of participants coming from countries with which the Republic of the Philippines has no diplomatic relations, together with the locations of consular establishments where they intend to apply for their visas en route, should also be furnished to:

Mr. FERNANDO TIENZO
Liaison Officer
PAGASA
1424 Quezon Blvd. Ext., Quezon City

as far in advance as possible so that he can request the Department of Foreign Affairs to authorize the consular establishment concerned to issue the visas.

/Health

Health requirements

14. Persons entering the Philippines are required to have a valid certificate of vaccination against smallpox and inoculation against cholera. They should check before departure whether they are passing through epidemic areas before arriving in Manila. In such cases other health certificates are needed. All international airlines should be consulted near the time of departure for information concerning temporary regulations which may then be in force regarding inoculations against yellow fever, etc.

Local transport

15. Transport will be provided for participants between the hotels for attending the meetings and for social functions.

Foreign exchange

16. Participants are advised to bring with them pound sterling or US dollar traveller's cheques, bank drafts or letters of credit which can be exchanged for Philippine currency at the prevailing bank rates. The exchange rates, which fluctuate from time to time, are approximately as follows:

\$US 1.00 = ₱6.60-6.70

£ 1.00 = ₱15.80-16.00

Weather

17. The climate of Manila during October is usually humid and warm with occasional showers. A daily mean temperature of about 27.8°C can be expected. The average daily maximum will be about 31.1°C and the average daily minimum 24.5°C. The mean monthly rainfall is 181.9 mm (7.2 inches).

Communications

18. Mail intended for participants should be addressed as follows:

Name of Participant
Typhoon Committee Session
Ambassador Hotel
Manila

Cable address: AMBASHOTEL

Working

Working languages

19. The working languages of the meeting will be English and French.

Documents

20. Some of the documents for the session will be supplied to participants in advance. Others will be distributed as they are issued during the session. In view of the limited number of copies available, it will be appreciated if participants bring with them the sets of documents supplied in advance.

HOTEL INFORMATION SHEET

	Savoy (Phil.)	Mabuhay Hotel	Ambassador ^{1/} Hotel	Enrico Hotel
Single room	\$19.00	\$15.00	\$14.00	\$16.00
Double room	\$27.00	\$23.00	\$18.00 18.00	\$20.00
Breakfast		\$ 2.00	\$ 2.00	
Lunch		\$ 3.25 4.25	\$ 3.00	\$ 3.50 4.50
Dinner		\$ 3.50 4.50	\$ 4.00	\$ 4.50
Swimming pool	Good	Good	Very Good	Good
Room service charge and taxes	25%	25%	10%	25%
Meal Services charge	10%	10%	10%	10%
Location	Pasay City facing Mla. Bay	Mabini St. Ermita	A. Mabini Ermita	L. Guinto Ermita

All rooms: Air conditioned, well furnished, fully carpeted, Class A standards.

^{1/} Venue of meeting.

NOTE: Two copies of this form
to be attached.

UNITED NATIONS
ECONOMIC COMMISSION FOR ASIA AND THE FAR EAST
AND
WORLD METEOROLOGICAL ORGANIZATION

SEVENTH SESSION OF THE TYPHOON COMMITTEE
8-14 October 1974
Manila, Philippines

Address replies to:

(1) Mr. C. Roy Smith
Chief
Division of Administration
ECAFE, Sala Santitham
Bangkok 2, Thailand

(2) Mr. FERNANDO TIENZO
Liaison Officer
PAGASA, 1424 Quezon Blvd.
Ext., Quezon City

Cable address:

(1) ECAFE BANGKOK

ATTENDANCE INFORMATION

(Please type or print)

Two copies of this form should be completed by or on behalf
of each participant who will attend the seventh session of the Typhoon
Committee and returned promptly to the above address.

1. NAME _____
(As it should appear in official listings)
2. TITLE OF PRESENT OFFICIAL POSITION _____
(In home country or official duty station)
3. PERMANENT MAILING ADDRESS _____

4. COUNTRY/ORGANIZATION REPRESENTED _____

5. WILL ATTEND THE COMMITTEE SESSION AS:

REPRESENTATIVE _____

ALTERNATE _____

ADVISER _____

OTHER _____

6. ACCOMPANIED BY FOLLOWING MEMBERS OF FAMILY

Name

Relationship

Age if under 18

<u>Name</u>	<u>Relationship</u>	<u>Age if under 18</u>
_____	_____	_____
_____	_____	_____

7. DATE OF ARRIVAL IN MANILA, CARRIER AND FLIGHT NUMBER:

8. PLEASE RESERVE LIVING ACCOMMODATION IN MANILA AS INDICATED BELOW:

(All rooms and suites will be assigned according to information furnished herewith and on a first-come first-served basis)

ROOMS: Single _____ Double _____

SUITES: _____

NAME OF HOTEL: _____

CHECK-IN DATE: _____

CHECK-OUT DATE: _____

Note: It is essential that any change in plans, i.e., arrival date, accommodation required, etc., be communicated to Mr. C. Roy Smith, Chief, Division of Administration, ECAFE and to Mr. Fernando Tienzo at the addresses shown above. Rooms not occupied in accordance with the latest advice will be held 24 hours at participant's expense and then released.

9. IF MAKING OWN LIVING ARRANGEMENTS IN MANILA, PLEASE INDICATE ADDRESS IN MANILA AND DATES OF ARRIVAL AND DEPARTURE:

(Date)

(Participant's signature)

FOR PARTICIPANTS ONLY

WRD/TC.7/4
6 September 1974

ORIGINAL : ENGLISH

ECONOMIC COMMISSION FOR ASIA AND THE FAR EAST
AND
WORLD METEOROLOGICAL ORGANIZATION

Typhoon Committee
Seventh session
8-14 October 1974
Manila

THE COMMITTEE'S ACTIVITIES DURING 1974

(Item 4 of the provisional agenda)

Preceded by a brief account of the sixth session

Note by the Typhoon Committee secretariat

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1. SIXTH SESSION OF THE TYPHOON COMMITTEE

1. The sixth session of the Typhoon Committee was held at Bangkok from 19 to 26 November 1973 and was attended by representatives of all seven member countries. Representatives of France, the Federal Republic of Germany, the Netherlands and the United States of America attended as observers. A representative of the United Nations Development Programme (UNDP) and observers from the International Civil Aviation Organization (ICAO), the International Telecommunication Union (ITU), the League of Red Cross Societies (LRCS) and the Committee for Co-ordination of Investigations of the Lower Mekong Basin were also present.

2. The representatives reviewed the activities of the Typhoon Committee and its secretariat during 1973 and took stock of the current state of implementation of the meteorological, telecommunication, hydrological and other facilities required for an efficient system for the mitigation of typhoon damage. The list of priorities drawn up at the fifth session for the implementation of observational and telecommunication facilities was reviewed by the Committee in the light of the progress made and a revised priority list was drawn up. A programme of work for 1974 was also agreed upon.

3. The draft request to UNDP for further technical support to the regional typhoon programme, which was revised in the light of the comments offered by UNDP Headquarters, was considered by the Committee. The revised project for the period 1974-1976 was accepted by the Committee in principle. The session urged the representatives of the member countries to take all possible steps to ensure approval of the project document by their respective Governments with the least possible delay.

4. The Committee reviewed the bilateral assistance received during 1973 and welcomed fresh offers of assistance in support of the typhoon programme. It noted with considerable satisfaction that the pilot flood forecasting system had been implemented in the Philippines with assistance from the Government of Japan. It also welcomed the news that the Government of Japan had approved a loan of \$1.5 million for the purchase of equipment needed for implementation of the pilot flood forecasting system in the Republic of Korea. The Committee renewed its expression of gratitude to the USSR for continuing

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its valuable aid by operation of Soviet research vessels in the typhoon area. The assistance provided by Australia and the Federal Republic of Germany in furnishing telecommunication equipment to Thailand was also noted with appreciation.

5. Another important topic discussed by the Committee was community preparedness and disaster prevention activities. The success of the Joint LRCS/WMO/ECAFE mission to Hong Kong, the Republic of Korea and Thailand in 1973 led the Committee to decide to continue such visits until all its member countries had been visited. It was agreed that a similar mission to Japan and the Philippines should be mounted in 1974.

6. The Committee was informed that the United States had planned to transfer its Stormfury project to the Pacific in 1976 and that prior concurrence of the countries situated in the typhoon area would be requested through diplomatic consultation on a bilateral basis. The representative of the Philippines also gave some information on the initial phase of the typhoon moderation programme undertaken by the Government of the Philippines.

II. ACTIVITIES DURING 1974

7. At its thirtieth session, held at Colombo, Sri Lanka, in March/April 1974, ECAFE examined the report of the Typhoon Committee on its sixth session. The Commission noted with satisfaction the substantial progress being made by the Committee in the implementation of its programmes to strengthen meteorological and hydrological services, in training, and in improving measures for better community preparedness and disaster prevention arrangements in the member countries. It also recorded its appreciation of the bilateral assistance given to the Committee and of the harmonious relationship with WMO and LRCS that had characterized past activities.

8. Soon after the sixth session, the revised request to UNDP for assistance in support of the regional typhoon programme was approved by the UNDP Administrator, subject to its approval by the member countries. The project document signed on behalf of WMO and UNDP was reviewed in January 1974 and this was followed by its acceptance by all member countries. The project thus stands approved for a period of three years (1974-1976). The UNDP contribution to

/the project

the project amounts to \$US662,000 in the form of expert services, equipment and fellowships, while Government contributions total an equivalent of \$US435,760. The progress made in the implementation of the project during 1974 will be discussed under agenda item 5 at the seventh session. A separate document (WRD/TC.7/5) provides relevant information on this matter.

9. Since the sixth session, Typhoon Committee secretariat (TCS) experts have made the following visits to member countries and to the WMO and ECAFE secretariat:

(a) Dr. S.N. Sen : Hong Kong, Seoul, Tokyo, 10-25 May; Bangkok, Vientiane, 10-26 July; Geneva, 21-29 August; Bangkok, 9-12 September 1974.

(b) Mr. C.H. Tang : Bangkok, Vientiane, 17 April-9 May; Seoul, Tokyo, Hong Kong, 29 May-16 June 1974.

(c) Mr. A. Hamamori : Bangkok, Vientiane, Tokyo, Seoul, 13 February-22 March; Seoul, Tokyo, 30 June-19 July 1974.

10. The Chief Technical Adviser of TCS represented ECAFE at the sixth session of WMO Regional Association V, held at Manila from 11 to 20 February 1974, and had an opportunity to discuss the Committee's activities with the representatives of the WMO secretariat attending the session.

11. Details of the progress made or action taken since the sixth session under each component of the action programme are reported in the following sections. Points on which the Committee may wish to consider further action are listed at the end of each of the sections.

A. METEOROLOGICAL COMPONENT

1. Status of meteorological observing and telecommunication systems

12. It is customary at each session of the Typhoon Committee to examine the degree to which the meteorological and telecommunication facilities essential to an efficient typhoon warning service have been implemented in the member countries. The review is based essentially on facilities forming part of the World Weather Watch (WWW) plan and with reference to the priorities established at the sixth session.

13. The information presented in annexes I-IV is intended to assist the Committee in reviewing this part of its programme. Information on those facilities which are not yet in operation, excluding deficiencies in surface observations, together with brief remarks on the outlook for their implementation over the next few years, is presented in a condensed form in annexes I-III.

14. Annex IV summarizes the state of implementation and further plans for those facilities included in the revised priority list established at the sixth session. The Committee may wish to give further attention to means of speeding up action where appropriate. Notification of any corrections, additions or changes at the session will be appreciated.

2. RS/RW, radar and APT stations

15. The RS/RW station at Vientiane, Laos, was established in October 1972 with VAP assistance. It has since been recording 00 GMT observations. The 12 GMT observation was introduced with effect from January 1974, but has had to be suspended temporarily since May 1974.

16. It was reported at the sixth session that lack of hydrogen generators and spare parts had resulted in a limited programme of RS/RW observations in the Philippines. In accordance with the Committee's recommendation to concentrate on three stations (Cebu, Clark and Laoag) until such time as the GOS network could be fully implemented, special efforts were made by the Philippine Atmospheric, Geophysical and Astronomical Services Administration (PAGASA) to continue 00 GMT RS/RW observations at Cebu and Laoag. During the first half of 1974, 60-70 per cent of these observations were made and special efforts continued to ensure regular observations at these stations.

17. The RS/RW ground equipment at Pohang (Republic of Korea) was out of order for some time earlier in the year. The telecommunication and electronics expert of TCS repaired the equipment in June 1974 and, as a result, regular upper air observations (00 and 12 GMT) were resumed.

18. Four 10-cm radars at Baguio, Cebu, Daet and Virac, and one 5.6-cm radar at Manila continued to be operational in the Philippines. A 10-cm radar was dispatched to Basco last year and road construction was completed, but the construction of the building was delayed. It is expected that the

/radar at

6. radar at Basco, and two additional 10-cm radars at Caliraya (70 km southeast of Manila) and at Aparri (northern tip of Luzon), will be installed in 1975.

19. In view of the large increase in the number of radars and other electronic equipment, PAGASA established an electronics workshop for repair and maintenance of the equipment. The telecommunication and electronics expert of TCS assisted PAGASA in the planning and formulation of the maintenance procedure and further assistance is provided under a UNDP country project.

20. The Meteorological Service of Laos submitted a request to WMO for VAP assistance for the establishment of a 10-cm radar at Vientiane. TCS assisted in the formulation of the request. The project has since been approved by WMO for circulation. As the radar at Vientiane was included in the latest priority list established by the Typhoon Committee, any offer of assistance in response to the VAP request would be most welcome. In this connexion please see paragraph 39.

21. The APT equipment installed at Vientiane towards the end of 1973 through French bilateral assistance has been functioning satisfactorily. A new APT receiver was installed at Sangley Point (30 km from Manila) in February 1974. Since then APT pictures received at this station have been retransmitted by UHF link to the central PAGASA office in Quezon City. The APT equipment provided under VAP by the United States to the Khmer Republic was awaiting installation at Phnom Penh.

22. Referring to the sixth session's discussion on the distortion of NOAA-2 satellite pictures and the difficulties experienced by member countries in obtaining equipment to rectify this distortion, WMO consulted the Permanent Representative of the United States with WMO on the possibility of improving the satellite imagery. In response, the United States pointed out the heavy expenditure that would be involved in modifying the current series of NOAA satellites to remove the distortion and urged members to modify or replace their display devices. It was also mentioned that Goddard Space Flight Centre (NASA) was developing an electronic device which could be inserted between an APT receiver and a facsimile receiver to rectify the distortion of the pictures.

23. Meanwhile, the Japan Meteorological Agency (JMA) has developed a new device for the reception of cloud images from NOAA satellites which reduces the distortion in question. The Satellite Data Processing System (SDPS) is designed to receive the VHRR visible and infra-red signals of the ITOS series, NOAA-2 and 3, and convert them by an electro-optical method to a picture on a 60°N polar stereographic projection chart. The electro-optical system installed at JMA is the first of its kind not only in Japan but also in the world. The Typhoon Committee may wish to record its appreciation to JMA for the development of SDPS.

24. TCS obtained a note from JMA describing the new device and distributed copies to the member countries. It is understood from JMA that the cost of SDPS equipment is more than \$US600,000. It may, therefore, be too expensive for the developing countries to adopt a similar system in the foreseeable future. However, the pictures received by JMA through SDPS are being re-transmitted by facsimile broadcast and can be intercepted by other countries using ordinary radio facsimile.

3. Telecommunication system

25. A detailed review of the meteorological telecommunication facilities for national data collection in the Philippines was conducted by the TCS during March-April 1974 in consultation with PAGASA officials. The provision of three sets of SSB receivers at Manila for simultaneous collection of data from 44 provincial stations was recommended. The need for correct frequencies, well designed antennae and more powerful transmitters to ensure reliable day and night communication was stressed. A detailed report including the design of antennae needed at individual stations, suggested locations for the antennae received from Australia, together with other recommendations for the improvement of the national data collection system, was furnished to the Administrator of PAGASA for the necessary action.

26. A revised VAP request amounting to \$US178,000 for improvement of telecommunication facilities in the Philippines was prepared by PAGASA in consultation with TCS and submitted to WMO. The VAP request is mainly aimed at the collection of radar pictures at Manila from the remote radar stations. The request was approved by WMO for circulation in June 1974.

The Committee will be pleased to note that

27. Preparations for establishing the Manila-Tokyo point-to-point circuit were completed. It was scheduled to become operational from 1 October 1974. The Tokyo-Peking link was expected to be established in July 1974.

28. The Bangkok-Vientiane point-to-point circuit was established and was in regular operation from 22 April 1974. As regards the Bangkok-Phnom Penh point-to-point circuit, the equipment needed for Phnom Penh was ordered as part of the UNDP project and the circuit is expected to be established in 1975. Regarding the Bangkok-Saigon circuit, while Thailand is ready to operate the Bangkok terminal, Saigon reported in September 1973 that the implementation of this circuit would have to be postponed.

29. In connexion with the strengthening of the Bangkok RTH, facsimile transmission and reception equipment worth \$US100,000 was received at Bangkok under bilateral aid from the Federal Republic of Germany. This equipment is to be installed at the Central and Airport Meteorological Offices at Bangkok, and at the regional centres in Chiangmai, Ubon and Songkhla. A German expert is expected to visit Bangkok for three months commencing late August 1974 to assist in installing the equipment. A revised VAP request for the remaining equipment required for strengthening of the RTH was prepared in consultation with TCS and submitted to WMO soon after the sixth session. In this connexion please refer to paragraph 39.

30. The sixth session was informed that the Government of Japan was considering the possibility of giving some SSB equipment and spare parts as bilateral aid to Laos for the purpose of improving national data collection. It was understood that the request for this assistance amounting to \$US15,000 was acceptable to Japan. Arrangements were being made to send an expert to Laos in late 1974 to conduct a preliminary survey. It was proposed to supply the required equipment and also to dispatch a technician of the manufacturing company to Laos after the survey to supervise the installation.

4. Other meteorological activities

31. The Chief Technical Adviser of TCS prepared a review paper on typhoon forecasting techniques. The paper summarizes the various objective techniques for forecasting intensity and movement of tropical cyclones and also deals with the methods currently in use for operational forecasting in developed

and in developing countries. The Chief Technical Adviser^{He} presented this paper at a seminar organized during his visits to the member countries. A large number of forecasting and research officers participated in the discussions following presentation of the paper. Based on the comments and additional information exchanged during these discussions, preparation of a revised text of the review paper was undertaken for circulation to the member countries.

32. JMA published a Manual on Typhoon Forecasting (in Japanese) in March 1974. As this publication will be of great value to meteorological services concerned with tropical cyclone forecasting, the Committee may wish to request JMA to arrange for its translation into English as early as possible.

33. In view of the special significance of storm surges in typhoon damage mitigation programmes, TCS initiated a survey of the present status of storm surge data collection, risk evaluation, forecasting and research activities in member countries. In response to a circular issued by TCS, replies were received from Hong Kong, Japan, the Philippines, the Republic of Korea and Thailand. The information collected is being consolidated, together with references to storm surge studies in the United States, for circulation to member countries. It is hoped that this information will assist member countries in organizing improved data collection systems and in developing forecasting techniques and related research activities.

