



UNITED NATIONS ECONOMIC AND SOCIAL COMMISSION

FOR ASIA AND THE PACIFIC

AND

WORLD METEOROLOGICAL ORGANIZATION

**REPORT OF THE TYPHOON COMMITTEE
ON ITS THIRTEENTH SESSION**

**Bangkok, Thailand
2 - 8 December 1980**



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REPORT OF THE TYPHOON COMMITTEE

ON ITS THIRTEENTH SESSION

Manila, Philippines
1981

ECONOMIC AND SOCIAL COMMISSION FOR ASIA AND THE PACIFIC
THE UNITED NATIONS BUILDING, RAJADAMNERN AVENUE
BANGKOK 2, THAILAND.

11/2/81

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NR/WRS/M/8

6 February 1981

Dear Dr. Kintanar,

We have received your letter No. TCS/TC XIV/39(A) dated 19 January 1981 regarding the necessary actions arising from the thirteenth session of the Typhoon Committee.

In reviewing the report of the thirteenth session and also your action sheet, it is noted that you have made a good review of the actions required to be taken. We have a few revisions and additions to suggest as shown on the appended sheets.

Sincerely yours,

3/1 4/2 4/11

B. X. Zhang
Chief

Natural Resources Division

Dr. Roman L. Kintanar
(Director-General)
Coordinator for Typhoon Committee
Typhoon Committee Secretariat
United Nations Development Programme
P.O. Box 1864
Manila, Philippines

cc: Dr. G. K. Weiss

2/19/81

Suggested, Revisions of "For Urgent Action"

Paragraph	Action/Subject	Responsible Unit
73	<u>Recruitment of flood control expert to be assigned to TCS</u>	
	ESCAP to renew its efforts to obtain the services of a flood control expert for the TCS.	ESCAP
82	<u>Support for 1982-1983-</u>	
	(1) Prepare new project proposal to UNDP incorporating requirements for 1982 and 1983	WMO/ESCAP
83	<u>Organization of training seminars during 1982-1983 period</u>	
	Include in the new project proposal to UNDP the following training seminars:	
	(1) Flood vulnerability analysis	WMO/ESCAP
	(2) Principles of flood plain management for flood loss prevention and management	WMO/ESCAP
	(3) Hydrological forecasting	WMO/ESCAP

Additions to "For Urgent Action"

72	<u>Continuation of support for Telecommunications Expert</u>	
	Request UNDP to consider continued funding of the post of telecommunications expert for 1982 and 1983	WMO/ESCAP

Suggested, Revisions of "For Routine Action"

86	<u>Visit under TCDC arrangements by a group of hydrologists from Malaysia to other members during the flood season</u>	
	Explore possibility and initiate arrangements	ESCAP
93	<u>Preparations for XIV th session</u>	
	Finalize provisional and annotated provisional agenda, letters of invitation and information note	ESCAP/WMO/TCS

Suggested, Revisions of "For Routine Action" (Cont'd)

Paragraph	Action/Subject	Responsible Unit
94	Date and venue of XIV th session	
	Seek confirmation of offer by the Philippines	ESCAP

Additions to "For Routine Action"

42	Malaysia suggested research activities be undertaken in fields other than meteorology	
	Identify research activities in fields other than meteorology related to Committee's programme	TCS



TYPHOON COMMITTEE SECRETARIAT
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TCS/TC XIV/39(A)

January 19, 1981

Dear Dr. Weiss,

Enclosed herewith is a draft action sheet on the report of TC-13 for further necessary action. Kindly inform us of any changes you may consider appropriate.

Yours sincerely,

ORIGINAL SIGNED

ROMAN L. KINTANAR
(Director-General)
Coordinator for Typhoon Committee

Dr. G. K. Weiss
Director
World Weather Watch Dept.
Geneva

cc: Dr. B. X. Zhang (with enclosure)
ESCAP Secretariat
Bangkok

Noted
1/21/81

ncc

Thirteenth Session of the Typhoon Committee

Action Sheet

NOTES:

1. The action sheet lists only those items on which new action is needed. Where items in the report refer to a continuing activity, it is assumed that the necessary follow-up action will be taken as part of the on-going programme and such items are not listed below.
2. The responsibility for initiating action on the points listed below lies with the organization mentioned first in the column headed "Responsible".
3. The Typhoon Committee Secretariat (TCS), as a consequence of its functions, is involved in all aspects of the Committee's programme. It is therefore understood that it will play its full role in the action required on all decisions of the session.