5. Action on decisions adopted at the sixth session

(a) Ocean weather ships in the southwest Pacific (paragraph 16)^{1/}

34. Soon after the sixth session, the Secretary-General of WMO conveyed the appreciation of the Typhoon Committee to the USSR for the continued operation of Soviet ocean weather ships in the typhoon area in 1973 and inquired about plans for the operation of Soviet vessels in 1974. The Hydrometeorological Service of the USSR informed WMO that, since a number of Soviet research vessels were to take part in the GARP Atlantic Tropical Experiment, it would not be possible to provide weather ships in the typhoon area during 1974. The reply also stated that the question of organizing research expeditions in the western Pacific commencing in 1975 and a systematic study of the conditions under which typhoons form and move was being considered; further information will be provided in due course. The member countries of the Typhoon Committee were informed accordingly.

^{1/} This and subsequent references to paragraphs relate to the report of the Committee on its sixth session (E/CN.11/1117).

35. JMA announced that its ocean weather ship "TANGO" would operate at 29°N, 135°E from 21 May to 30 October 1974. During this period, the ship would record surface observations eight times a day, radiosonde observations twice a day and pilot balloon observations four times a day.

(b) Bangkok-Vientiane point-to-point link (paragraph 20)

36. The Bangkok-Vientiane point-to-point link was established in April 1974. Transmitters and antennae received under a bilateral programme with France were installed at Vientiane to operate this circuit. Meanwhile, a Soviet expert who visited Vientiane during May-July 1974 repaired and installed two facsimile receivers and assessed the antennae requirements to complete the equipment supplied earlier by the USSR.

37. Since operation of the Bangkok-Vientiane circuit began, Vientiane has been receiving sufficient regional data from the Bangkok RTH. During his visit to Vientiane/Bangkok in July 1974, the Chief Technical Adviser of TCS found that the weather charts at Vientiane now have a distinctly better coverage of surface and upper air data. Observational data from Laos, however, are not being received regularly at Bangkok. This matter was investigated at Vientiane and Bangkok and certain remedial measures were suggested.

(c) Priorities for the implementation of observing and telecommunication facilities (paragraphs 23 and 24)

38. The revised priority list was distributed by WMO to all its members. In forwarding the list, the hope was expressed that other countries might find it possible to assist the Typhoon Committee countries in their efforts to speed up full implementation of the programme adopted.

39. The twenty-sixth session of the Executive Committee of WMO held in May-June 1974 noted with appreciation that, in view of the importance and urgency of the problems connected with the prevention of typhoon damage, the Hydrometeorological Service of the USSR was prepared to take responsibility for the implementation of a number of VAP projects in the southeast Asia region and, in particular, the organization of a radar station in Laos and the strengthening of the RTH at Bangkok.

40. TCS has maintained close contacts with countries, both by correspondence and by visits, with a view to expediting implementation of the recommended facilities. Where bilateral or VAP assistance was offered, representatives of the prospective donor countries or the WMO secretariat were consulted, and the receiving country advised on further action.

(d) Exchange of radar fix messages (paragraph 26)

41. In accordance with the sixth session's discussion on the need for more frequent radar fixes under typhoon conditions, TCS issued a circular advising member countries that radar fixes should continue to be exchanged at three-hourly intervals, but that additional reports should be sent at intermediate hours when significant changes occurred. It was also suggested that, as in the previous years, systematic records of outgoing and incoming radar fix messages be maintained to permit evaluation of the system of exchanges. JMA confirmed that three-hourly radar fixes of typhoons were transmitted through JMG broadcasts and available point-to-point circuits. As stated at the fifth session, it is not possible for JMA to maintain records of outgoing and incoming radar messages because the Agency has to handle a large volume of data through its automatic data editing and switching system.

(e) Technical conference on the uses of meteorological radar (paragraph 27)

42. Regarding the proposed technical conference on the uses of meteorological radar for Regions II (Asia) and V (South-West Pacific), WMO sent a project document to the permanent representatives in these regions requesting them to intercede with the appropriate authorities in their respective countries in support of this project. It also inquired whether any of the Governments would be willing to provide host facilities for the conference. It may be mentioned that the sixth session of Regional Association V reiterated its request for this radar conference, placing it in the first priority category. It is proposed that it should be held in the first half of 1975.

(f) Meteorological reconnaissance flights (paragraphs 28 and 29)

43. Reconnaissance flights by United States aircraft in the typhoon area continued to provide valuable information for typhoon warning services. Recent information indicates that Hong Kong plans to continue its limited reconnaissance flights to locate centres of weak tropical disturbances.

/(g)

(g) Meteorological satellite (paragraph 31)

44. Japan continued preparations to launch its GMS satellite at 140°E late in 1976. Additional information of interest to the member countries may be presented by the Japanese delegation at the session. The WMO Executive Committee Panel on Meteorological Satellites held its first session in Geneva in May 1974. The Panel's report contains summaries of the programmes of all satellite-launching members.

45. The follow-up action and developments relating to NOAA-2 satellite pictures have already been recorded under paragraphs 22-24.

(h) Meeting of major VAP donors, Singapore, February 1974 (paragraph 32)

46. The sixth session of the Committee requested the meeting to take full account of the facilities listed for priority implementation and, whenever possible, to make provision for VAP support to ensure their early completion. The WMO representative at the seventh session will provide information on the action taken by the meeting of major VAP donors and on any subsequent developments of interest to the Committee.

(i) Marine-type automatic weather station (paragraph 33)

47. The automatic marine buoy established by Japan at 30°N, 135.5°E in August 1973 was brought back to Tokyo in June 1974 for checking and maintenance. It was expected to be reinstalled at a new position 25.4°N 135.5°E in August 1974. It was planned to install at 28°N 126°E in July 1974.

46. Further action proposed

48. It is suggested that the Typhoon Committee may wish to:

- ✓(a) Examine the information contained in the annexes, especially in regard to the progress made in implementing the facilities to which priority was assigned at the sixth session;
- ✓(b) Revise the list of priorities;
- ✓(c) Recommend further measures to expedite the implementation of meteorological and telecommunication facilities;
- ✓(d) Record its appreciation to JMA or development of SDPS, which reduces the distortion of NOAA satellite pictures;

/(e)

- ✓(e) Express its views on the exchange of information on typhoon forecasting techniques initiated on the basis of a review paper prepared by TCS and suggest any further measures considered appropriate;
- ✓(f) Express its appreciation to JMA for publishing a Manual on Typhoon Forecasting, and request JMA to arrange for its translation into English as early as possible;
- ✓(g) Request the Government of the USSR to resume operation of its ocean weather ships in the typhoon area;
- ✓(h) Express its appreciation to the Government of the USSR for its readiness to assist VAP projects in southeast Asia, and in particular, implementation of some of the facilities included in the priority list drawn up by the Typhoon Committee;
- ✓(i) Recommend continuance of the exchange of radar fix messages and consider, in the light of the countries' latest experience, any measures for improvement of these exchanges;
- ✓(j) Thank Japan for establishing two buoys at 25.4°N 135.5°E and 28.0°N 126°E, and consider the possibility of setting up other buoys in the typhoon area.

B. HYDROLOGICAL COMPONENT

1. General activities

49. Further progress has been made in developing comprehensive plans for and the establishment and improvement of pilot flood forecasting and warning systems in the key river basins selected for this purpose in Laos, the Philippines, the Republic of Korea and Thailand. Fresh developments during 1974 are summarized below:

(a) Laos

50. A reconnaissance survey of the Se Bang Hieng River basin was conducted in February 1974 by the TCS hydrologist together with officials of the Government of LAOS. Although the survey was confined to the western quarter of the basin for security reasons, information was collected on which the comprehensive

/plan of

plan of the flood forecasting system could be based. Early installation of staff gauges at selected key stations as suggested by TCS was agreed. The draft note prepared by TCS on flood forecasting in the Se Bang Hieng River basin was revised on the basis of the information collected during the reconnaissance.

51. The possibility of bilateral assistance from Japan for the establishment of pilot flood forecasting systems in Laos and Thailand has been under consideration since the latter part of 1973. After joint consultation between the representatives of ECAFE, WMO, TCS and the Japanese Embassy at Bangkok, the Secretary-General of WMO wrote to the Government of Japan on this matter. The TCS experts gave supplementary explanations to the agencies concerned during their visits to Tokyo, Vientiane and Bangkok. As a result of these consultations, the Government of Laos submitted a formal request for assistance to the Government of Japan.

52. The Government of Japan considered the request for assistance favourably and sent a questionnaire to Laos concerning flood forecasting in the Se Bang Hieng River basin. The reply was sent to Japan in July 1974. It is understood that the Government of Japan will dispatch a preliminary survey mission to Laos before the end of 1974. The TCS hydrologist is likely to participate in this survey.

(b) Philippines

53. It may be recalled that the pilot flood forecasting system in the Pampanga River basin was implemented in September 1973 with assistance from the Government of Japan. Soon after its inauguration, the flood of October 1973 caused damage to three of the reporting stations of the system. However, repairs and improvements to these stations were completed before the 1974 flood season by PAGASA and the Bureau of Public Works with the assistance of a Japanese expert assigned to the Flood Forecasting Centre. A facility for run-off observations by floats at a key station was also completed before the flood season. TCS provided advice in connexion with these activities.

54. Staff members of the Flood Forecasting Centre have been actively engaged in hydrological studies for improvement of the forecasting procedures such as run-off estimation from rainfall, analysis of storm pattern, calculation of backwater curve, etc. Improvements to or extension of the forecasting network has been also considered.

55. Two typhoons affected Central Luzon in June and July 1974 and caused moderate floods in the Pampanga River. The Flood Forecasting Centre issued appropriate flood advisories on both occasions.

56. The Government of Japan assigned an expert for the period covering the flood season in 1974 to assist the Flood Forecasting Centre in forecasting and in improving the forecasting techniques. Some instruments for training purposes and additional spare parts for the established network worth about \$US3,000 were expected from the Japanese Government as part of the technical co-operation to the Pampanga project.

57. With a view to summarizing technical developments to date, problems yet to be solved and proposals for future improvement of the forecasting technique, TCS has undertaken preparation of a technical note on flood forecasting in the Pampanga River basin.

(c) Republic of Korea

58. The feasibility survey carried out by a team of Japanese experts for the establishment of a pilot flood forecasting and warning system in the Han River basin led to a comprehensive report completed in August 1973. Its recommendations were accepted by the Government of Korea and orders were placed for the equipment required in accordance with the specifications proposed. A Japanese Government loan amounting to \$US1.5 million was appropriated for this purpose.

59. The rapid manufacture of the equipment in Japan enabled its installation to be completed before the flood season in 1974. The Ministry of Construction of the Republic of Korea also hastened the construction of the forecasting centre, station buildings and other facilities involving an expenditure of 200 million won (equal to over \$US0.5 million). Installation of the equipment, including a 130 kW electronic computer, was carried out in the period from April to June 1974.

60. A ceremony inaugurating the flood forecasting system in the Han River basin was held at the newly completed flood forecasting centre on 3 July 1974, with the participation of the Minister of Construction, the Minister of Public Health and Welfare, the Japanese Ambassador to the Republic of Korea and representatives of other agencies concerned. The hydrologist and flood forecasting expert of TCS, who visited Seoul whilst the final installation was in progress, attended the inaugural ceremony.

61. In response to the request of the Korean Government, the Government of Japan sent a third mission consisting of five experts in hydrology and telecommunication to Korea for the period from May to August 1974. The mission provided extensive assistance in the preparation of the software for the computer system and in the installation and adjustment of the telecommunication system, and gave initial guidance in operating the forecasting system. The TCS hydrologist participated in part of this activity in early July 1974.

62. It is noteworthy that the Han River forecasting system is equipped with 1 forecasting centre, 1 monitor station, 24 rainfall stations, 6 water stage stations, 8 rain and stage stations and 3 repeater stations; a powerful computer permits on-line processing of the data reported by all the stations and provides one-day flood forecasting within a few minutes. The effect of existing dams is also taken into account. In addition, 4 flood warning stations equipped with sirens and powerful loudspeakers are located at vulnerable spots along the lower reach of the river.

63. The Ministry of Construction plans to extend the flood forecasting system into the river basins of the Keum and the Nakdong following the completion of the Han River basin system, so that some 60 per cent of the country will be covered by the flood forecasting network controlled by the centre at Seoul. A preliminary design of the system has been completed by the Ministry of Construction with technical assistance from Japanese experts. A grant of \$US2.75 million from the Japanese Government for equipment and about 300 million won (equal to \$US750,000) for counterpart expenditure have already been earmarked.

64. Within the framework of the technical assistance provided by the Japanese Government for the flood forecasting and warning systems in the Han River basin and other river basins, 5 hydrologists of the Korean Ministry of Construction have received training in Japan. Training of a few other government officials is also being arranged in Japan. In addition, 13 telecommunication engineers were invited to Japan by the manufacturers of the equipment and given training in operating and maintaining the system.

(d) Thailand

65. Following action similar to that reported in paragraph 57 under Laos, the Government of Thailand submitted a formal request to the Government of Japan for technical assistance in the implementation of the pilot flood forecasting /system in

system in the Mae Klong River basin. The request has been examined by the agencies concerned in Japan and it is planned to dispatch a Japanese team of experts to Thailand for a preliminary survey during the next dry season.

66. The Energy Generating Authority of Thailand has begun construction of the Ban Chao Nen multipurpose dam on the Kwaie Yai River. The reservoir to be provided by the dam is large enough to detain almost all the flood run-off from the Kwaie Yai. Although the major portion of flood discharge is attributed to the Kwaie Noi, the expected effect of the Ban Chao Nen dam should be taken into account in making a comprehensive flood forecasting plan for the Mae Klong River. TCS has collected the necessary information and has suggested some new hydrological studies for this purpose.

67. Case studies of past floods are being continued by the Meteorological Department and the Royal Irrigation Department with modified coefficients of run-off and other factors. Arrangements similar to those in 1973 were made for trial flood forecasting in the Mae Klong River for the 1974 flood season. The Royal Irrigation Department has installed an SSB set at Thong Pha Phun to obtain hourly reports of water stage during July-October 1974. The Meteorological Department is setting up a station with SSB communication at Umphang. Data from Thong Pha Phun and Umphang will be very useful for flood forecasting in the Mae Klong. It is expected that the representative of Thailand will report on the case studies and trial flood forecasting at the seventh session.

2. Action on decisions adopted at the sixth session

68. The action taken on the decisions contained in paragraphs 37-43 of the report on the sixth session, regarding establishment of pilot flood forecasting systems in Laos, the Philippines, the Republic of Korea and Thailand has been described in the preceding section.

3. Further action proposed

69. It is suggested that the Typhoon Committee may wish to:

- (a) Record its appreciation of the valuable assistance provided by the Government of Japan in the establishment of the pilot flood forecasting system in the Han River basin, and the further assistance in the maintenance and improvement of the flood forecasting system in the Pampanga River basin;
- (b) Consider the steps so far taken towards implementation of pilot flood forecasting systems in Laos and Thailand and suggest means of expediting further action.

/C.

C. COMMUNITY PREPAREDNESS AND DISASTER PREVENTION

1. General activities

70. The accelerated tempo of activities under this component of the Committee's programme has been maintained in 1974. The sixth session fully demonstrated the awareness of member countries that these activities are of prime importance if the benefits of progress under the other components of the programme are to be translated into a reduction of typhoon damage and a saving of human lives. The paragraphs which follow summarize the main events of the past year under this heading.

(a) Second Joint LRCS/WMO/ECAFE Mission

71. In accordance with a decision taken at the sixth session of the Committee, arrangements were made for the Second Joint LRCS/WMO/ECAFE Mission on Community Preparedness and Disaster Prevention to visit the Philippines and Japan in May/June 1974. The programme for the mission was drawn up in close consultation between the countries concerned and the three organizations. In the Philippines the objective of the mission was the same as for the countries visited in 1973, namely, to promote co-operation between all the national authorities involved in the design and operation of an effective system of community preparedness and disaster prevention, and to recommend measures to improve the safety of life and property. The main purpose of the visit to Japan was to study the very advanced and highly organized disaster prevention system already existing there, with the object of considering how the lessons of the system could be applied in developing countries. In both countries the mission's recommendations were accepted by the government authorities concerned. The mission's report and its recommendations are contained in document WRD/TC.7/6, which will be discussed under agenda item 6.

(b) Follow-up to the Joint Missions

72. As recommended by the First Joint Mission, which visited Thailand, Hong Kong and the Republic of Korea in March 1973, each of the countries made statements at the sixth session of the Committee on the action they had taken to follow up the Mission recommendations. These statements showed that serious attention was being given to the proposals made by the Mission and that effective action to implement a number of them had already been taken. Shortly after the session the Joint Mission team held informal discussions in Bangkok with representatives of the national

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agencies constituting the task force for the National Committee for Disaster Preparedness (NCDP). On that occasion the Thai authorities announced that Government approval for the establishment of NCDP had been given.

73. More recently, information was received that a direct telephone link had been set up between the headquarters of the Korean Red Cross society and the Disaster Prevention Centre in the Ministry of Construction. This action was taken in response to a recommendation made by the Mission.

74. Action has been initiated on some of the recommendations of the Second Joint Mission and it is hoped that sufficient progress will have been made by the time of the seventh session for further details to be available. It is expected that the representatives of Japan and the Philippines will inform the Committee of the measures taken in their countries to act upon the Mission's recommendations. As the Committee's forthcoming session is to be held at Manila, it is hoped that the opportunity can be taken to hold a further short meeting between the national authorities of the Philippines and members of the Mission team to review the progress made and any difficulties encountered.

75. The Mission also recommended that the visits it made in 1973 and 1974 be completed by visits to the remaining member countries in 1975. This proposal, which is fully in line with the decisions of the sixth session, should be discussed under item 6.

(c) Publications distributed by TCS

76. Copies of the following publications have been distributed by TCS to the member countries:

- (i) "A federal plan for national disaster warning and preparedness" published by NOAA, United States;
- (ii) "Disaster prevention of Korea" received from the Ministry of Construction, Seoul, Republic of Korea;

(iii) A set of 17 printed or mimeographed papers relating to disaster prevention organization in Japan. These papers were provided to the Joint LRCS/WMO/ECAFE Mission during its visit to Japan in May-June 1974.

(d) Consultant services

77. One of the recommendations made by the Second Joint Mission during its visit to Japan was that the Government of Japan study the feasibility of providing experts in different aspects of community preparedness and disaster prevention /for periodic

for periodic short-term service with the Typhoon Committee Secretariat on a non-reimbursable basis. It will be remembered that the request to UNDP for continued support to the Committee originally made provision for consultant services in a number of fields, including community preparedness and disaster prevention. When the project was revised, this provision could not be maintained.

78. Experience in the past two years in conducting a more active programme of community preparedness and disaster prevention has clearly demonstrated the need for services of this nature, at least on a part-time basis. TCS is not adequately staffed to provide the help to member countries called for by the expansion of these activities. The major portion of the additional work undertaken has been carried out by staff provided by LRCS, WMO and ECAFE for the preparation and execution of the Joint Missions. It is, therefore, to be hoped that the recommendation of the Second Joint Mission that the Government of Japan provide experts will meet with a favourable response.

79. In view of the considerable and increasing importance of this component of the Committee's programme, the seventh session may also wish to request WMO to approach UNDP for provision of additional consultant services as part of the present UNDP project.

2. Action on decisions adopted at the sixth session

80. The action taken on the decisions contained in paragraphs 79-81 of the report of the sixth session has already been described.

3. Further action proposed

81. The main discussion on community preparedness and disaster prevention will take place under agenda item 6 when the report of the Second Joint Mission is considered. It is suggested that, at that time, the Typhoon Committee may wish to:

- (i) Examine the report of the Second Joint LRCS/WMO/ECAFE Mission on Community Preparedness and Disaster Prevention, taking into account the statements made by the representatives of Japan and the Philippines on the measures taken in pursuance of the Mission's recommendations;
- (ii) Consider the proposal made by the Mission that similar visits be made to the remaining member countries in 1975;

/(iii) Consider

- (iii) Consider the need to strengthen the Typhoon Committee secretariat by the periodic assignment of consultants in community preparedness and disaster prevention, and the means by which it might be achieved, so that it may fully carry out its responsibilities in this component of the Committee's programme.

D. TRAINING AND RESEARCH

1. Training of personnel

82. In accordance with the information given at the sixth session, the Government of Japan organized a group training course in river engineering including flood forecasting and warning and another course in meteorology (radar) in 1974. The course in river engineering was to last six months commencing 28 July 1974, and the one in meteorology (radar) for four months commencing 29 September 1974. Invitations for the nomination of trainees

have been sent to the Governments of the Khmer Republic, Laos, the Philippines, the Republic of Korea and Thailand. TCS sent a circular to the meteorological and hydrological services to ensure timely nominations for these training courses.

83. The last year's group training course in flood forecasting and warning, which commenced in September 1973, was completed in March 1974. At the request of the Japanese Government, the TCS hydrologist gave a lecture on the Pampanga flood forecasting system during his visit to Tokyo in March 1974.

84. A circular letter has been sent to member countries drawing their attention to earlier offers of assistance in the provision of training facilities by Australia, France, the Federal Republic of Germany and the United States of America. Reference was made to the offers at the sixth session by the Federal Republic of Germany to provide training in meteorology if requests were made through diplomatic channels, and by the United States to provide long-term fellowships in meteorology and hydrological forecasting. It is understood that the Khmer Republic has sent four officers to Australia for Class II meteorologists' training.

85. In pursuance of the statement made at the sixth session, the Government of Laos submitted a proposal to WMO for UNDP assistance in providing two experts for two years for the training of Class II meteorologists at Vientiane.

86. The TCS telecommunication and electronics expert gave on-the-job training in maintenance of telecommunication equipment to the technicians at Vientiane. He also gave on-the-job training in radar maintenance at Seoul and in the estimation of rainfall by radar at Bangkok and Khon Kaen.

/2. Co-ordination

2. Co-ordination of research activities

87. An IBM 1130/S-7 computer was installed at the Royal Observatory, Hong Kong, and has been in operation since early 1974. Computer programming to test some objective techniques of typhoon forecasting is in progress. After further trials, it is intended to use the computer on an operational basis and to disseminate the results to other members.

88. The Royal Observatory published Technical Memoir No. 12 by P.O. Chin and M.H. Lai on "Monthly mean upper winds and temperatures over Southeast Asia and the Western North Pacific". Two Technical Notes, one on "Statistical bias of objective techniques for predicting cyclone movement used in Hong Kong" and the other on "Tropical cyclone rainfall in Hong Kong" were also published by the Royal Observatory during the year.

89. The UNDP/WMO-sponsored Institute for Meteorological Research and Training has been established in the Republic of Korea. The Project Manager and an expert in meteorological instruments have taken up their posts at Seoul. A new building for the institute is under construction. The project will initiate and promote research activities on various subjects, including typhoon forecasting and hydrometeorology.

90. In the Philippines, a research project entitled "Development of design criteria and methodology for low-rise/low-cost buildings to better resist extreme winds" has been undertaken. It is a multi-national project participated in by the United States, Jamaica, Bangladesh and the Philippines. Because of the high frequency of tropical cyclones in the Philippines, it has been chosen as the focal point of this research project.

91. Under the typhoon moderation programme of the Government of the Philippines, on which information was given at the fifth and sixth sessions, preparatory activities and associated research began in April 1974. The annual budget for this project is estimated to be about ₱10 million. The building for the air operations unit is under construction, while another building for the project headquarters is being designed. Three Lockheed C-130 Hercules-type aircraft have been received for typhoon moderation and reconnaissance flight activities. Fifteen persons from the Philippines, including three PAGASA officials, have so far been trained in reconnaissance techniques.

92. In pursuance of a recommendation made by WMO Regional Association V (South-West Pacific) at its sixth session in February 1974, WMO decided to

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convene a technical conference on typhoon modification and related problems such as rain stimulation in conjunction with the seventh session of the Typhoon Committee. The technical conference is scheduled to be held from 15 to 18 October 1974 at Manila.

3. Action on decisions adopted at the sixth session

(a) Offers of assistance by Australia, France, the Federal Republic of Germany, Japan and the United States (paragraphs 46, 47, 50 and 51)

93. Follow-up action has already been described.

(b) Joint collaboration in typhoon research (paragraphs 59-61)

94. TCS issued a circular letter to member countries giving relevant background information leading to this recommendation and inviting nominations for research correspondents. The following nominations have since been received:

Hong Kong : Dr. P.C. Chin

Japan : (1) Dr. Masamori Miyazaki
(for storm surge studies)

(2) Dr. Minora Okuda
(for wind and heavy rain studies)

Philippines: (1) Mr. Hugo de la Cruz
(2) Mr. Catalino Arafiles

Republic of Korea: Mr. Seung Man Lee

Thailand: Mr. Twee Montrivade

95. During his visits to the member countries, the Chief Technical Adviser of TCS discussed with the research correspondents various steps to be taken as envisaged by the Committee's recommendation. Selection and preparation of an annotated list of research problems that could be taken up for study by joint collaboration were considered on the basis of the list furnished by JMA the previous year. Following these discussions, the research correspondents of Japan sent a detailed note on problems relating to wind, heavy rainfall and storm surge outlining the nature of studies that could be undertaken even with limited research facilities.

96. The research correspondents from the Philippines sent a note giving their comments and suggestions. The research correspondent of Hong Kong suggested that one or two subjects, which should be of interest and concern to most members might be selected in the first instance for joint investigation. Prediction of

/typhoon

typhoon movement and rainfall were suggested as examples for such studies. He further suggested that it would be advantageous if a research correspondent nominated by one country would act as initiator. For example, Dr. Miyazaki of Japan could be the initiator for storm surge studies, and Hong Kong for investigation of objective techniques for typhoon movement forecast.

97. The detailed note received from Japan has been circulated to all research correspondents, together with the comments and suggestions from the Philippines and Hong Kong. It is hoped that further consultations among the research correspondents, with the assistance of TCS, will lead to more concrete proposals and exchange of information on projects already in progress in the member countries.

4. Further action proposed

98. The Typhoon Committee may wish to:

- (a) Record its appreciation of the valuable assistance provided by the Government of Japan in organizing, during 1974, two training courses for the benefit of member countries;
- (b) Examine the steps taken to initiate joint collaboration in typhoon research and recommend measures to foster this collaboration.

/ANNEXES

Annex I

WWW GLOBAL OBSERVING SYSTEM - UPPER-AIR STATIONS

Deficiencies and further plans

Country and station	Radiowind (W)				Radiosonde (R)		Plans and remarks
	00	06	12	18	00	12	
<u>Japan</u>							
47971 Chichijima		0		0			
991 Minamitorishima		0		0			
<u>Khmer Republic</u>							
48991 Phnom Penh							VAP project 08/1/1/
Pochentong */		0		0	v	v	circulated in 1971, no offer to date.
<u>Laos</u>							
48940 Vientiane		0		0			
<u>Philippines</u>							
98223 Laoag */		0	0	0		0	
444 Legaspi		0	0	0			
618 Puerto Princessa	N	0	0	0			
645 Cebu */	1974	0	0	0		0	
755 Davao		0	0	0	0		
836 Zamboanga		0	0	0	0	0	
<u>Republic of Korea</u>							
47138 Pohang		0		0			
187 Mosulpo AB		0		0			
<u>Thailand</u>							
48327 Chiangmai		0		0			
407 Ubon Ratchathani		0		0			
455 Bangkok							No plans
568 Songkhla		0		0			

Notes: */= Typhoon Committee priority station.
 v = VAP request.

/Annex II

Annex -11

WWW GLOBAL OBSERVING SYSTEM - OTHER FACILITIES NOT YET IMPLEMENTED

(a) Storm-warning radar stations

Philippines	Guiuan	Implementation planned for 1974
	Basco	Implementation planned for 1975
	Caliraya (70 km SE of Manila)	Implementation planned for 1975
	Aparri	Implementation planned for 1975
Republic of Korea	Cheju	Implementation planned for 1976 from national resources
Thailand	Bangkok	National project (time of implementation uncertain)

11 (b) Automatic picture transmission (APT) stations

Khmer Republic (Cambodia) Phnom Penh (Cambodia) VAP project - implementation planned for 1974

Annex III

WWW GLOBAL TELECOMMUNICATION SYSTEM (GTS)

(a) National collection facilities

Although there has been improvement in the national collection facilities of Laos and the Philippines, some shortcomings subsist, particularly in night time collection facilities. See section II, A, 3.

11 (b) Regional telecommunication links not yet implemented

<u>Country</u>	<u>Link</u>	<u>Remarks</u>
Philippines	Manila-Tokyo	National project 1974
Thailand	Bangkok-Phnom Penh	National/UNDP project 1975
	Bangkok-Saigon	National project 1975

/Annex IV

Annex IV

PRIORITIES ESTABLISHED BY THE TYPHOON COMMITTEE AT ITS SIXTH SESSION
Summary of the state of implementation and further plan

Observing facilities:

(i) Upper-air stations

No plans 48991 Phnom Penh(Khmer Rep.) - W observation implemented at 00 and 12 GMT. RS observation under VAP request but no offer

Already planned: 98223 Laoag(Philippines)- 12 GMT radiosonde/radiowind
98645 Cebu (Philippines) - National project 1975

(ii) Weather radar

No plans Vientiane (Laos) - Under VAP request but no offer

Cheju (Rep. of Korea) - No plans known

Already planned: Basco(Philippines) - National project 1975
Bangkok(Thailand) - National project

(iii) APT stations:

Already planned: Phnom Penh(Khmer Rep.) - VAP project 1974

(iv) Ocean weather stations

Already planned: ship at 16°N, 135°E - USSR provided ship till 1973. It could not be provided in 1974 owing to commitments in GATE.

Communication facilities

(i) National collection facilities

Already planned: Khmer Republic - National/UNDP project
Laos - Bilateral/UNDP project
Philippines - National/bilateral project (partly implemented)

(ii) Regional telecommunication links

Establishment of the following point-to-point links:

Already planned: Bangkok-Phnom Penh - National project (Bangkok)/UNDP project (Phnom Penh)

Bangkok-Saigon - National project (Saigon not yet ready)

Manila-Tokyo (implemented)
Tokyo-Peking - National project 1974

/Bangkok

Bangkok - Vientiane
Hong Kong - Peking

- Implemented
- National project

(iii) Other telecommunication facilities

Already planned: strengthening of RTH Bangkok

- Partially implemented with VAP/bilateral help and national resources

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FOR PARTICIPANTS ONLY

WRD/TC.7/5
30 August 1974

ORIGINAL : ENGLISH

**ECONOMIC COMMISSION FOR ASIA AND THE FAR EAST
AND
WORLD METEOROLOGICAL ORGANIZATION**

**Typhoon Committee
Seventh session
8-14 October 1974
Manila**

**UNDP TECHNICAL SUPPORT TO THE
REGIONAL TYPHOON PROGRAMME**

(Item 5 of the provisional agenda)

Note by the Typhoon Committee secretariat

Approval of the draft request to UNDP

1. It may be recalled that a revised draft request to UNDP for technical support to the regional typhoon programme was presented to the Typhoon Committee at its sixth session, after incorporation of the amendments proposed by UNDP. The revised project is for a period of three years (1974-1976). The UNDP contribution amounts to \$US662,000 in the form of expert services, equipment and fellowships, and the government contributions total the equivalent of \$US435,760. The sixth session was informed that the project as revised was acceptable to UNDP subject to concurrence by the participating Governments.
2. As the revised project document had been distributed to the Governments through local resident representatives only some days before the sixth session, sufficient time was not available for any of the countries to indicate a decision on the matter at the session. The representative of the Philippines, however, indicated the readiness of his Government to continue to provide host facilities for the Typhoon Committee secretariat. The Committee urged the member countries to ensure approval of the project document by their respective Governments with the least possible delay.
- 3.

3. Soon after the sixth session, information was received that the Administrator of UNDP had approved the project document subject to endorsement by the participating Governments. By March 1974, all participating Governments had conveyed their acceptance of the project to UNDP.

Progress in the implementation of the project

4. The activities of the Typhoon Committee during 1974 are reviewed in detail under agenda item 4 (WRD/TC.7/4). The Committee may wish to consider under this item the present status of implementation of the UNDP project. For this purpose, the progress so far made in the implementation of the main components of the project is summarized below:

(a) Equipment component

5. The Typhoon Committee secretariat (TCS) furnished to WMO a detailed breakdown and specifications of the equipment required for the Khmer Republic, Laos, the Philippines and the Republic of Korea after consulting the countries as necessary. Some changes in the original list of equipment proposed by Laos and the Republic of Korea were accepted without altering the total cost. At the time of preparing this document, WMO had already placed orders for some \$60,000 of equipment and had informed the concerned resident representatives of UNDP. For the remaining items of equipment, various questions were under correspondence between WMO, TCS and the member countries concerned. It is expected that orders for most of the equipment will be placed by December 1974 and that delivery will take place during 1975 or early in 1976.

(b) United Nations experts and counterpart staff

6. The assignments of the three United Nations experts who were serving in the ongoing WMO/ECAFE typhoon project were extended with effect from 1 January 1974. All three experts were thus made available from the beginning of the project as scheduled. The Chief of TCS was redesignated as Chief Technical Adviser in the project.

7. The supporting staff for the TCS (secretaries and drivers) continued to be provided by the Government of the Philippines. Counterpart staff needed for operation of the pilot flood forecasting systems and for radar ancillary equipment are expected to be provided by the member countries concerned as soon as the facilities have been installed.

8. Less satisfactory is the situation regarding the provision of professional staff by the participating countries. The project document includes the obligation of member countries to provide professional counterpart personnel to be assigned to the Committee secretariat in order that the present UNDP experts can be gradually replaced. It requires that by the end of 1974 one synoptic meteorologist, one telecommunication and electronics engineer and one hydrologist should be made available, in order that they may gradually gain experience in the activities of the Typhoon Committee and can take over smoothly when the UNDP experts are withdrawn by the end of 1976.

9. WMO addressed the ministers for foreign affairs of the participating countries in October 1973, inquiring whether professional staff to man the TCS could be made available. Three countries replied that they could not provide such staff; others have not replied so far. The Chief Technical Adviser discussed this matter during his visits to member countries. These discussions indicated that the Governments of the Philippines and Japan might consider the possibility of providing one synoptic meteorologist and one hydrologist to TCS. It must be emphasized that the provision of two and ultimately three professional staff by the participating countries is absolutely necessary. The UNDP approval of the project was contingent on the provision of professional staff by the members gradually to replace the UNDP experts.

10. It is to be noted that the intergovernmental Typhoon Committee is expected to function on a long-term basis. In accordance with the provisions of the project, United Nations experts will be available up to the end of 1976. The Committee will need to discuss the ways by which professional counterpart staff can be provided to man the TCS and arrangements for its continuation on a long-term basis. This question is dealt with separately in document WRD/TC.7/12 submitted to the seventh session.

11. The Government of the Philippines has agreed to provide the TCS with a building and a vehicle. The Government of the Philippines has also agreed to provide the TCS with a vehicle and a building. The Government of the Philippines has also agreed to provide the TCS with a vehicle and a building.

12. The Government of the Philippines has agreed to provide the TCS with a building and a vehicle. The Government of the Philippines has also agreed to provide the TCS with a vehicle and a building. The Government of the Philippines has also agreed to provide the TCS with a vehicle and a building.

(c) Fellowships

11. Five international fellowships of one year are provided by UNDP as part of the project. Each of the five member countries, the Khmer Republic, Laos, the Philippines, the Republic of Korea and Thailand, will receive one fellowship. In view of the group training courses in hydrology and flood forecasting organized by the Government of Japan annually since 1969 for the benefit of the Typhoon Committee countries, it was felt that the UNDP fellowships might best be devoted to training in meteorology or in meteorological telecommunication/electronics.

12. Some countries expressed their desire to nominate two trainees for shorter courses of six months each instead of one fellowship of one year. If this desire is met, for example, for training Korean fellows in Japan and Laotian fellows in Thailand, no additional travel expenses would be involved. Language requirements restrict the choice of countries where the training courses can be arranged. During their visits to member countries TCS experts discussed these and other related questions and it is expected that nominations for the fellowships can be sent to WMO through the respective resident representatives by late 1974.

(d) Bilateral assistance

13. One of the most significant items of bilateral assistance to project activities is the loan of \$US1.5 million given by the Government of Japan for the purchase of flood forecasting equipment in the Republic of Korea. The Korean Government has made a counterpart contribution of the equivalent of over \$US0.5 million for buildings alone in the implementation of the pilot flood forecasting system.

14. When approving the project with an equipment component of \$350,000, UNDP had imposed a condition that at least a like amount would be obtained through bilateral sources. Negotiations have accordingly been initiated to obtain bilateral assistance from the Government of Japan for implementation of pilot flood forecasting systems in Laos and Thailand. The Governments of Laos and Thailand have since submitted formal requests to Japan

/for assistance.

for assistance. It is understood that the Government of Japan is planning to send survey teams to Laos and Thailand before the end of 1974, indicating that there are very good hopes that the proposed assistance will be forthcoming.

Action proposed

15. The Committee is invited:

- (a) To note the information given regarding the implementation of the UNDP project "Technical support to the regional typhoon programme";
- (b) To recommend measures to ensure that the professional counterpart staff are made available to TCS as soon as possible; and
- (c) To recommend to its members that nomination of candidates for the fellowships included in the project be speeded up.

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FOR PARTICIPANTS ONLY

WRD/TC.7/6
5 August 1974

ORIGINAL : ENGLISH

ECONOMIC COMMISSION FOR ASIA AND THE FAR EAST
AND
WORLD METEOROLOGICAL ORGANIZATION

Typhoon Committee
Seventh session
8-14 October 1974
Manila

REPORT OF THE SECOND JOINT LRCS/WMO/ECAFE MISSION ON
COMMUNITY PREPAREDNESS AND DISASTER PREVENTION

(May/June 1974)

* League of Red Cross Societies

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* Three of the annexes to the report - "I. Programme of the mission", "II. List of persons contacted", and "IV. List of major publications consulted (Japan)" - have not been reproduced in the present document.

1. BACKGROUND TO THE MISSION

Origins

1. When the Typhoon Committee was established in 1968 it assumed a wide range of responsibilities for the further planning and implementation of measures to minimize typhoon damage in the ECAFE region. The meteorological and hydrological systems which are the basis of typhoon detection and prediction were, quite logically, given special attention during the first years of the Committee's programme. This was all the more understandable in that the national representatives on the Committee were, at that time, exclusively from the technical agencies.