<u>Paragraph(s)</u>	<u>Subject/Action</u>	<u>Responsible</u>
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FOR URGENT ACTION

30 & 74	<u>Visit of Dr. K. Seevaratnam to Committee members in 1981</u>	
	WMO to provide advanced information to enable members to make preparatory actions	W M O
54	<u>Warning distribution and information exchange</u>	
	To urge members to provide information to UNDRO and LRCS or through WMO on their plans of implementation on this subject.	W M O
56	<u>Common system for the identification of Tropical Cyclone</u>	
	To obtain from JMA the procedures for the assignment of the number of tropical cyclone for information of members of WMO	W M O

Paragraph(s)	Subject/Action	Responsible
80-85	<u>Support for TOPEX and TC beyond 1982</u> WMO and ESCAP to draft new project proposal requesting UNDP to support the funds needed for the Typhoon Committee's activities incorporating requirements of TOPEX; also to approach UNEP and other international bodies to explore their readiness to assist in supporting TOPEX.	WMO/ESCAP
58 & 59	<u>Establishment of a Special Temporary Voluntary IOPEX fund</u>	
	WMO to take follow-up action	W M O
61	<u>Support of member governments on activities and requirements to TOPEX</u> WMO and ESCAP to approach member governments at the highest level to convince them of the benefits to ensue from successful execution of TOPEX and to draw attention to certain priorities.	WMO/ESCAP
<u>FOR ROUTINE ACTION</u>		
15	<u>Difficulties in meteorological telecommunications in Laos</u> Visit of TCS or WMO expert to Laos to determine requirements in the improvement of telecommunications.	WMO/TCS
18	<u>Establishment of a direct point-to-point link between Hanoi and Bangkok.</u> Follow-up action	WMO/TCS
32, 36, 37 & 38	<u>Information on training courses and available fellowships. Identification of universities or agencies conducting suitable courses relevant to Committee's programme</u> TCS in consultation with WMO to make a survey of such facilities and training courses for information of members.	TCS/WMO

Paragraph(s)	Subject/Action	Responsible
41	<u>Offer by Japan to extend co-operation and exchange of views on information and results of research in non-structural flood control</u>	TCS
46	<u>Compilation of list of research work in the field of disaster preparedness by LRCS</u>	WMO/ESCAP
73	<u>Recruitment of flood control expert to be assigned to TCS</u>	WMO/ESCAP
83	<u>Organization of training seminars on the following subject: (i) Flood vulnerability analysis (ii) Principles of flood plain management for flood loss prevention and management (iii) Hydrological forecasting</u>	WMO/ESCAP
86(TR. a, b & g)	<u>Assistance to members in exploring possibility of long term training courses in meteorology, hydrology and electronics. Also, on short term training courses and fellowships especially on maintenance of satellite receiving equipment, radar and telemetering equipment and Storm surge prediction</u>	WMO

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Paragraph(s)	Subject/Action	Responsible
86	Offer by Japan to extend co-operation and exchange of views on information and results of research in non-storm-tropical flood control	WMO/ESCAP
87	TCS to inquire further and distribute information to members	WMO/ESCAP
88	Compilation of list of research work in the field of disaster preparedness by TCS	WMO/ESCAP
89	WMO and ESCAP to include the task in terms of relevance of consultant	WMO/ESCAP
90	Recruitment of flood control expert to be assigned to TCS	WMO/ESCAP
91	ESCAP or WMO to examine the possibility of recording and expert by the members	WMO/ESCAP
92	Organization of training seminars on the following subjects: (1) Flood vulnerability analysis (2) Principles of flood plain management for flood loss prevention and management (3) Hydrological forecasting	WMO/ESCAP
93	WMO and/or ESCAP to look into the matter, or include such activities in new project proposal to UNDP	WMO/ESCAP
94	Assistance to members in exploring possibilities of long term training courses in meteorology, hydrology and electronics. Also, on short term training courses and fellowships especially on maintenance of satellite receiving equipment, radar and meteorological equipment and storm surge prediction	WMO/ESCAP
95	WMO may give to members information on TCS procedures and other possible sources of fellowships	WMO/ESCAP