2. Although these systems are still being improved - and much remains to be done - the relatively rapid progress made led the Committee to turn its attention to the next stage of the warning system. Interest in what happens when the warning of danger is issued and of the extent to which preparatory planning can reduce the associated risks was awakened rapidly. It was apparent that no forecast, however accurate, could on its own save lives or reduce damage. Although this fact had long been realized in many countries, closer investigation of the disaster planning arrangements quickly revealed that they lagged far behind the technical arrangements leading to the forecast and warning.

3. In late 1971 the Typhoon Committee initiated a new phase of its programme when it decided that it must devote a much greater effort to community preparedness and disaster prevention if there was to be any real hope of reducing the loss of life from typhoons and of arresting the ever-mounting cost of damage.

4. At that time it was also recognized by ECAFE and WHO as the organizations sponsoring the Typhoon Committee that expert advice would be needed to guide an expansion of the Committee's activities in these fields. The League of Red Cross Societies (LRCS), with its long experience in disaster relief, obtained the services of an expert to make a survey of the present arrangements in all the member countries of the Typhoon Committee. The four-month survey confirmed the need for better community preparedness and disaster prevention arrangements in many of the countries and highlighted a number of important short-comings in the existing system.

The First Joint Mission

5. As a direct consequence of the recommendations resulting from the survey, the Typhoon Committee decided at its fifth session that a Joint LRCS/WMO/ECAFE Mission should conduct pilot visits to three countries. The Mission visited Hong Kong, the Republic of Korea and Thailand in March 1973; its purposes and the results achieved are fully described in the report it submitted to the Committee at its sixth session in November 1973 and need therefore not be repeated here.

6. The Committee considered that the contacts made with governmental and non-governmental agencies in each of the three countries had been extremely successful in engendering a new spirit of co-operation and understanding between all those with responsibilities under the national systems for disaster prevention. It was of the opinion that the Joint Mission had served a very useful purpose in stimulating new activities in community preparedness and disaster prevention which were of vital importance to the safety of human life and the reduction of typhoon damage. The Committee further agreed that it was highly desirable to continue such visits until all member countries had been covered, and that a similar mission to Japan and the Philippines would be a logical choice for the next stage of the work.

The Second Joint Mission

7. At the sixth session the representatives of Japan and the Philippines welcomed the proposal for a joint mission to their countries and indicated their willingness to accept such a mission. The Typhoon Committee accordingly requested LRCS, WMO and ECAFE, in consultation with Japan and the Philippines, to draw up a detailed programme for the mission to take place in 1974 and to determine its precise dates.

8. Unlike the First Mission, when the purpose of the visit had been broadly the same in each of three countries, the Second Mission had quite different objectives in Japan from those in the Philippines. It will be useful at this point in the report to state clearly the objectives in each country so that the reader may fully understand the extent to which the Mission was able to meet these objectives in the time available. This information is given in the order in which the countries were visited.

/Philippines

Philippines

The Philippines suffers more tropical storms than any other country in the world. This fact has obliged the Government to set up a National Committee on Disaster Operations to co-ordinate action in times of natural disaster. In addition, a National Disaster Control Centre (NDCC) has been established. It was felt that the experience gained in the past few years since the new system has been in operation merited close study. Doubtless lessons had been learned that could readily be applied in other member countries of the Typhoon Committee. One of the functions of the Mission was to appraise the methods adopted and the degree of co-ordination achieved in order to see in what way further improvement in community preparedness could be attained. This appraisal followed closely the lines of the action taken by the 1973 Mission to Hong Kong and the Republic of Korea, both of which had national arrangements similar to those in the Philippines.

The principal objectives of the Mission in the Philippines were, accordingly:

- (a) To bring together all the national authorities concerned to promote co-operation in the design and operation of an effective community preparedness/disaster prevention system;
- (b) To prepare an agreed programme to improve community preparedness/disaster prevention for the safety of life and property.

Japan

Japan, alone of the member countries of the Typhoon Committee, is a highly developed nation. Nevertheless, it suffers, in financial terms, by far the highest losses of any. The Government's considerable experience in coping with losses from typhoons and other natural disasters has led it to develop a protective system unparalleled elsewhere in the area, if not the world. Although a great deal of information on this system has been made available, no in-depth study of the complete system had been made and, consequently, its detailed structure is unknown to other nations. To some extent at least, this is the result of the official laws and procedures being promulgated only in the Japanese language.

/It was

It was felt that the Typhoon Committee programme in community preparedness and disaster prevention could never be complete unless it took full account of the potential benefit to all concerned of the best organized system in any of its member countries. In many respects, the organization and success of the system in Japan represented the ideal at which other member countries could aim.

The principal objective of the Mission was, therefore, to make a thorough investigation of the detailed structure and provisions of the national disaster preparedness system in Japan. This investigation was mainly directed at obtaining information that could readily be applied in other member countries.

Preparations for the Mission

9. In accordance with the request of the Typhoon Committee, the more detailed planning of the Mission was taken up by LRCS, WMO and ECAFE soon after the sixth session. Representatives of the three organizations met in Bangkok and drew up an outline programme for visits to Japan and the Philippines on the following dates:

1-17 May 1974	Philippines (Manila)
18 May-2 June 1974	Japan (Tokyo)

10. The plan drawn up also provided for the Mission to spend the period from 3 to 10 June 1974 in Tokyo to complete its report. As in 1973, facilities for this purpose were kindly provided by the Japan Meteorological Agency.

11. The further planning of the Mission was carried out at a series of meetings held in Geneva between LRCS and WMO, in full consultation with ECAFE by correspondence. These preparations took place under the guidance of Mr. Robert M. Pierpont, Under Secretary-General (LRCS); Mr. Arnold H. Glaser, Director of the World Weather Watch Department (WMO); and the late Mr. Alan D. Benham, Chief of the Division of Natural Resource (ECAFE). The two countries visited by the Mission were consulted on the proposed programme, which was adapted to meet their particular wishes.

12. The team met at Bangkok at the end of April 1974 for final discussions of the arrangements prior to beginning the Mission on 1 May 1974.

13. As for the First Mission in 1973, the team was composed of:

LRCS - Dr. Kingsley Seevaratnam, Regional Officer for Asia (Leader)

WMO - Mr. Peter Rogers, Special Projects Officer

ECAFE - Mr. M. Kawamura, Economic Affairs Officer

II. PHILIPPINES

Report on the Mission's activities

14. The Mission's activities during its visit to the Philippines followed closely the programme prepared prior to its arrival. Minor adjustments were made to the order of visits to national agencies to meet the requirements of these bodies. The arrangements throughout the visit were co-ordinated by the Philippine Atmospheric, Geophysical and Astronomical Services Administration (PAGASA). The Mission wishes to place on record its appreciation to the Administrator of PAGASA, Mr. Roman L. Kintanar, for the excellent arrangements made for its visit, which greatly facilitated its work in the Philippines. Apart from the visits to the different agencies, all the meetings took place at the headquarters of PAGASA in Quezon City under the chairmanship of Mr. Kintanar, a former Chairman of the Typhoon Committee.

15. The programme began with a preliminary meeting and a joint meeting at which the objectives of the Mission were explained and the need for the full participation of all the national agencies holding responsibilities under the typhoon warning system were emphasized. They were followed by visits to see the facilities of the Weather Bureau and of the Flood Forecasting Center in Quezon City for the Lower Pampanga River basin. Subsequently visits were made to the Office of Civil Defense/National Disaster Control Center (OCD/NDCC), the Philippine National Red Cross (PNRC), the Department of Social Welfare, the Bureau of Public Works, the Department of Education and Culture, the Department of Local Government and Community Development and the Bureau of Telecommunication. Representatives of the national agencies concerned participated in the discussions held during these visits.

16. Arrangements were also made for the Mission to carry out a field visit to see the facilities installed in the Lower Pampanga River basin

for flood forecasting and warning. The Mission completed its work during several days of joint meetings at which full and frank discussion of many aspects of the typhoon warning system in the Philippines took place.

17. The Mission's report, including observations and recommendations based mainly on proposals put forward by the national agencies, was examined during the final joint meetings and received the approval of all those participating.

Observations

18. Earthquakes, floods, typhoons and volcanic eruptions are a recurrent feature of life in the Philippines. The frequency with which natural disasters strike the country has created a laudable awareness of the need for vigilance and for an efficient, highly organized system for the protection of human life and property. Much thought and considerable resources have been and still are being devoted to making the protective system more closely knit and effective. Familiarity with disaster has not produced complacency.

19. The very nature of the country, composed of over 7,000 islands scattered in the Pacific Ocean, presents formidable problems for the Government in its evident desire to extend and improve its capability to lessen the impact of natural disasters. Problems of communication and co-ordination rank high amongst those to which no easy solution is apparent. Nevertheless, they are being tackled with vigour and an understanding that must bring slow but sure improvement.

20. Many of the elements needed to ensure that the system works smoothly and effectively are already present. The establishment of the National Committee on Disaster Operations and, especially of NDCC with its wide-ranging powers as the focal point for disaster preparedness and relief activities, is an indication of the Government's determination to build a system which can respond effectively to the constant challenge posed by disasters.

21. The Mission was gratified to observe that the various national agencies concerned participated consistently throughout the discussion and visits. It felt that this was a further proof of their desire to co-operate fully within the limitations of the resources available to them. The

/outstanding

outstanding impression of the Mission during the discussions it held related to the frankness with which all these taking part spoke of the difficulties they encountered and of the need for improvement in their ability to prepare for and operate in times of disaster. Not only were the discussions open, but many positive ideas were put forward by the participants for ways in which the arrangements for meeting disasters could be strengthened.

22. This positive attitude was of the greatest help to the Mission in formulating the recommendations contained in paragraphs 24-35 of this report. It wishes to emphasize that the substance of these recommendations stems from proposals put forward by the participants themselves. It is the confident hope of the Mission that its visit will further stimulate the wish of the Philippine authorities to plan for better community preparedness and disaster prevention.

23. These brief observations can only reflect partially some aspects of the warning system in the Philippines. Detailed information on the organization of the system and the responsibilities of its component parts appears in a variety of national documents and publications too numerous and lengthy for inclusion in this report. The Philippine authorities, to whom this report is addressed primarily, are in any case fully conversant with such information not reproduced herein. The Mission wishes to state that the order in which the recommendations appear in the next section must not be interpreted as an indication of their relative importance.

Recommendations

24. The Government of the Philippines is invited to study the proposals set out below, which the Mission believes could contribute to achieving a better integrated and co-ordinated system of defence against typhoon damage.

25. Dissemination of typhoon warnings

One of the most important findings of the Mission in the Philippines was that the present arrangements for the dissemination of typhoon warnings allowed room for improvements, representatives of several government departments having expressed concern over the deficiencies. The major reasons hindering the remedying of that situation were probably of a budgetary nature. The Mission noted, however, that improvements already planned would eliminate some, but not all, of the present deficiencies, provided adequate funds could be ensured.

/It was

It was the view of the Mission that to save human lives and mitigate property damage, immediate action was called for to ensure that typhoon warnings were speedily available to all threatened. Although it was a self-evident fact, it was worth restating that the effective and timely distribution of typhoon warnings was the crux of the entire system and no progress could be made in reducing loss of life and damage unless that part of the system was fully efficient. The cost of perfecting the distribution system would be small in relation to the large sums expended in the preparation of the warnings and the potential savings of lives and damage essential to the development of the national economy. As these defects exist at several levels in the system, each is dealt with separately below. In formulating these recommendations, the Mission wishes to acknowledge its indebtedness to the Typhoon Committee Secretariat (TCS) for the provision of detailed information on existing facilities for the dissemination of warnings.

(a) Warnings disseminated through the Philippine Bureau of Telecommunication

Where no other channel of communication is available, warnings are distributed through the Philippine Bureau of Telecommunication. This agency is well equipped with microwave, tropo-scatter and VHF circuits and is fully capable of rapidly reaching most of the major cities of the Philippines (see paragraph 34). Despite the availability of these modern communication techniques, warnings are invariably delayed, sometimes for days or even weeks.

They are thus rendered useless. There appear to be two reasons for the delays - first, the essential priority is not always assigned to warning messages and, second, the Bureau facilities are not manned 24 hours a day in some outlying areas.

The Mission therefore recommends that:

- (i) Absolute priority be given to messages involving the safety of human life, such as typhoon warnings;
- (ii) The Bureau of Telecommunication be manned 24 hours a day in disaster prone areas during periods of natural disasters;

7(iii)

- (iii) Funds be assigned before the 1974 typhoon season to permit (ii) above. Whilst no estimate of the funds required could be obtained, it was the consensus that additional staff would not be needed and that the extended periods of operation could be met by existing staff working overtime.

(b) Dissemination of warnings from the PAGASA headquarters to parent radio and TV stations in Manila

A report issued by TCS in 1973 shows that the 29 radio and TV stations in the provinces provide good broadcasting coverage all over the Philippines. These stations are linked to the parent stations in Manila by reliable UHF or HF communications. Communication between PAGASA and the parent stations in Manila is much less satisfactory, sometimes relying on the public telephone service, which may be saturated with calls or rendered inoperative when a typhoon threatens the Manila area. TCS has recommended the establishment of UHF direct channels with high-speed facsimile links between PAGASA and the parent radio and TV stations. A tentative scheme of this nature has been proposed by TCS and is estimated to cost \$US60,000 (see annex). The Mission feels that this estimate may now be too low and that the cost of the proposed facilities might be assessed more realistically at \$US80,000-100,000.

The Mission recommends that:

- (i) The TCS scheme for the installation of the above facilities be re-examined as a matter of urgency with a view to its implementation as soon as possible;

(ii) Negotiations be undertaken immediately by the Government of the Philippines with the parent radio and TV stations in Manila to see whether a joint financing arrangement can be worked out for the provision of this vital public service.

(c) Communications between the PAGASA headquarters and the disaster prevention agencies

In its 1973 report TCS points out that a situation analogous to that in (b) above exists between PAGASA and the agencies concerned with disaster prevention activities such as NDCC, the Department of National Defense, PNRC, the Departments of Social

/Welfare,

Welfare, Education and Culture, etc. It has proposed that it is highly desirable to establish reliable direct communication links along similar lines. The cost is estimated at \$US10,000 per agency.

The Mission strongly supports this proposal and to this end recommends that:

- (i) In consultation with the PAGASA headquarters and the agencies concerned, TCS initiate a study immediately to determine the best method of establishing these links, and their probable cost. This study should, if possible, be completed by 30 June 1974;
- (ii) In anticipation of the results of the above study, the Government of the Philippines (Budget Commission) examine the possibility of assigning funds for the implementation of the links required in the second half of 1974.
- (d) Other matters related to the dissemination of typhoon warnings

The present system for the dissemination of warnings relies to a considerable extent upon the provincial weather stations, which have responsibility for the distribution in their areas of warnings received from PAGASA in Manila. The TCS report already referred to draws attention to requests made by some of these stations for equipment to assist them in fulfilling these responsibilities. In general, the cost of meeting these requests is minimal.

The Mission recommends that:

- (i) These requests be met without delay.

For some years PAGASA has been working to improve its system of typhoon warning dissemination. Present plans for the installation of new broadcast facilities under a joint OCD/NDCC-PAGASA project confirm this fact. It may appear that a continuation of this policy would conflict with the recommendations made above for more efficient use of the excellent facilities available in the Bureau of Telecommunication. The Mission recognized that some duplication of the means of disseminating warnings might occur but did not consider that it would necessarily imply a waste of resources. In a matter of such primordial importance, some duplication gives an insurance against failure of one single method and should be accepted not merely as inevitable but even as desirable.

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Without prejudice to the above recommendations for action by the Bureau of Telecommunication, the Mission therefore strongly urges:

- (i) PAGASA to continue and expand its present measures towards the eventual attainment of an independent system ensuring its ability to distribute its warnings to all concerned in an efficient and timely fashion.

26. Collection of national meteorological data in Manila

In discussions with TCS, the Mission reviewed the results of studies it had made on the collection of national meteorological data in Manila. Substantial improvements had been made but there remained important short-comings which called for early attention. The Mission felt that the regular and reliable reception of national data in Manila within the time limits specified by the World Weather Watch plan was of fundamental importance not only for the issue of typhoon warnings within the Philippines but also for other countries in the area which might be threatened. It noted with satisfaction that the telecommunications/electronics expert in TCS was continuing to co-operate closely with PAGASA in providing advice and practical assistance to resolve the outstanding problems.

The Mission accordingly recommends that:

- (i) The telecommunications/electronics expert in TCS continue and increase his efforts to assist PAGASA in ensuring the reliable, timely reception of all national data in Manila;
- (ii) The above national data should include surface and upper-air reports and radar reports;
- (iii) The TCS expert should, in addition, assist in the conduct of periodic training and maintenance classes to ensure that all the equipment used in obtaining these reports remains in constant operational condition;
- (iv) PAGASA implement the recommendation of TCS for the setting up of a special unit in its Communications Division charged with monitoring the effective operation of the data collection system and ensuring its maintenance;
- (v) The Bureau of Telecommunication give high priority to the collection of meteorological data for PAGASA whenever its circuits are used for this purpose.

27. Issue of flood warnings

The Mission noted that the pilot flood forecasting system in the Pampanga River basin, inaugurated in September 1973, had proved its effectiveness during

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floods associated with the passage of typhoons in October. Because the public storm signals are based upon wind speed, the public do not fully understand that even after storm signals have been lowered and the weather has become relatively fine there can still be a serious risk of dangerous flooding in the flood plains of large river basins. The Mission was also informed of the work being carried out in Manila and its suburbs on a \$US100 million flood control and drainage scheme, and of the telemetering facilities installed in the Marikina River under a UNDP/WHO project. The Mission considered that flood forecasting and warning services were necessary not only for the effective management of the flood control programme and drainage system but also for better community preparedness against floods.

The Mission therefore recommends that:

- (i) To supplement the present storm signals, PAGASA and the Bureau of Public Works consider the feasibility of issuing heavy rainfall and flood warnings to interested agencies and the public for the most densely populated areas of the major river basins;
- (ii) In the Pampanga and Pasig River basins, both agencies should further develop their capabilities to issue flood warnings to interested agencies and the public more frequently and in greater detail, specifying the expected water-stage and time at selected points;
- (iii) The community preparedness agencies make prior contact with the Bureau of Public Works and PAGASA to train personnel who will be able to interpret the warnings to the public in the flood-prone areas.

28. Assessments of typhoon and flood damage

Attention was drawn by several national agencies to the difficulties they encountered in obtaining the reliable assessments of loss of life and damage on which they must base emergency operational decisions. That the difficulties of making accurate assessments under abnormal conditions were very real was understandable. The Mission nevertheless felt that a more formalized approach to such assessments could reduce the danger of conflicting reports. The evaluation of damage in monetary terms was also important, not only for rehabilitation purposes but to make it possible to assess the impact of the damage on the national economy and measure the same against the benefits of preventive measures.

The Mission recommends that:

- (i) The present methods of assessing casualties, number of families affected and material damage be re-examined with a view to introducing standardized methods of general application throughout the country. This could be an appropriate task for the co-ordinating agency;

- (ii) As far as practicable, one single national agency be assigned for authority for co-ordination of assessments in the disaster area;

- (iii) All such assessments be channelled at the national level to NDCC, which should share this information with all the other interested national agencies and the news media. To this end, all agencies at all levels should provide the required information to ensure not only a total picture of the disaster situation, but also to permit effective action and to avoid duplication;

- (iv) Methods be evolved for the consistent, uniform evaluation of damage in monetary terms so that the results may be used in economic planning and in determining the benefits accruing from damage prevention measures.

29. Vulnerability studies

Relatively little appeared to have been done so far in the Philippines to assess in a realistic fashion the risks of typhoon and flood damage in different parts of the country. Information of that type was of particular importance in controlling uninformed development and unwise land use with its greatly increased potential for further disaster. The Mission was informed that there were no zoning laws and that the building code was designed primarily to provide protection against earthquakes and winds.

The Mission recommends that:

- (i) Studies be initiated to evaluate the risk of typhoon and flood damage in different parts of the Philippines, first attention being devoted to the more densely populated areas. The importance of fully alerting the public to the results of these studies is underlined;

- (ii) On the basis of the results of these studies:

- (a) Zoning laws be enacted to prevent development and bad land use in areas of high risk;

- (b) The present building codes be kept under constant review and new findings considered for improving the present legislation covering wind and water damage caused by typhoons and floods;

- (iii) The National Economic Development Authority, as the highest planning body, support and co-ordinate the action mentioned in (i) and (ii) above.

30. Relations between NDCC and community preparedness/disaster prevention agencies

The Mission was made aware of difficulties encountered by some national agencies engaged in community preparedness and disaster prevention in taking

decisions on the basis of the 24-hour forecasts of expected wind speeds when a typhoon approached. A case in point was the Department of Education, which was statutorily obliged to order the suspension of school classes upon issue by PAGASA of public storm signal No. 2 (winds of 35-55 knots expected within 24 hours).

This problem reveals the need of the agencies for additional advice on expected weather conditions throughout the 24-hour period. As NDCC is the focal point for all information during the approach of a typhoon, to meet this requirement the Mission recommends that:

- (i) All community preparedness/disaster prevention agencies attach an officer to NDCC during emergency periods when a PAGASA officer is already on duty;
- (ii) The PAGASA officer provide additional and more detailed advice on the expected weather conditions to enable the community preparedness/disaster prevention agencies to take the decisions which their responsibilities entail;
- (iii) As far as is practical and compatible with the long periods of duty that may be involved, each agency endeavour to depute the same officers for this duty whenever the need arises for their presence at NDCC. This recommendation is made because the ability to take wise and meaningful decisions will come only as the result of experience in interpreting the information provided by the PAGASA officials;
- (iv) Workshops or seminars be introduced as soon as possible which will enable community preparedness/disaster prevention agency officers assigned to NDCC to understand adequately the consequences of the meteorological advice available to them from PAGASA, and to enable PAGASA to understand more fully the requirements of users;
- (v) PAGASA study how it can best provide the above workshops or seminars for the staff of community preparedness/disaster prevention agencies.

31. Regional meetings at the national level for the discussion of common problems and the promotion of a better understanding of the roles of the agencies involved in the disaster system

The attachment of officers from government departments and PNRC to NDCC during emergency periods had already helped considerably in integrating the different components of the typhoon warning system into a co-ordinated whole. The Mission observed, however, that the meetings it had held during its visits often brought together staff who had not previously been in contact. The development of those new contacts was felt by all to be beneficial in leading to a better

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understanding of the role of each in the total system. The wish was expressed that those new contacts be continued and expanded after the departure of the Mission.

The Mission accordingly recommends that:

- (i) Regular (possibly monthly) meetings be held during the non-typhoon season, with the participation of all involved government departments and PNRC;
- (ii) These meetings be convened by NDCC, which has the function of overall co-ordination of the national disaster prevention system;
- (iii) At the meetings, stress be laid on the need for close interagency planning of all aspects of community preparedness and disaster prevention;
- (iv) These meetings be used for lectures and discussions designed to promote a better understanding of the functions of each of the agencies participating. After every typhoon season, they should be devoted to reviewing the experience gained during the season and to recommending further improvements. NDCC should prepare a programme to ensure a rational and progressive improvement in interdepartmental relationships.

32. Test exercises at the local level

It was the impression of the Mission that the relative frequency of natural disasters in the Philippines had, to some extent, obscured the need for regular test exercises, which served as a timely check on the state of preparedness. That fact appeared to be of particular relevance at the local level.

The Mission therefore recommends that:

- (i) Provision be made for regular test exercises at the local level in which all agencies involved should participate;
- (ii) At least one such exercise be conducted at all levels immediately before the main typhoon season begins (probably in May).

33. Public education material, particularly for use in schools

The Mission, accompanied by representatives of PAGASA, was privileged to have discussions with the Secretary and Under-Secretary of the Department of Education and Culture (DEC). Although a small amount of public education material was already available, it was of a general nature and did not deal specifically or in a graphic manner with typhoons and floods. Representatives of several departments expressed the need for a much more vigorous campaign of public education, slanted especially at young people. That situation was explained to the Secretary of Education, with reference to the recommendations to that effect under the WMO Tropical Cyclone Project and with proposals for co-operation between DEC and PAGASA in instituting a new programme to educate the young. The proposals were accepted with enthusiasm by DEC and arrangements made for early contact with PAGASA to draw up a detailed programme.

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These recommendations are enumerated below:

- (i) A new programme of education in typhoon and flood dangers should be jointly prepared by DEC and PAGASA for inclusion in the present school curricula in social studies;
- (ii) Advice on the design of suitable material for (i) above should be provided by WMO to PAGASA as part of its Tropical Cyclone Project;
- (iii) The above material should be expanded to include some suitable for adult public education purposes. Agencies such as PNRC should be invited to participate actively in the public education process;
- (iv) In implementing these recommendations, special attention should be given to the need to produce graphic, eye-catching material likely to have the maximum impact upon the public. The need for the use of local languages should be taken into account and the maximum use made of press, radio and TV to acquaint the public fully with the national arrangements for protecting them from typhoons and floods.

34. Assistance to the community preparedness agencies by the Bureau of Telecommunication

The facilities afforded by the Bureau of Telecommunication were admittedly the most extensively used by the community preparedness agencies in disseminating warnings and information to and from disaster stricken areas. However, as indicated earlier [para. 25(a)], the modern techniques available to the Bureau of Telecommunication were limited to major cities only. The rural areas were constrained to overburdened station-to-station contacts which could be often disrupted so that essential messages for priority action were invariably delayed. Such delays no doubt hindered disaster preparedness activities and could seriously impair the local economy through loss of lives and properties requiring a recovery period development efforts could ill afford.

The Mission recommends that:

- (i) The Bureau of Telecommunication, which is so vital a component in the over-all system of community preparedness and disaster prevention, be given urgent support to strengthen and extend its services to permit it to fulfil its role adequately;
- (ii) The facilities accorded by the Bureau of Telecommunication services to community preparedness agencies during disasters be extended to allow for comprehensive messages, covering also the pre- and post-disaster periods.

35. Interpretation of warnings to fishermen by community preparedness agencies

The responsibilities of PAGASA for the issue of typhoon warnings included the coastal waters around the Philippines. Those waters were used extensively by local fishermen in small boats which were not, and perhaps could not be, equipped with even the simplest radio receiver. It was therefore impossible to recall them to safe shelter upon the approach of dangerous weather conditions. Their safety consequently depended upon the provision of adequate advice before they left port.

It was the view of the Mission that community preparedness agencies could play a vital role in interpreting the warnings to local fishermen to ensure that they did not put to sea when dangerous weather was expected to affect the area in which they would operate. The ability of the local staff at community preparedness agencies to undertake that function would call for some limited training in the interpretation of warning messages.

The Mission recommends that:

- (i) The staff of community preparedness agencies in coastal areas be charged with advising local fishermen whether they should put to sea on occasions when a storm warning has been issued by PAGASA;
- (ii) The community preparedness agencies arrange, with the co-operation of PAGASA whenever necessary, for training local staff in the interpretation of storm warning messages to the extent needed in order that they may be able to provide this advice;
- (iii) Community preparedness agencies investigate the possibility of providing transistor radios to fishermen for installation in their boats whenever feasible.

III. JAPAN

Report on the Mission's activities

36. Prior to the formal beginning of its work in Japan the Mission had preliminary discussions with officials of the Ministry of Foreign Affairs on the programme to be carried out during its visit. A comprehensive programme following the lines previously proposed to the Government of Japan was agreed upon.

37. The programme began with a joint meeting held at the Ministry of Foreign Affairs at which the purposes and objectives of the Mission were explained in detail. This meeting was attended by representatives of 13 ministries and agencies, the Tokyo Metropolitan Government, the Japan Red Cross Society and the Nippon Telegraph and Telephone Public Corporation. An address of welcome to the Mission was made by Mr. Hiroshi Sugioka, Councillor of the Secretariat of the Central Disaster Prevention Council, Prime Minister's Office. The joint meeting was held under the chairmanship of Mr. Makoto Taniguchi, Director of the Economic Affairs Division, United Nations Bureau, Ministry of Foreign Affairs. The Ministry of Foreign Affairs acted as the co-ordinating body for all arrangements in connexion with the Mission's programme.

38. Subsequently, individual visits for discussions with the officials concerned were made to the Prime Minister's Office, the Fire Defence Agency, the Japan Meteorological Agency, the Ministry of Construction, the Ministry of Agriculture and Forestry, the Ministry of Transport, the Ministry of Health and Welfare, the Japan Red Cross Society and the Tokyo Metropolitan Government. The last of these visits included a tour of inspection of some of the public facilities for disaster prevention in the Koto Ward of eastern Tokyo.

39. The Mission was also privileged to be taken on a two-day study tour of similar facilities in a rural area of the Chiba Prefecture. The visits in both Tokyo and the rural area were important in giving the Mission a practical understanding of some of the problems of community preparedness and disaster prevention in Japan and of the ways in which those problems were being overcome.

40. This report on the Mission's work in Japan, including the observations and recommendations that follow, was discussed and approved at a final joint meeting again attended by representatives of all the interested national bodies.

41. Throughout its visit to Japan the Mission was treated with great courtesy and given every assistance in accomplishing an extremely difficult task. Skilful and patient explanations of the interlocking responsibilities of the large number of national bodies involved in disaster prevention were given by many persons too numerous to be mentioned individually here. The Mission wishes to record its sincere thanks to each and every one of them. It further wishes to express its deep gratitude to the Government of Japan for agreeing to receive the visit and for planning and executing an extremely well-thought

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out and highly organized programme of activities for the Mission. It is the hope of the Mission that the results of its visit to Japan may in some measure contribute to improving the preparedness system in other countries and, hence, to reducing the loss of life and the damage caused to national economies by typhoons and floods.

Observations

42. There can be few, if any, countries in the world in which greater and more continuous attention is being given to community preparedness and disaster prevention than in Japan. That this should be so is understandable in the face of the constant threat typhoons, floods, earthquakes, landslides, fires and marine disasters pose for the country. Nevertheless, it is, in the view of the Mission, unlikely that any other country, however prone it may be to disasters, has developed a defensive system as complete and detailed as Japan.

43. The Mission was, of course, conscious of the broad lines of the system before its visit to Japan through information appearing in publications such as "A review of the existing disaster prevention organizations against typhoons and floods in the member countries of the Typhoon Committee" published by TCS in August 1972 (revised version). It was also aware that there were many national publications, mostly available only in the Japanese language, describing the disaster prevention system and laying down detailed responsibilities for all concerned. The Mission was not fully prepared to discover how extensive and complete that material was.

44. At every stage of its work in Japan, and especially during the discussions already mentioned, the Mission was provided with voluminous printed and mimeographed matter relating to the organization of the system and the activities and responsibilities of the national bodies. Those papers that were indispensable to an understanding of the system ran to many hundreds of pages. Publications, brochure and maps increased that figure by a factor of at least three. It was obvious that, with its heavy programme of meetings and visits, the Mission could not study and analyse thoroughly so much material during the short period it was in Japan. The Mission had, perforce, to be selective and makes no pretence to have given that wealth of information the close attention it deserved.

45. The above remarks should not be interpreted in any way as criticism of the Japanese authorities in furnishing the Mission with more information than it was capable of absorbing. Indeed, the preparations made by the Government were undertaken with a remarkable and wholly praiseworthy thoroughness. It is noteworthy that many of the essential papers were translated and even printed in English specially for the Mission's visit. Important fundamental material such as the "Disaster Counter-measures Basic Law and Related Laws and Ordinances" thus became available for the first time in a language other than Japanese. The Mission gave particular attention to the basic material of that type so that it could understand the structure of the disaster prevention system in Japan.

46. It may be recalled that the primary objectives of the Mission were to gain this understanding and to see to what extent and how the knowledge and experience of Japan in this field could be applied in other countries. The Mission has endeavoured to confine the scope of its activities to these specific objectives and the recommendations that follow later in this report reflect this fact. It is fully recognized that a great deal more time must be devoted to the study of the complete documentation provided to the Mission and proposals to this effect are also made later in the report.

47. As part of the objectives specified in the previous paragraph, it was hoped that a synthesis of Japan's disaster prevention system could be included in this report. Here again the Mission has found itself in a dilemma. The system is based upon the Disaster Countermeasures Basic Law and operates on a three-tier structure -- national, prefectural and municipal. There are 47 prefectures in Japan and 3,290 municipalities. Each must have its own disaster prevention plan. The State has the basic responsibility, through its designated administrative organs (25), for the drafting of a plan which will provide a basis for disaster prevention and emergency measures to deal with such disasters and rehabilitation, and shall implement the plan by law. In addition, the State shall ensure the performance of operations relating to disaster prevention to be undertaken by designated local administrative organs (25), designated public corporations (20) and designated local public corporations. A description that would do justice to this intricate, complex and interwoven organization is beyond the scope of this report. The Mission

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has accordingly limited itself to an outline of the main features of the system which, it is hoped, will give readers of the report a general idea of how the system is organized.

48. The Mission wishes to emphasize that the outline given cannot be considered a satisfactory substitute for a full description. Such a description must await the detailed study of all the documentation but its preparation is regarded by the Mission as an important task deserving of early attention. It is proposed that it could most suitably take the form of a manual providing guidance for the preparation of similar comprehensive plans upon which other countries could draw in organizing or improving the organization of their own community preparedness and disaster prevention systems (see under "Recommendations").

Outline of the disaster prevention system

49. The disaster prevention system in Japan is built up fundamentally on the Disaster Countermeasures Basic Law (Law No. 223, 15 November 1961 and subsequent revisions) and the Basic Disaster Prevention Plan (adopted 14 June 1963). In this context it may also be mentioned that the above is complemented by the "Essentials of Earthquake Countermeasures for Larger Cities" (adopted 25 May 1971). This, however, is not dealt with in this report as it is outside the terms of reference of the Mission.

(a) Disaster Countermeasures Basic Law

50. This law provides for the establishment of a machinery working through the State, local governments and public corporations, for the formulation of disaster prevention plans and basic policies relating to preventive and emergency measures, and for rehabilitation programmes to deal with disaster. As stated earlier, it operates on a three-tier structure requiring detailed plans at all levels. Further laws have been formulated to provide for the necessary financial measures to ensure an effective, organized and comprehensive administration of disaster prevention activities, disaster relief and rehabilitation.

51. In the organization for disaster prevention, a Central Disaster Prevention Council has been established within the Office of the Prime Minister having over-all responsibilities for the formulation and implementation of basic disaster prevention and emergency relief plans, and other matters related thereto. The Prime Minister serves as Chairman of the Council and appoints members from among chief officers of designated administrative organs and persons with pertinent knowledge and experience, including those from designated public corporations. He also has the prerogative to appoint technical experts in order to investigate matters requiring expert knowledge; they serve on the Council only in a temporary capacity.

52. The Central Disaster Prevention Council has a Secretariat to transact its business which involves, inter alia, the seeking of adequate data, opinions and co-operation from appropriate national or local agencies, as well as the making of recommendations or providing instructions to them.

53. Similarly, local disaster prevention councils at the prefectural and municipal (city, town or village) levels, under the chairmanship of the governor and mayor respectively, are constituted under prefectural and municipal ordinances. When it is deemed necessary, joint committees of local disaster prevention councils may be formed by mutual agreement at the prefectural and municipal levels where the disaster-prone area falls within the jurisdiction of more than one prefecture or municipality. The organization of the prefectural disaster prevention council follows that of the Central Disaster Prevention Council, and that of the municipal disaster prevention council, the model of the prefectural disaster prevention council. The Prime Minister may also, when deemed necessary, instruct the prefectural governor to establish a joint committee of prefectural disaster prevention councils, and the governor likewise may instruct the mayor to establish a joint committee of municipal disaster prevention councils. Once such joint committees of local disaster prevention councils have been constituted it is required that the Prime Minister, governor or mayor make this action public.

54. Notwithstanding the foregoing, in the event of a major disaster the Prime Minister may, if necessary, given the dimensions of the disaster and other related considerations, establish in his office on a temporary basis a headquarters for major disaster control. The designation of such headquarters, its jurisdiction and duration, is determined by the Prime Minister in consultation with the Cabinet. Its designation, jurisdiction and abolition is to be made known to the public. The chairman shall be selected from among cabinet ministers and the vice-chairman and other members shall also be appointed by the Prime Minister. The headquarters is responsible for the over-all co-ordination of the emergency measures under the disaster prevention plan and the implementation of the provisions thereunder.

55. The governor of a prefecture or the mayor of a municipality may, as part of emergency or rehabilitation measures, request national or local administrative organs to dispatch officials to assist in the carrying out of their responsibilities. They may also seek the intercession of the Prime Minister or the governor of another prefecture for limited action. It is to be noted that the prefectures or municipalities requesting such assistance will provide allowances as laid down under the ordinances. Also in the interest of efficiency, the Prime Minister is provided by the chief officer of a national or local administrative organ, or the governor of a prefecture, with data at regular intervals indicating the number of officials by profession who have pertinent skills, knowledge or experience in this field with a description of the degree of their skills, knowledge or experience.

56. The formulation of a basic disaster prevention plan, as stated earlier, falls within the purview of the Central Disaster Prevention Council and is to be reviewed each year in the light of the experience

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gained and revised as may be necessary. In the event of such revision all interested parties are to be informed. The basic disaster prevention plan comprises a long-term comprehensive plan for disaster prevention and those matters to be stressed in operational disaster prevention plans and local disaster prevention plans. It is to be noted that the basic disaster prevention plan serves as a model for both prefectural and municipal level plans covering all aspects of disaster prevention, emergency measures and rehabilitation. It also contains all relevant data for disaster prevention, relief and rehabilitation.

57. Further, the operational disaster prevention plan provides for measures to be undertaken for disaster prevention by designated administrative organs and for those matters which will serve as standards for the formulation of such plans. Provision is also made for the co-ordination of all operational plans so as to ensure an integrated whole at both stages of formulation and implementation. It is of importance to note that there must not be any inconsistency between operational disaster prevention plans drawn up by designated administrative organs and the basic disaster prevention plan.

58. Prefectural and municipal area disaster prevention plans are drawn up on similar lines, as are those for areas designated by more than one prefecture or municipality. In addition the plans at the prefectural and municipal levels will include provision by category of operations, such as investigation and research, public education, test exercises, forecast, alarms, stockpiling, distribution, rehabilitation, etc. For the revision of the basic disaster prevention plan at the national level, the Prime Minister shall consult with the Central Disaster Prevention Council. When a prefectural or municipal disaster prevention plan is to be revised, the local disaster prevention councils shall consult with the Prime Minister and the governor of the prefecture respectively.