Paragraph(s)	Subject/Action	Responsible
86(TR. f)	<u>Organization of training under TCDC in flood forecasting including study tours</u>	WMO/ESCAP
	WMO and ESCAP may initiate action	WMO/ESCAP
86(Hyd. g)	<u>Visit under TCDC arrangement by a group of hydrologist from Malaysia during flood season to other members of TC</u>	WMO
	WMO to initiate action	WMO
93	<u>Provisional Agenda for XIVth Session</u>	TCS
	(1) Write members for new agenda items	WMO/ESCAP
	(2) Finalize and send provisional and annotated agenda, letters of invitation and information note	WMO/ESCAP
94	<u>Date and place of XVth Session</u>	WMO/ESCAP
	Await confirmation of offer by the Philippines and decide venue in consultation with appropriate authorities.	WMO/ESCAP
<u>FOR FUTURE ACTION AS APPROPRIATE</u>		
91 & 92	<u>Provision of background information on the International Hurricane Scale to members</u>	WMO/TCS
	WMO to furnish information to TCS for distribution to members	WMO/TCS
87, 88 and 89	<u>Distribution of TCP publications and seminar proceedings</u>	WMO
	WMO may distribute to members through TCS a new series of publications under the TCP (e.g, No.3 Automatic Weather station No.4 Radar and No. 12 Human response to tropical cyclone warnings and their contents) also proceedings of workshop on storm surges (Bangkok), and symposium on typhoons (Shanghai).	WMO

UNITED NATIONS
ECONOMIC
AND SOCIAL COUNCIL



GENERAL
E/ESCAP/197
22 December 1980
ORIGINAL: ENGLISH

ECONOMIC AND SOCIAL COMMISSION FOR ASIA AND THE PACIFIC

Thirty-seventh session
10-21 March 1981
Bangkok

PROGRESS REPORTS ON SPECIAL REGIONAL
PROJECTS AND REGIONAL INSTITUTIONS

(Item 7 of the provisional agenda)

REPORT OF THE TYPHOON COMMITTEE ON
ITS THIRTEENTH SESSION

I. ORGANIZATION OF THE SESSION

1. The thirteenth session of the Typhoon Committee was held at Bangkok from 2 to 8 December 1980.

Attendance

2. The session was attended by representatives of China, Democratic Kampuchea, Hong Kong, Japan, Lao People's Democratic Republic, Malaysia, Philippines, Republic of Korea, Thailand and Viet Nam. Observers from the Union of Soviet Socialist Republics and the United States of America attended the session. Observers were also present from the Office of the United Nations Disaster Relief Co-ordinator (UNDRO), the United Nations Development Programme (UNDP), the International Civil Aviation Organization (ICAO), the League of Red Cross Societies (LRCS) and the Interim Committee for Co-ordination of Investigations of the Lower Mekong Basin.

3. Two delegations reaffirmed their position stated at the thirty-sixth session of the Commission concerning the representation of one delegation.

4. The delegation referred to, and another delegation, protested and rejected the claims which had been made, and reconfirmed the right of representation of the delegation referred to as confirmed by a majority vote at the thirty-fifth session of the United Nations General Assembly.

5. In the discussions which followed, four delegations emphasized that the matter was beyond the competence of the Committee and therefore should not be

Opening addresses

6. A statement by the Executive Secretary of ESCAP was read by the Chief of the Natural Resources Division. A statement by the Secretary-General of WMO was read by a representative of that Organization.

7. In his message, the Executive Secretary of ESCAP noted that the Committee was entering a new phase in its history as the executive leadership in the Typhoon Committee Secretariat had passed from UNDP project personnel to an official of a member of the Committee. He urged the members to continue to look after their own needs. He expressed optimism that the long- and short-term goals of the Committee would be achieved. He assured the Committee that ESCAP was prepared to support the Committee to the fullest extent possible.

8. The Secretary-General of WMO, in his message, expressed the view that arrangements for the Typhoon Operational Experiment (TOPEX) would tend to dominate discussions at the thirteenth session. He felt that the ultimate success or failure of TOPEX would depend upon the efforts made by the members themselves but that seeking international support to supplement purely national resources was fully justified by the benefits expected from the Experiment. Subject to the comments of the Committee and the Management Board, he was willing to authorize the establishment of a special voluntary fund for TOPEX to which contributions could be made in cash, equipment or expert services.

Election of officers

9. The Committee elected Dr. Roman L. Kintanar (Philippines) as Chairman of the Committee for the year 1980/81 and Mr. Itsuro Shimizu (Japan) as Vice-Chairman. Mr. Ho Tong Yuen (Malaysia) was elected Chairman of the Drafting Committee.