59. National and local administrative organs, public corporations and other agencies given responsibilities under the Disaster Countermeasures Basic Law for the prevention of disasters, disaster relief and rehabilitation are required by the Law to carry out their respective responsibilities in the most efficient manner. Except as otherwise specified by ordinance, or when special action is required, expenses incurred for disaster prevention and relief shall be borne by the designated agencies and local governments. For rehabilitation, they may be shared between the central and local governments and the victims, depending upon the extent of the disaster.

60. In the event of an extraordinary disaster which affects the national economy and public welfare seriously, the Prime Minister may declare a state of emergency following consultations with the Cabinet. Such a declaration is to have the consent of the Diet within 20 days or at the earliest session when the Diet is in adjournment. A temporary headquarters for extraordinary disaster countermeasures, headed by the Prime Minister, shall be constituted in the Prime Minister's Office and shall exercise functions similar to those of the headquarters for major disaster countermeasures, in addition to those required by the extraordinary disaster situation.

61. The Disaster Countermeasures Basic Law finally provides not only for distinguished service awards in disaster prevention, but also has provisions for penal action in the event of non-compliance.

(b) disaster prevention plan

62. The ultimate objective of the basic disaster prevention plan is none other than the removal of the causes of disaster. However, in the light of present-day conditions, the plan seeks to provide a basis for policies for the prevention of disaster, the reduction of loss of life and damage caused by disaster, and rehabilitation after disasters. It also sets standards for the formulation of operational and area disaster prevention plans.

63. As part of a comprehensive long-term policy, emphasis is placed upon:

(1) Establishment of a machinery for disaster prevention. (1)

The state, local government and the entire nation to be brought to a state of early readiness for action in disaster preparedness and, in particular, for:

- (i) The strengthening of disaster preparedness activities of the various responsible agencies;
 - (ii) The encouragement of popular participation and initiative in these activities;
 - (iii) The maintenance of a high level of efficiency of the establishments and equipment for disaster prevention.
- (2) Promotion of disaster prevention activities.
- The systematic promotion of measures for the conservation of the land, restructuring of cities to withstand disaster, and other environmental safety measures.
- (3) Facilitating rehabilitation efforts.
- Rehabilitation programmes and aid for disaster victims to be made more rapid and appropriate.
- (4) Promotion of research in the science and technology of disaster prevention.
- A research programme in the science and technology of disaster prevention, including control of the causes that bring about disaster, will be established and pursued systematically.

64. The above-mentioned points are covered in the most minute detail and provide the base for further development by the respective agencies in their specialized fields. The indications contained in the subsequent chapters of the basic disaster prevention plan are so precious that they cannot but be of the utmost value to other countries. The Mission has therefore made further proposals for the use of this material in the section of the report headed "Recommendations".

65. In the practical application of the Disaster Countermeasures Basic Law and the disaster prevention plan, the major facets that have been given considerable attention and importance are outlined below as they will certainly be of great value and benefit to others.

(1) Warning system

66. Japan has advanced meteorological and hydrological services equipped with the most modern facilities for the collection, transmission and analysis of the basic information required for the prevention of national disasters.

It is fully conscious of the contribution these services can and must make to the safety of transportation, the prosperity of industry and the promotion of the public welfare. To this end the Japan Meteorological Agency (JMA) and the Ministry of Construction carry out meteorological and hydrological observations, collect and disseminate these data, and issue forecasts and warnings based thereon. The system covers the entire nation.

67. Information for general use includes weather and flood forecasts for various periods, advisories and warnings. Advisories and warnings are issued when there is a risk of damage or serious damage being caused by meteorological and/or hydrological phenomena. They cover storms and heavy rainfall, high tides, sea waves, storm surges and floods, as well as other dangers not associated with typhoons. Specific information is provided for flood defence activities, shipping, aviation, railways, electric power facilities and for fire prevention.

68. The Weather Administration Law (1952) and the Flood Defense Law (1949) specify those national organizations to which warnings must immediately be conveyed and the responsibilities of those organizations for the onward transmission of the warnings to all users.

69. Under this heading it must be mentioned that JMA and the Ministry of Construction have joint responsibility for the issue of flood forecasts for 18 major river basins in Japan. Flood defence warnings are issued for those river basins, as well as for the remaining 97 river basins in Japan by the Ministry of Construction.

70. In accordance with the Disaster Countermeasures Basic Law, both JMA and the Ministry of Construction have established disaster prevention programmes to contribute to the maximum to the prevention of disasters. Important features of these programmes worthy of mention are education and training of a technical nature relative to disasters, and comprehensive activities designed to spread information to the general public through schools and other media. Continued research to promote improvement of the already excellent system, as well as public relations in times of emergency, are also given a prominent place in these programmes.

(2) Risk evaluation

71. Japan's vulnerability to many forms of natural disaster has led to intensive risk evaluation studies being carried out by many national agencies, particularly the Ministries of Construction, Home Affairs (Fire Defence Agency), Agriculture and Forestry, and Transport (Marine Safety Agency). In accordance with the Disaster Countermeasures Basic Law these Ministries are continuously making risk evaluations and enforcing conservation programmes with popular participation. Particular emphasis is given to conserving the upper forest lands, important river basins, mountain villages and areas surrounding the larger cities. Efforts are being made to protect the coast against tidal waves, flood tides and unusually high surges in order to prevent damage to farmlands and farm facilities, and to fishing harbours and related installations.

72. In the study and implementation of these projects close contact is maintained between Ministries to ensure co-ordination. The areas designated as danger zones following risk evaluation are "protected" in that specific precautionary measures are undertaken by the responsible authorities. Similarly hazardous areas specified in article 39 of the Building Standards Law are subject to precautionary measures against tidal waves, storm surge or flooding through guidance given by the Ministry of Construction.

73. This Law also makes provision for basic building codes to be followed, and similar legislation covers zoning and urban redevelopment to ensure a safe environment.

(3) Flood control structures

74. A vast and costly programme of flood control structures has been pursued in Japan over many years, and will continue. Legislation such as that contained in the Flood Defence Law and the River Law recognizes the importance of levee protection and the control of rivers being executed by the Ministry of Construction, prefectures and municipalities. The Ministry provides the necessary recommendations and advice to prefectures and flood defence organizations, which take appropriate action through the assistance of municipalities, as stated in the Flood Defence Law. For, as required under articles 3 to 6 of the Flood Defence Law, "Prefectures shall have the responsibility of ensuring that sufficient flood defence is executed in the area by flood defence control organizations."

75. Under the same law, municipalities have the principal responsibility for executing emergency levee protection within the area of their jurisdiction. Under the River Law, the Ministry of Construction approves plans for, provides guidance and assists in the construction of dams, weirs and gates in close co-ordination with the prefectures and municipalities. All administration (this includes construction and maintenance) of Class A (major) rivers falls within the purview of the Minister of Construction. Class B (minor) rivers are administered by the prefectural governor(s) for the same purposes. Provision is made under article 13 of the River Law for all structures to be of safe construction based on structural standards fixed by the Ministry.

76. Under article 14 of the Coast Law provision is made for "Construction standards of coast protection facilities". This Law also empowers the prefectural governor to take all necessary steps to prevent the inroad of, or the submersion by sea water of coastal zones. In so doing he is required to consult with Ministries such as Agriculture and Forestry, Transport and Construction.

77. The Ministry of Agriculture and Forestry (Forestry Agency) is responsible for erosion control work and other soil conservation projects in order to prevent landslides, etc.

(4) Health and welfare

78. Health and welfare responsibilities relating to disasters fall under the Ministry of Health and Welfare, which is assisted by the Japanese Red Cross Society. The responsibilities of each of these agencies are defined under the Disaster Countermeasures Basic Law and the Disaster Relief Law.

79. As provided for under these Laws the prefectural governor and the mayor respectively are responsible for co-ordinating all matters relative to health and welfare. They ensure that necessary personnel, materials and facilities are available, or take compulsory measures to obtain such facilities. The efforts of the prefectures and municipalities are subsidized through grants in aid.

80. Although the role of the Japanese Red Cross Society is that of an auxiliary to the public authorities, the main tasks allotted to it include:

- (1) Emergency disaster relief, including medical services, midwifery and disposal of dead bodies;
- (2) Liaison and co-ordination of assistance by local public bodies or individuals under the direction of the Government;
- (3) Through its volunteer corps, assistance in feeding, distribution of relief, services in shelters, transportation of blood and emergency supplies, tracing of missing persons, communication and correspondence, collection and distribution of contributions in cash and kind.

81. In order to achieve the foregoing, the Society has a disaster prevention plan which is incorporated into the local disaster prevention plan of the prefectural government. As part of its disaster preparedness, the Society not only trains personnel but ensures the availability of doctors, nurses and midwives at all times. It further ensures that relief equipment and material shall be available for quick distribution through a decentralized system. The Society also avails itself of the services of the Japan Amateur Radio League and the Flying Corps of the Red Cross for obtaining and disseminating information, conducting surveys, and transport.

82. The Society has been assigned special frequencies for emergency communications.

(5) Disaster logistics

83. The main responsibilities for transport under the Disaster Counter-measures Basic Law are assigned to the Ministry of Transport, which has under its jurisdiction the integrated administration of water transport, railway and road transport, as well as aviation.

84. In order to meet the responsibilities placed upon it, the Ministry concentrates on these main fields:

- (1) Prevention of coastal and harbour disasters and restoration of damage (see paragraph 76);
- (2) Activities for preventing disasters at sea and rescue operations by the Marine Safety Agency (MSA);

85. MSA broadcasts in both Japanese and English forecasts of and warnings against typhoons, tidal waves and other weather conditions transmitted to it by JMA. These broadcasts are intended for all shipping, including fishing vessels. Regular meetings and training courses are also held for mariners so as to propagate a greater understanding of the messages diffused and the steps to be taken as part of self-defence. It has 126 marine safety offices at bases throughout Japan to respond to distress calls, and patrols areas dangerous for navigation. MSA responds to requests made by municipalities and prefectures in accidents or emergencies. It has the possibility, through its aircraft and patrol vessels, of rescuing survivors, transporting relief supplies and of maintaining communications with the interested organizations while taking the necessary measures to minimize or prevent further damage.

(3) Transport services in times of natural disaster

86. Through its highly developed network of railways, Japanese National Railways (JNR) plays an important nation-wide role in mass transportation of materials. In so doing it co-operates closely with prefectural and municipal authorities and other organizations. JNR, through its "Rules for the prevention of disasters and for management in case of disasters", provides for emergency measures including alternate transport facilities and the quick re-establishment of services.

87. The Minister for Transport is also empowered through the Law of Marine Transportation (1949); the Law of Transportation at Ports and Harbours (1951); and the Law of Road Transportation (1951) to order other carriers to undertake emergency transportation.

88. As regards the stockpiling and supply of the material and equipment needed for disaster prevention measures (e.g., sandbags, rope, logs, mallets, etc.) each municipality is basically responsible. The cost of constructing flood defence depots for such material is subsidized by the Ministry of Construction. For transport and other heavy equipment the municipality is required to have its own resources. Where the municipal resources prove to be inadequate to cope with the scale of the disaster, the mayor may seek outside support.

89. The stockpiling of relief supplies (e.g., food, blankets, tents, boats, etc.) is again the responsibility of the prefectural governor or the mayor, at their respective levels, whereas public corporations such as the Japanese Red Cross Society have stockpiles at chapter level, supplemented at the national level.

(6) Rehabilitation

90. Under article 87 of the Disaster Countermeasures Basic Law each designated national or local administrative organ, executive agency or public corporation is responsible for those rehabilitation measures falling within its own domain. In some instances expenses are met by the Government in part or in whole, the responsibility for the fixing of such amounts devolving upon the competent Minister as set out in article 88 of the Law. This is done on the basis of reports from prefectural governors, data from other local governments and results of on-the-site investigation. Such action is to be reported to the Central Disaster Prevention Council (article 89).

91. Provision for special financial measures is contained in articles 91 to 104 of the Basic Law, which cover both those applicable to disasters of normal scale and those for a disaster of extreme severity.

92. Notwithstanding the foregoing, it is extremely important to stress the existence of a wide spectrum of compensation systems through the various national agencies. They cover assistance to individuals, small- and medium-scale enterprises, agriculture, forestry and fishing, and local governments, etc., through low interest long-term loans and grants in aid.

(7) Public education, training and text exercises

93. Traditionally, Japanese society has for decades been responsible for safety within the community. The Disaster Countermeasures Basic Law and related laws and ordinances have been built up on the concept that the first responsibility for the prevention of disasters rests with the people - the municipalities, prefectures or national agencies providing the guidance and logistic support necessary.

94. The popular participation concept is most evident in the flood defence system, where volunteers from villages in flood-prone areas and agencies such as the Japanese Red Cross Society take vigorous action in times of disaster. The various agencies involved in disaster prevention and relief carry out, as part of their disaster preparedness programme, not only the training of volunteers for active service but also campaigns to educate the public. In addition, agencies such as the Ministry of Construction and MSA have disaster prevention training meetings and courses for all governmental and other officials. These are organized in co-operation with interested agencies and include test exercises with the actual evacuation of people.

95. Flood fighting exercises are held yearly at sites of rivers or sea coasts which have a known bearing on flood prevention. Such training includes temporary constructions such as roads, houses, bridges or coffer dams which are frequently provided as emergency measures.

96. Propaganda and public relations activities for disaster prevention are also undertaken through "flood prevention exercise meetings", "river and road protection campaigns", "construction weeks" and "disaster prevention days". These campaigns emphasize that it is the duty of the public to participate in flood fighting and to evacuate when danger impends.

97. The various national agencies provide a series of most interesting manuals, texts, brochures, posters, maps and other similar material for use at the prefectural level, which, in turn, provides similar material to the municipalities for dissemination by them to the public. Simultaneously, instruction is given through schools on safety and disaster prevention measures. It must be stressed that the material provided is geared to teaching the public that the first responsibility for disaster prevention lies with them.

(8) Public information and communications

98. Japan being a country where the mass media are very highly developed and reach even the remotest corners of the land, the various agencies responsible for disaster prevention use these facilities extensively. The media lend themselves most readily not only to the diffusion of forecasts and warnings but also play a major role in disseminating information on disaster prevention measures to the general public during non-disaster periods.

99. The posts and telecommunications authorities also have extensive plans for servicing the country in times of disaster through preventive measures against the interruption of communications. For example, the Nippon Telephone and Telegraph Public Corporation has, following past experience during disasters, concentrated on planning a network for reliability engineering which covers the protection of telephone and data services from unforeseeable breakdowns. The present system includes:

Mobile radio equipment to prevent isolation)	for city, town and village offices and their branch offices where danger of isolation is foreseeable.
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Portable mobile radio equipment)	for telephone offices of toll centre rank and of district centre rank.
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Large-capacity mobile radio vehicles)	for each telecommunications bureau
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Mobile radio equipment to cope with disaster in cities)	for major cities.
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100. It should also be mentioned that all the major national agencies involved in disaster prevention have their own telecommunication networks.

Recommendations

101. As stated in the section entitled "Observations" earlier in this report one of the major aims of the Mission was to endeavour to determine how the knowledge and experience of Japan in community preparedness and disaster prevention could be applied in other countries. The main body of the report portrays

/the broad

the broad organization of the disaster prevention system in Japan and provides general guidance which should serve to aid these countries. The Mission wishes to emphasize that the recommendations which follow are made solely with this object in mind. It was not the function of the Mission to set forth recommendations concerning the organization or operation of the disaster warning system in Japan itself - a task for which, in any case, it could hardly claim to be qualified. Nevertheless, the Mission has taken the liberty of making proposals to the Government of Japan for action designed to benefit other countries suffering from natural disasters such as typhoons and floods. The order in which the recommendations appear must not be interpreted as an indication of their relative importance.

1. Guidance for the organization of effective disaster prevention systems against typhoons and floodsThe Mission recommends that:

(i) A detailed study be made as soon as possible of all the material amassed during its visit to Japan;

(ii) This study be directed towards the early compilation and publication of a manual providing guidance for the organization of effective disaster prevention systems which could be used in those countries where the present defensive system against typhoons and floods is capable of improvement;

(iii) ECAFE and WMO, with the co-operation of LRCS and TCS, investigate as a matter of urgency how the proposed guidance could best be compiled and published;

(iv) The Government of Japan be approached by the above organizations as may be required to provide additional advice and guidance in the execution of this recommendation.

2. Regional seminar on community preparedness and disaster prevention for the member countries of the Typhoon CommitteeThe Mission recommends that:

(i) The Government of Japan study the possibility of organizing a regional seminar on community preparedness and disaster prevention for the member countries of the Typhoon Committee, as soon as it is convenient;

(ii) The regional seminar be organized in close co-operation with ECAFE, WMO, LRCS and TCS;

/(iii)

- (iii) Participants from other disaster-prone countries also be invited to attend the seminar.

3. Disaster Countermeasures Basic Law and Related Laws and Ordinances

The Mission recommends that:

- (i) The publication "Disaster Countermeasures Basic Law and Related Laws and Ordinances" and the basic disaster prevention plan included therein, now available for the first time in English, be distributed by TCS to all member countries of the Typhoon Committee;
- (ii) The Government of Japan be requested to provide sufficient copies for this purpose and consider making available extra copies for distribution by ECAFE, WMO and LRCS to other countries afflicted by natural disasters.

4. Translation into English of an example of a rural area disaster prevention plan

The Mission recommends that:

- (i) The Government of Japan translate into English the disaster prevention plan for Sakae Machi as an example of such a plan for a rural area so that it may be made available to other countries;
- (ii) TCS distribute copies of the plan to all member countries of the Typhoon Committee;
- (iii) ECAFE, WMO and LRCS consider the desirability of giving the plan a wider distribution to other countries afflicted by natural disasters

5. Services of experts in community preparedness and disaster prevention in the Typhoon Committee Secretariat

The Mission recommends

that the Government of Japan study the feasibility of providing experts in different aspects of community preparedness and disaster prevention for periodic short-term service with TCS on a non-reimbursable basis.

6. Extension of international training courses

The Mission recommends

that the Government of Japan explore the possibility of extending international training courses, similar to the group training courses river engineering and flood forecasting conducted as part of its technical co-operation schemes for developing countries, to include training in other fields such as those covered by the Marine Safety Agency.

7. Public education material

The Mission recommends that:

- (i) The wealth of public education material existing in Japan should become available to other countries affected by natural disasters to aid them in promoting a sound public understanding of the hazards they face;
- (ii) The Government of Japan consider translating into English selected brochures, posters, etc., for this purpose;
- (iii) The selection of the material and its further distribution be carried out in consultation with ECAFE, WMO, LRCS and TCS.

IV. CENTRAL CONCLUSIONS AND RECOMMENDATIONS

102. The Second Joint Mission was planned and carried out at the request of the Typhoon Committee as a continuation of the work begun in 1973. It was the view of the Committee at its sixth session that missions of this type should be made to all its member countries. With the conclusion of the Second Mission five members have so far been visited (Hong Kong, Japan, the Philippines, the Republic of Korea and Thailand).

103. The Mission believes that substantial progress in the Typhoon Committee's programme on community preparedness and disaster prevention can result from the visits made to the Philippines and Japan in 1974. A large number of recommendations for further activities in this field were made to, and accepted by, the Government of the Philippines. It is essential that they be pursued with vigour. The Mission was impressed by the enthusiasm shown by many of those it met during the course of its work in the Philippines and considers that the visit served to stimulate a greatly increased awareness of the benefits accruing from closer co-operation between all involved in the disaster prevention system. Some proposals for follow-up action are made at the end of this section.

104. The complexity and depth of the disaster prevention system in Japan has been described in paragraphs 49 to 100 of this report. The Mission wishes to state its conviction that the organization of this system carries many invaluable lessons for other Typhoon Committee member countries. Although some cannot be transplanted direct and unmodified to countries where the governmental structure differs considerably from that in Japan, careful study

/will certainly

will certainly reveal ways in which these lessons may be adapted to other nations. Priority should be given to ensuring that the knowledge and experience gained by the Mission as a result of its visit to Japan is not lost, and that it constitutes a fund upon which other countries may draw in their endeavours to improve their own disaster prevention system.

105. As in 1973, the Mission's task could not have been carried out without the whole-hearted and enthusiastic support of all those involved in activities related to community preparedness and disaster prevention in the countries visited. The Mission wishes to place on record its sincere appreciation of the willing assistance it received from many persons in carrying out the work it was privileged to be entrusted with by the Typhoon Committee. These thanks are also extended to the Philippine National Red Cross, the Ministry of Foreign Affairs in Tokyo and the Japan Meteorological Agency, without whose facilities the present report could not have been completed during the mission itself.

106. In the light of the experience it has gained during its visits to five countries in 1973 and 1974, the Mission fully appreciates the Typhoon Committee's proposal that similar visits should be made to the remaining member countries, and believes they should take place as soon as possible. There are obvious advantages in completing the visits to all countries within a reasonable period of time. If the visits are spread over too long a period it is inevitable that some of the impetus gained by the expanded programme of activities in community preparedness and disaster prevention will be lost.

107. These and other considerations stemming from the Second Joint Mission are reflected in the general recommendations set out below.

General recommendations

1. That, as a follow-up to the Mission's work in the Philippines and in conjunction with the seventh session of the Typhoon Committee, to be held at Manila in October 1974, further discussions be held between members of the Mission and representatives of the national agencies concerned to review the progress made in implementing the recommendations appearing in part II of this report.

2. That the representatives of the Philippines and Japan be requested to make statements at the seventh session of the Typhoon Committee on the action taken on the recommendations of the Mission.

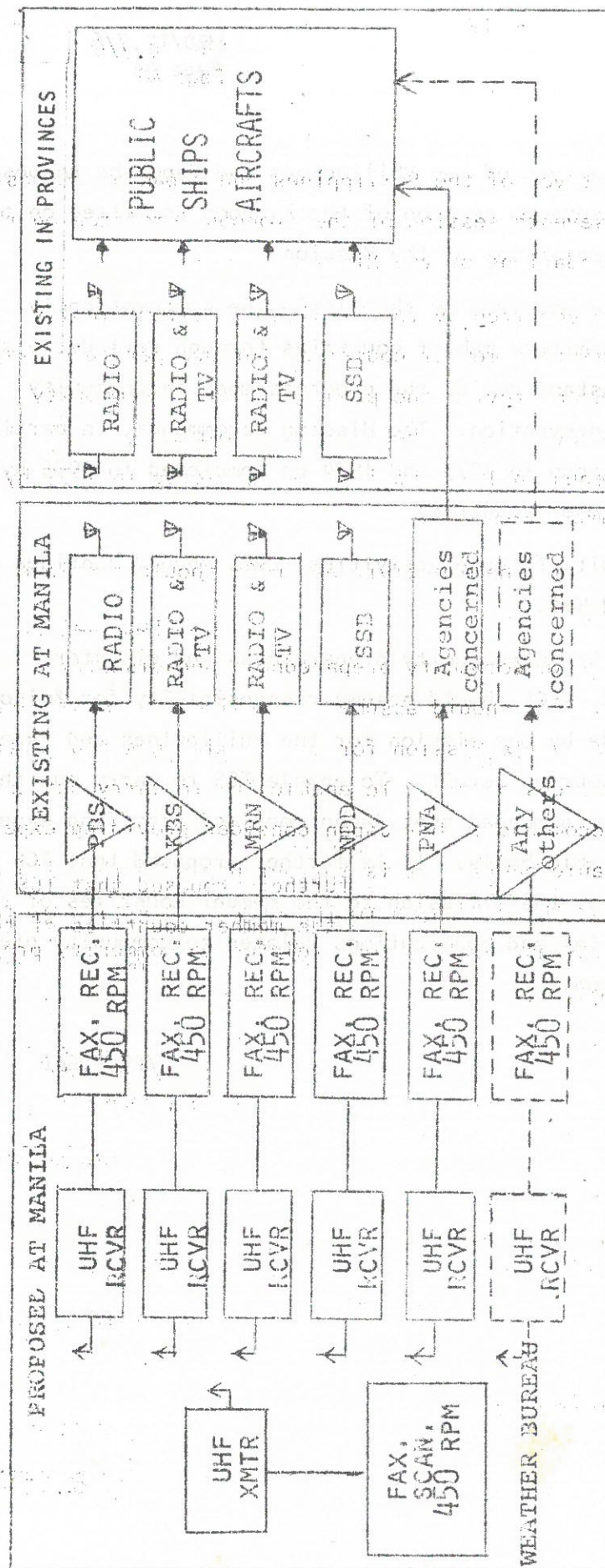
3. That the experience acquired by the Mission be systematically extended to all Typhoon Committee member countries through periodic visits arranged to keep under constant review the progress made in community preparedness and disaster prevention. The Mission recommends, in particular, that the round of visits begun in 1973 and 1974 be completed in 1975 by visits to the remaining member countries.

4. That, in the pursuit of these activities, LRCS should continue to act jointly with ECAFE and WMO.

5. That the role of TCS in community preparedness and disaster prevention be strengthened. TCS should assume responsibility for following up the recommendations made by the Mission for the Philippines and Japan to the extent that its resources permit. To enable TCS to carry out this function the Mission has recommended that Japan consider providing expert services on a non-reimbursable basis. It is further proposed that TCS serve as an information centre for the diffusion to the member countries of the Typhoon Committee of material and publications related to community preparedness and disaster prevention.

/PROPOSED

"HIGH SPEED FAX" - TYPHOON WARNING
TRANSMISSION SYSTEM



COST ESTIMATE

1.	UHF transmitter including ANT	-	\$US 5,000 x 2 =	10,000	-	For Weather Bureau
2.	FAX scanner (450 RPM)	-	5,000 x 2 =	10,000	-	For Weather Bureau
3.	UHF receiver including ANT	-	5,000 x 4 =	20,000	-	For KDS, PDS, PNA, MRN
4.	FAX recorder (450 RPM)	-	5,000 x 4 =	20,000	-	For "
	TOTAL			\$60,000		

ORIGINAL : ENGLISH

Typhoon Committee
Seventh session
8-14 October 1974
Manila

(Item 7 of the provisional agenda)

Note by the WMO secretariat

Introduction

1. At its sixth session, the Typhoon Committee was informed of the various other activities being undertaken as part of the WMO Tropical Cyclone Project or through its associated programmes. This document provides information on more recent developments in other tropical cyclone areas in order that the seventh session, may review the effectiveness of the present arrangements for the co-ordination of such activities and the exchange of information thereon.

WMO Tropical Cyclone Project

2. The Plan of Action for the WMO Tropical Cyclone Project, drawn up by the Executive Committee Panel of Experts on Tropical Cyclones, was circulated to all members in the beginning of 1973. Replies from members indicating whether they were willing to undertake some of the studies and development work called for in the plan continued to reach the secretariat during 1973. Subsequent analysis of the offers received revealed that a small number of countries are willing to undertake a substantial amount of work for the implementation of the Plan of Action. Consideration was then given to the best means of taking up these offers, bearing in mind that a large amount of

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/preparatory
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preparatory work was required to ensure co-ordination between the different parts of the implementation programme. To assist in the rational planning and execution of this work, a consultant with long experience in all aspects of tropical cyclone warning systems was engaged for three months in mid-1973. During this period he made a thorough review of the Plan of Action, drawing up a more detailed implementation programme. Certain of the recommendations by the consultant have been reviewed by the President of CIMO and the Secretary-General will presently distribute them to members. Since it has been found that a number of the countries have active programmes parallel to some elements of the Plan of Action, their support will also be solicited.

3. The growing scope of the collaboration between WMO and other international organizations with responsibilities for disaster prevention and relief should be outlined. Joint projects had been carried out and were continuing with the Economic Commission for Asia and the Far East (ECAFE) and with the League of Red Cross Societies (LRCS); the United Nations Disaster Relief Office has helped to finance a survey of disaster preparedness arrangements in the southwest Indian Ocean, and has initiated a project, with the financial support of the United Nations Environmental Programme (UNEP), to provide a handbook for planning authorities on the causes of, and means of protection against, natural disasters; WMO has been asked to provide consultants and give technical supervision in the areas of meteorological and flood disasters. In response to the request of the Committee at its sixth session, the second Joint LRCS/WMO/ECAFE Mission on Community Preparedness and Disaster Prevention visited Japan and the Philippines in May/June 1974. The report of this mission is presented in a separate document under agenda item 6.

WMO Project on Tropical Cyclone Disaster Risks

4. After preliminary discussions with UNEP, WMO has submitted a proposal for a new project which deals with disaster risk evaluation with respect to meteorological, storm surge and hydrological (flood) aspects of tropical cyclones. This project has been conceived within the WMO Tropical Cyclone Project, which has been approved by Congress and by the Executive Committee.

/The project

The project also falls within the approved policy of the Organization to co-operate fully with UNEP with a view to obtaining the financial support of UNEP in all appropriate fields of activity of WMO. UNEP has a field of activity entitled "quantitative evaluation of disaster risks". It is within this field of activity of UNEP that the present project will, it is hoped, be approved by UNEP.

Summary description

5. The over-all and long-term objective of the project is to provide national authorities, particularly in developing countries, with objective and quantitative economic criteria for minimizing the exposure of population and of economy to natural disaster, aid for planning, warning and protection systems aimed at prevention of human losses and economic damages resulting from tropical cyclones. These objectives and criteria are to be developed in order to fill a gap that exists in the data evaluation capabilities of national services in charge of supply of data to planning authorities.
6. The immediate objectives of the first phase of the project are to develop methodology of techniques to be used by national meteorological and hydrological services to evaluate the quantitative risk of damage from tropical cyclones to human settlements and economic developments. The particular risks involved are damage by wind, or inundation by heavy rainfall, storm surge or river flood. While the techniques to be developed must be used by meteorologists and hydrologists to ensure their proper application, the ultimate objective is to permit the meteorological and hydrological services to give concrete advice to planners, engineers, architects and agricultural authorities.
7. The second phase is a pilot project to test and develop the techniques in a suitable co-operating developing country, while the third phase would involve expanding the applications of the techniques to the quantitative consideration of as large a part as possible of the economic and social sectors of all interested developing countries.
8. The support which WMO will give to the project will be derived from the related activity of the World Weather Watch Department and the Hydrology and Water Resources Department of the secretariat. It is hoped that the UNEP contribution will enable expert consultants to be recruited for short periods to deal with the various aspects of the project.

/WMO/ECAFE

WMO/ECAFE Panel on Tropical Cyclones

9. As regards the WMO/ECAFE Panel on Tropical Cyclones, it will be recalled that this Panel, which has functions similar to those of the Typhoon Committee but covers the Bay of Bengal and Arabian Sea tropical cyclone areas, was constituted in 1972. Its first session was held at Bangkok late in 1973. The Panel adopted terms of reference covering, broadly, the promotion and co-ordination of the measures required to minimize tropical cyclone damage in the areas mentioned above. A great deal of the session was devoted to deciding on a long-term technical plan to guide its activities in the years ahead. The Panel thus gave detailed attention to the meteorological and hydrological facilities, including telecommunication, required as the basis of an effective tropical cyclone warning system. Community preparedness, disaster prevention, research and training also feature prominently in the plan. In addition to adopting a work programme for 1974-1975, the Panel discussed ways of ensuring the technical management of its programme and of co-ordinating its activities with the WMO Tropical Cyclone Project. The second session of the WMO/ECAFE Panel is, at the time of drafting this document, scheduled for 18-23 December 1974. However, a decision on its venue has not yet been taken.

10. At its first session, the WMO/ECAFE Panel on Tropical Cyclones recognized the importance of community preparedness and disaster prevention in the tropical cyclone area and decided that a study should be made of the state of disaster preparedness in Bangladesh, Burma, the Indian states prone to cyclones and Sri Lanka, by a qualified expert as a necessary prelude to further action. At the request of the Panel, LRCS provided an expert in the person of Mr. Moriteru Konoye, who is on loan to the League from the Japanese Red Cross, and he conducted a survey mission during the period from 22 March to 6 May 1974. The programme was worked out in consultation with the national red cross society of each country, which maintained liaison with various agencies concerned. Prior to his departure he dispatched to each country a questionnaire based on the terms of reference provided by the Panel and the survey was undertaken according to the information thereby obtained. This mission is similar in character to the one undertaken by Mr. James Hickey in 1971 for the member countries of the Typhoon Committee, and the report on Mr. Konoye's findings, with comments on the specific problems of each country will be submitted to the coming session of the Panel scheduled for the end of 1974.

/Tropical

Tropical Cyclone Committee for the Southwest Indian Ocean

11. In accordance with resolution 13 of the sixth session of Regional Association I (Africa), this Tropical Cyclone Committee has been re-established. In agreement with its Chairman and at the kind invitation of the Government of France, the second session of the Committee will be held from 21 to 26 October 1974 at St. Denis, La Reunion. The session will review the implementation of the technical plan for the reduction of cyclone damage in the southwest Indian Ocean area and the plans for further activities of the Committee. A Joint LRCS/WMO Mission on Community Preparedness and Disaster Prevention to three selected countries in the southwest Indian Ocean cyclone area, Mauritius, La Réunion and Tanzania, was undertaken in June/July 1974. This mission was a follow-up to the initial survey made by consultants of the two organizations in early 1973. Its main purpose is the improvement of the co-ordination between all national agencies with responsibilities under the cyclone warning system, and the preparation of an agreed programme of action for implementation in each country to ensure the safety of life and property. Information on the outcome of this mission will be provided at the session.

Region V - southwest Pacific

12. At its sixth session (Manila, February 1974), Regional Association V (southwest Pacific) noted with appreciation the report of its Rapporteur on tropical cyclone damage mitigation. It also considered a number of proposals for further action submitted by the Secretary-General, including the need for co-ordinating machinery for the mitigation of tropical cyclone damage in the region. Whilst it recognized the need for an integrated subregional attack on the problems associated with tropical cyclones, the Association felt that the creation of a subregional body such as those already existing in other tropical cyclone areas of the world would be premature. The Association decided, however, that a technical conference could usefully be held in 1974 for the benefit of members of Regions II and V. It was suggested that it should be held in conjunction with the seventh session of the Typhoon Committee and that it should deal mainly with tropical cyclone modification and related problems such as monsoon moderation and rain stimulation.

13. The Secretary-General of WMO acted upon the suggestion of Regional Association V and, at the kind invitation of the Philippine Atmospheric, Geophysical and Astronomical Administration, a Technical Conference on Tropical
/Cyclone

Cyclone Modification will be held at Manila from 15 to 18 October 1974, just after the seventh session of the ECAFE/WMO Typhoon Committee, to discuss a number of invited papers on the perspectives for tropical cyclone modification and related problems, such as rain stimulation and monsoon moderation.

Relevant decisions of the twenty-sixth session of the WMO Executive Committee

14. The WMO Executive Committee at its twenty-sixth session (Geneva 4-13 June 1974) reviewed the activities carried out under the Tropical Cyclone Project and the regional cyclone programmes since its previous session. It was noted by the Executive Committee that two areas had had the greatest activity, the regional cyclone programmes and co-ordination with other international organizations active in the field of disasters. The WMO Executive Committee stressed the need for the activities under the regional cyclone programmes to be pursued vigorously by the countries concerned and invited the attention of all WMO members to the desirability of providing further support through the WMO Voluntary Assistance Programme or bilaterally to countries afflicted by tropical cyclones in order to improve the warning systems as rapidly as possible.

15. The growing scope of the collaboration between WMO and other international organizations with responsibilities for disaster prevention and relief was outlined to the Committee. It noted with satisfaction these activities and encouraged the Secretary-General to continue and strengthen co-operation with other international bodies engaged in activities to mitigate tropical cyclone damage.

Action proposed

16. The Committee is invited:

1. To note:
 - (i) The above information concerning the developments in related WMO programmes;
 - (ii) The relevant decisions of the twenty-sixth session of the WMO Executive Committee;
2. To consider what further measures are required, if any, to ensure the necessary degree of collaboration with these programmes.

FOR PARTICIPANTS ONLY

WRD/TC.7/8
6 August 1974

ORIGINAL : ENGLISH

ECONOMIC COMMISSION FOR ASIA AND THE FAR EAST
AND
WORLD METEOROLOGICAL ORGANIZATION

Typhoon Committee
Seventh session
8-14 October 1974
Manila

PROGRAMME FOR 1975

(Item 8 of the provisional agenda)

Note by the Typhoon Committee secretariat

1. The action programme approved by the Typhoon Committee at its first session continues to provide the general guidelines for its future activities. The functions of the Committee given under Article 6 of its Statutes, and the functions and duties of the Typhoon Committee secretariat, as revised by the sixth session, are also relevant in this connexion.
2. The UNDP project on technical support to the Regional Typhoon Programme has been approved for three years (1974-1976). The proposed work plan for this period, including individual project activities, their starting dates and proposed duration, are shown in chapter III of the project document. Under agenda item 5, the Committee will review the progress made during 1974 in the implementation of the various components of the UNDP project. The programme adopted for 1975 should therefore be related to the project work plan and the progress made during 1974.
3. It is recognized that many activities of interest to the Typhoon Committee will be carried out by member countries. However, under this item the Committee may wish to consider items of work on which it will concentrate /during

during 1975, with the assistance of the Typhoon Committee secretariat. For this purpose, the current developments in the execution of the Committee's programmes and the provisions of the UNDP project should be taken into account. The following items are accordingly suggested for special attention during 1975:

- TCS
- (i) The reorganization of the Committee's secretariat with the posting of professional counterpart staff;
 - (ii) The procurement and installation of equipment provided by UNDP and other sources;
 - (iii) Assistance to member countries in the provision of additional meteorological and telecommunication facilities included in the priority list established by the Committee;
 - (iv) Assistance in the improvement of facilities for dissemination of typhoon and flood warnings;
 - (v) Establishment of pilot flood-forecasting systems in Laos and Thailand with bilateral assistance from Japan;
 - (vi) Assistance to the Philippines and the Republic of Korea in improving their pilot flood-forecasting systems in collaboration with experts furnished by Japan;
 - (vii) Assistance in the procurement of international and other fellowships and in the provision of on-the-job training in the operation and maintenance of meteorological and hydrological facilities;
 - (viii) Assistance in the improvement of community preparedness and disaster prevention activities, including follow-up of recommendations made by the joint LRCS/WMO/ECAFE mission;
 - (ix) Assistance in the exchange of the latest information on typhoon forecasting techniques and in the distribution of objective forecasts on a regular operational basis;
 - (x) The stimulation of research activities through advisory services, exchange of information and joint collaboration in typhoon research activities.

Action proposed

4. The Committee may wish:

- (a) to approve in principle or suggest amendments to the items of work listed above on which the Committee should concentrate during 1975;
- (b) to urge member countries to take all possible measures, with the assistance of the Typhoon Committee secretariat, to accelerate implementation of the Committee's programmes.

FOR PARTICIPANTS ONLY

WRD/TC.7/9
30 July 1974

ORIGINAL : ENGLISH

ECONOMIC COMMISSION FOR ASIA AND THE FAR EAST
AND
WORLD METEOROLOGICAL ORGANIZATION

Typhoon Committee
Seventh session
8-14 October 1974
Manila

PROVISIONAL LIST OF DOCUMENTS

	Document No.
1. Provisional agenda	WRD/TC.7/1
2. Annotated provisional agenda	WRD/TC.7/2
3. Notes for the information of participants	WRD/TC.7/3
4. The Committee's activities during 1974	WRD/TC.7/4
5. UNDP technical support to the regional typhoon programme	WRD/TC.7/5
6. Report of the Second Joint LRCS/WMO/ECAFE Mission on Community Preparedness and Disaster Prevention	WRD/TC.7/6
7. Co-ordination with the WMO Tropical Cyclone Project and other regional programmes	WRD/TC.7/7
8. Programme for 1975	WRD/TC.7/8
9. Provisional list of documents	WRD/TC.7/9
10. Provisional list of participants	WRD/TC.7/10
11. Tentative programme	WRD/TC.7/11
12. Long-term staffing of the Typhoon Committee secretariat	WRD/TC.7/12

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FOR PARTICIPANTS ONLY

WRD/TC.7/11
30 July 1974

ORIGINAL : ENGLISH

ECONOMIC COMMISSION FOR ASIA AND THE FAR EAST
AND
WORLD METEOROLOGICAL ORGANIZATION

Typhoon Committee
Seventh session
8-14 October 1974
Manila

TENTATIVE PROGRAMME

8 October - Tuesday

0900 - 0945 hours

Registration

1000 - 1040 hours

Opening session

- (1) Opening address
- (2) Statement by the Executive Secretary of ECAFE
- (3) Statement by the Secretary-General of WMO

Recess 20 minutes

1100 - 1230 hours

- (4) Election of the Chairman and Vice-Chairman
- (5) Adoption of the provisional agenda (WRD/TC.7/1)
- (6) Agenda item 4: the Committee's activities during 1974 (WRD/TC.7/4)

1430 - 1700 hours

- (7) Continuation of discussion on agenda item 4:
 - (a) Meteorological component
 - (b) Hydrological component

9 October - Wednesday

0930 - 1230 hours

- (1) Continuation of discussion on agenda item 4:
 - (c) Community preparedness and disaster prevention
 - (d) Training and research
- (2) Agenda item 5: UNDP technical support to the regional typhoon programme (WRD/TC.7/5 and WRD/TC.7/12)
 - (a) Equipment component
 - (b) United Nations experts and counterpart staff

1430 - 1700 hours

(3) Continuation of discussion on agenda item 5:

- (c) Fellowships
- (d) Bilateral assistance

10 October - Thursday

0930 - 1230 hours

(1) Agenda item 6: Second Joint LRCS/WMO/ECAFE Mission on Community Preparedness and Disaster Prevention (WRD/TC.7/6)

1430 - 1700 hours

(2) Agenda item 7: co-ordination with the WMO Tropical Cyclone Project and other regional programmes (WRD/TC.7/7)

(3) Agenda item 8: programme for 1975 (WRD/TC.7/3)

(4) Agenda item 9: date and place of the eighth session

11 October - Friday

1430 - 1700 hours

Meeting of the Drafting Committee

12 October - Saturday

Study tour

13 October - Sunday

Free

14 October - Monday

0930 - 1230 hours

(1) Consideration of the draft report

(2) Closure of the session

FOR PARTICIPANTS ONLY

WRD/TC.7/12
30 August 1974

ORIGINAL : ENGLISH

ECONOMIC COMMISSION FOR ASIA AND THE FAR EAST
AND
WORLD METEOROLOGICAL ORGANIZATION

Typhoon Committee
Seventh session
8-14 October 1974
Manila

LONG-TERM STAFFING OF THE TYPHOON COMMITTEE SECRETARIAT
(Item 5 of the provisional agenda)

Note by the ECAFE and WMO secretariats

Introduction

1. Technical support to the regional typhoon programme is being provided by the United Nations Development Programme (UNDP) and a report on the progress of the project, which covers the years 1974-1976, is given in document WRD/TC.7/5 under this item of the provisional agenda. The efforts being made to recruit counterpart staff for the Typhoon Committee Secretariat (TCS), as required by the UNDP project, are reported in that document. The results so far are very unsatisfactory in spite of the importance of this matter. UNDP approved technical support to the Typhoon Committee activities on the condition that the participating countries make professional staff available to the Typhoon Committee secretariat. These professionals should gradually replace the present UNDP experts.

2. The objectives of the Typhoon Committee are essentially of a long-term nature. They can not and will not be accomplished by the end of 1976, when the present UNDP assistance project is terminated. Even in highly developed countries, the need for constant vigilance and the application of new and improved measures to combat tropical cyclone damage are recognized as being vital to the safety of human life and the reduction of the impact of this damage on the national economy. Full advantage must be taken of advances in technology, and shifting and growing populations in disaster-prone

areas must be educated and trained to respond to the threat of danger. The design and operation of an efficient typhoon warning system is, thus, a continuing task calling for frequent reappraisal.

3. At the national level, long-established institutions (such as the meteorological and hydrological services, social welfare departments and Red Cross Societies) exist in all member countries of the Typhoon Committee. These institutions will continue to support the programmes of the Committee in the years beyond the end of the UNDP project. It should be remembered, however, that the very reason for which the Typhoon Committee was established was to promote a regional approach to the problems posed by typhoons. The co-ordination of national efforts through the Committee's activities has brought considerable benefits to all the participating countries since the initial establishment of the Committee in 1968. A key role in this progress has been played by TCS.

Functions of TCS

4. The functions of TCS as the executive arm of the Typhoon Committee have been laid down by the Committee itself. Broadly, they are to:

"advise the participating countries on the technical and administrative co-ordination of plans for the implementation of improved meteorological, hydrological and other facilities for the prevention of typhoon damage. It will assist the Committee in carrying out the day-to-day co-ordination of all related activities undertaken at the request of the Committee by the United Nations and specialized agencies, as well as under bilateral or multilateral programmes."

These functions have been spelt out in greater detail by the Committee in the text appended to its Statute.

5. As may be seen from the above, the functions of TCS are primarily of a technical character. Since its early days TCS has been staffed by three professional officers - a meteorologist, a hydrologist and a telecommunication/electronics expert. These officers will continue to serve TCS as international experts until the end of the UNDP project in 1976.

6. The prime function of TCS may therefore be described as that of the management of the Committee's technical programme. Management, in this sense, involves active participation in many aspects of the programme decided upon by the Committee. The importance of this function cannot be overrated. Whilst ECAFE and WMO, as the sponsoring organizations, can and will continue to assist the Committee to the maximum extent that their resources permit, neither is staffed to provide full-time specialist services to the member countries involving frequent and lengthy visits to those countries. Nor can they provide on-the-job training or repair and maintenance services such as those carried out by TCS.

7. Progress in implementing the programme depends to a very large degree upon a close watch being kept both on the scientific and technical developments of concern to the countries and on the national activities carried out by the countries themselves. In addition to its managerial functions, TCS is therefore involved to some extent in the operational aspects of the typhoon warning system, and also in matters relating to training and research. The range of its responsibilities is broad and it is difficult to see how they could be carried out if TCS did not exist. To say the least, a slowing down of the progress being achieved by the Committee would be an inescapable consequence of TCS ceasing to exist.

The problem

8. The continued provision of technical staff for TCS is ensured to the end of 1976 by the UNDP project. The project requirement for counterpart staff, as mentioned in paragraph 1, is described in document WRD/TC.7/5. It will be seen from that document that little progress has been made so far in efforts to obtain staff for TCS from the participating countries. There is, accordingly, no guarantee at present that any technical staff will be available to man TCS from the beginning of 1977. It is suggested that this possibility is of sufficiently grave concern to the Committee to make it imperative that serious efforts be made as soon as possible to find a solution to this problem.

Some possible solutions

9. ECAFE and WMO, in consultation with TCS, have considered the problem of the long-term staffing of TCS, to which, potentially, there are a number of possible solutions. Each of those considered in this document is set forth below, with some brief comments on its feasibility. Other proposals from member countries would be most welcome. It is hoped that the Committee at its seventh session will discuss the proposals made and express its comments thereon.

(a) Member countries to provide staff through a rotation system

Under such a system member countries would themselves send national staff to TCS for a determined period, bearing the costs of salaries, allowances and travel from national budgets. It would be necessary for the Committee to work out a rotation system to share the burden and the costs between member countries. It is suggested that a period of two years may be considered as a minimum for a secondment. Information already available shows that some member countries are unlikely to have suitably qualified staff available for secondment to TCS in the foreseeable future. Adoption of this solution would almost certainly imply that the staffing of TCS would fall to a limited number of member countries.

(b) Member countries to provide funding for TCS staff

This solution would involve the setting up of a cash fund from which the expenses of the TCS staff would be met. It could be operated in conjunction with (a) above for those member countries unable to provide staff but willing to share in the cost of manning TCS. Potential difficulties demanding careful consideration would include that of deciding how the total (or partial) budget should be divided amongst member countries. Should some sort of assessment, say proportionate to member countries' contribution to WMO, be applied to take account of different levels of economic development?

(c) Further support from UNDP

The current UNDP project does not totally exclude the possibility of further assistance beyond the end of 1976. The need for future UNDP assistance is reflected in paragraph 27 of the project document. Nonetheless, UNDP has made it abundantly clear that it is not prepared to continue to finance TCS itself. Any further aid would undoubtedly have to be in the form of technical

support (possibly one or two experts for limited periods) and would need to be matched by a substantial contribution to the staffing of TCS from the member countries themselves.

(d) Joint ECAFE/WMO financing of limited staff

The possibility of ECAFE and WMO jointly financing the services of a project manager to head TCS could be investigated. He should be supported by other staff provided by the member countries themselves, or by consultants provided for short-periods (3-6 months) by members at their own expense. As the sponsoring organizations, both ECAFE and WMO are committed to assisting the Committee to the maximum extent possible, and consider the continuation of TCS to be essential to the long-term success of the programme. Neither ECAFE nor WMO has, at present, any source of funds for this purpose. If any future support in respect of this project by ECAFE and WMO is required (e.g., the provision of the services of a project manager), a specific request will have to be made by the Typhoon Committee for consideration by the appropriate ECAFE and WMO bodies.

(e) Provision of staff through bilateral aid

The extent to which bilateral aid has helped the Committee to accomplish its objectives is well-known. A number of countries outside the typhoon area have made substantial contributions in the form of equipment and services which have greatly aided member countries in improving the typhoon warning system. Another possible solution would be to inquire whether any country outside the area would be prepared to furnish the services of a project manager (or other staff) for TCS as a bilateral contribution to the Committee's activities. The period and conditions of service of the staff concerned could be negotiated with any country expressing interest in providing such assistance.

(f) Aid from other sources

The proposals made above are evidently not exhaustive. Whilst no other firm proposals are made at this stage, consideration could perhaps be given to alternative sources of assistance. The interest of the United Nations Environment Programme (UNEP) in projects related to natural disasters suggests that it might be prepared to consider some support to the Typhoon Committee. This and other potential sources of aid, such as trust funds, should be given attention if none of the other proposals result in a solution.

10. It will be clear that each of the above proposals needs to be developed in greater detail. Further guidance is, however, sought from the Committee before this is done. Although two full years remain between the seventh session and the end of 1976, it must be recognized that no effective and lasting means of staffing TCS is likely to be found in the space of a few months. It may be necessary to try several different means before a successful answer is arrived at, or to combine parts of the various proposals outlined in order to staff TCS fully. The information in this document is intended to stimulate discussion and to show the direction in which the Committee feels this important question may most profitably be pursued.

Action proposed

11. It is proposed:

- (i) That the seventh session of the Typhoon Committee should discuss the problems of the long-term staffing of TCS, taking into account the proposals made in this document;
- (ii) That the Committee express its preliminary views as to the most effective solution;
- (iii) That member countries study the matter further with a view to making more definite proposals to the eighth session;
- (iv) That ECAFE and WMO should, as a matter of urgency, also devote further attention to finding an effective long-term solution upon the basis of the views expressed by the Committee.

FOR PARTICIPANTS ONLY

WRD/TC.7/13
13 September 1974

Original: ENGLISH

UNITED NATIONS ECONOMIC AND SOCIAL
COMMISSION FOR ASIA AND THE PACIFIC

AND

WORLD METEOROLOGICAL ORGANIZATION

Typhoon Committee
Seventh Session
8-14 October 1974
Manila, Philippines

HYDROLOGICAL COMPONENT

(Item 4(b) of the provisional agenda)

Note by the WMO Secretariat

Introduction

1. The Typhoon Committee has undertaken a number of pilot studies on hydrological forecasting in some of the typhoon affected river basins. The significance of hydrological forecasting and warning systems to human life and economy is now well recognized in the project area. This is evident from the fact that the hydrological component of the project programme receives increasingly more attention. This note attempts to outline some suggestions in this respect.

Basic studies

2. An effective hydrological forecasting and warning system requires certain basic hydrometeorological studies of the river basin in order to obtain reasonably accurate results. Such studies are also useful in other applications of hydrology such as design floods.

3. The foundation for carrying out such studies was laid with the holding of the fourth ESCAP/WMO Inter-Regional Hydrological Seminar on "Assessment of the Magnitude and Frequency of Flood Flows" (Bangkok, 1966).

The Seminar specifically recommended that studies should be carried out and maps prepared for the ESCAP region on the following subjects:

- a) Rainfall frequency;
- b) Analysis of major flood-producing storms;
- c) Depth-area-duration (DAD)
- d) Probable Maximum Precipitation (PMP)

4. In addition to the meteorological input, the results of the above listed studies are basic to improve the accuracy of hydrological forecasts particularly if the river basin is subject to tropical storms.

5. In order to assist the countries to carry out such studies WMO has published two practical manuals:

- a) Manual for Estimation of Probable Maximum Precipitation, by J.L.H. Paulhus, et al (WMO-NO.332)
- b) Manual for Depth-Area-Duration Analysis of Storm Precipitation (WMO-NO.237. T.P. 129)

Conceptual Models used in Operational Hydrological forecasting

6. Tropical cyclone rainfall of a given frequency, depth, duration and extent may produce a flood of different severity depending on the response of the basin on which it falls. This response can be simulated by a conceptual model. The Typhoon Committee has already obtained a limited amount of experience in the application of conceptual models for hydrological forecasting. It seems that broadening of this experience would be of benefit to the programme.

WMO Project on Intercomparison of Models

7. National Services interested in initiating a modernized forecast system face the difficulty of ascertaining the relative advantages and disadvantages of the many models proposed for operational use. Model testing is taking place in several countries of the world, but only large Services with sufficient resources in manpower, software and hardware are in a position to conduct such tests extensively.

8. To meet the needs of National Services, WMO initiated a project for the intercomparison of conceptual models used for hydrological forecasting. The object of the project was to provide information and guidance on the use of models and a basis for selection depending on circumstances. It must be emphasized that the objective was not to determine which model yields the most accurate forecasts under all circumstances.

The preliminary phase

9. The plan of action was formulated on the basis of three informal study group meetings covering all geographical areas of the world and including experts directly involved in the subject. These meetings were held in Washington, D.C., Paris and Tokyo. In reply to the questionnaire, 21 models were submitted by 9 Members.

The intercomparison phase

10. For various reasons, only 10 models were actually tested in the project. Six standard data sets from climatologically varied basins in six countries were chosen to be tested, as a maximum, on the 10 models. These were the Bird Creek (Oklahoma, U.S.A., 2344 km²), the Bikini River (coastal region, U.S.S.R., 13 100 km²), the Wollombi Brook (Australia, 1580 km²), the Kizu River (Kiuki region, Japan, 1445 km²), the Sanaga River (at Edea,

Cameroun, 131 500 km²) and the Nam Mume River (above Ubol, Thailand, 104 000 km²).

11. As proposed by the meeting of experts several graphical and statistical verification criteria were used in the evaluation and intercomparison of the stimulations produced by the 10 models. The graphical criteria included linear scale plots of simulated and observed hydrographs, double mass plots of simulated versus observed monthly discharge volumes, flow duration curves of both simulated and observed daily discharges and scatter diagrams of simulated versus observed monthly maximum discharges. The statistical verification criteria comprised the computation of the coefficient of variation of residual errors, the ratio of relative and absolute error to the mean, the arithmetic mean, a phasing coefficient and a coefficient of persistence. These statistical coefficients were indicated for mean daily discharge, maximum monthly discharge, monthly volumes of flow and mean daily discharge for low flow days.

The reporting phase

12. A restricted technical conference, attended by representatives of agencies participating in the project and several invited experts, was organized by WMO in Geneva from 8 to 12 July 1974. The conference considered the results of the tests and prepared recommendations for national authorities in need of guidance on the subject. The results of the project, including the proceedings of the technical conference and its conclusions and recommendations, will be published by WMO in the form of a technical report for circulation to all concerned.

13. The conference concluded that the principal factors to be considered in the selection of a model for specific application are: the purpose to be served (e.g., flood warnings or water management) and the potential benefits; climatic and physiographic characteristics of the basin; adequacy of basic

data (record length, network density and quality of data); capability of personnel and computer facilities; need for transposing model parameters; and the character of input data to be available for forecast preparation. The technical report on the project will include conclusions with respect to these factors, recommendations concerning testing and intercomparison of models, and proposals for continuing activities of WMO in this field.

Note: A more detailed description of the project is given in a report, copies of which are available with the Secretariat.

Application of conceptual models for operational hydrological forecasting in the Typhoon Project.

14. Bearing in mind that the basic hydrometeorological studies are still to be carried out in most of the participating countries in the typhoon area, and that a wide range of practical information on these studies and on conceptual models useful for the hydrological component of the project programme is available, it is recommended that a training Seminar on conceptual models for operational hydrological forecasting purposes should be organized for the benefit of participants from the hydrological services of the Member countries of the Typhoon Committee. At this Seminar, besides training in the execution of basic studies, the participants could become fully acquainted with the application of all the conceptual models on which information is available in WMO. This Seminar would have the following advantages:

- a) Wider technical knowledge and experience would enable the project and countries to make judicious selection and application of conceptual models;
- b) The participants from Member countries would be encouraged to improve and standardize instruments

and methods of observation of those elements of the hydrological cycle required as inputs in models;

- c) The participants should be able to initiate and carry out the basic hydrometeorological studies in their respective countries under the guidance from the project, and also apply conceptual models as necessary.

15. Co-operation of ESCAP should be sought for the organization of such a Seminar. WMO is willing to prepare, in co-operation with ESCAP, the technical programme of the Seminar if so desired by the Committee.

Action proposed

16. The Committee is invited to note the above information, in particular related to the Typhoon Project activities, and to consider the proposal for holding a Seminar for the benefit of personnel of the member countries and the project itself.

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