Agenda

10. The Committee adopted the following agenda:

1. Opening of the session
2. Election of officers
3. Adoption of the agenda
4. The Committee's activities during 1980
 - (a) Meteorological component
 - (b) Hydrological component
 - (c) Disaster prevention and preparedness component
 - (d) Training
 - (e) Research

5. Typhoon Operational Experiment (TOPEX)
 - (a) Report on the First Planning Meeting for TOPEX
 - (b) Report on the first session of the Management Board for TOPEX
6. Support for the Committee's programme
7. Programme for 1981
8. Co-ordination with other activities of the WMO Tropical Cyclone Programme
9. Consideration of the agenda for the fourteenth session
10. Date and place of the fourteenth session
11. Scientific lectures
12. Adoption of the report

II. THE COMMITTEE'S ACTIVITIES DURING 1980 (Agenda item 4)

11. The Committee reviewed and assessed the progress made in implementing its programme during 1980, as set out in document WRD/TC.13/1. It considered in turn each of the five components, namely (a) meteorological, (b) hydrological, (c) disaster prevention and preparedness, (d) training and (e) research. The main features of the discussions and decisions taken for each component are reported below.

A. METEOROLOGICAL COMPONENT (Agenda item 4 (a))

12. The Committee noted with interest the large amount of information given in document WRD/TC.13/1 on the steps taken by members to improve their capabilities for typhoon forecasting and warning. Its review covered meteorological satellites, upper-air observations, radar stations and the exchange of fixes, ocean weather ships and buoys, reconnaissance flights, and meteorological telecommunications. The following additional information was made available during the discussion.

13. Hong Kong informed the Committee that funding had been approved for the purchase of a new replacement 10 cm radar set. It would be equipped with a Digital Video Integrator Processor (DVIP), and Constant Altitude Plan Position Indicator (CAPPI), and facilities for recording and remote display of the radar data. It was expected to be installed before the TOPEX-Pre-Experiment in 1981. A new NAVAID upper-air system was also being installed and would be

4. Japan reported that although there were some difficulties with the full disk image, GMS-I continued to operate satisfactorily. Plans were proceeding on schedule for the launching of GMS-II in August 1981. The operation of its four ocean buoys had continued to be satisfactory even in storm conditions.

5. The Lao People's Democratic Republic explained that difficulties in the transmission of data from the National Meteorological Centre (NMC), Vientiane to the Regional Telecommunications Hub (RTH), Bangkok were due to the fact that only 6 of the 10 stations operating were equipped to transmit their observations. It was ready to receive the visit of the TCS expert or a WMO expert to assist in rectifying the present position.

6. In the Philippines five new 10 cm radars were in the course of delivery. They were expected to become operational in 1981. Steps had been initiated to purchase 12 SSB sets to improve national data collection. External assistance would be necessary to make up the total of 25 required. A request had been made for the supply of upper-air equipment under the WMO Voluntary Co-operation Programme (VCP).

7. Thailand announced that the GMS HR receiver was now expected to be installed in mid-1981. The installation of the TIROS-N HR receiver would follow later that year. The installation of the three new radars would take place in early 1982 and not in 1981 as previously reported.

8. Viet Nam was ready to discuss, with the help of WMO and TCS, arrangements for the implementation of a direct point-to-point link between Hanoi and Bangkok. The Committee was informed that those discussions would take place immediately after TC.13.

19. The United States confirmed that it expected to continue to carry out meteorological reconnaissance flights in the typhoon area in the years ahead. The Committee noted that the USSR offered to continue automatic transmission of satellite pictures to members of the Typhoon Committee.

20. The Committee welcomed the supplementary information provided during the discussion of that item and reiterated the importance of all members making strenuous efforts to implement fully the requirements of the World Weather Watch Plan. It recalled that the networks for TOPEX were based primarily on that Plan.

21. In the light of the information available it revised the priority list established at the twelfth session, as shown below:

Observing facilities

(1) Upper-air stations

98223 Laoag (Philippines))	
98645 Cebu (Philippines))	12 GMT RS/RW-national projects
47187 Cheju (Republic of Korea)		External assistance needed

(2) Weather radar

Cheju (Republic of Korea)		External assistance needed
Tanay (near Manila, Philippines)		National project
Haiphong (Viet Nam)		External assistance needed

(3) Satellite receiving equipment (GMS/TIROS-N satellites)

Manila (Philippines))	
Bangkok Thailand)	National projects
Hanoi (Viet Nam)		External assistance needed

Telecommunication facilities

(1) Improvement of national data collection facilities

Lao People's Democratic Republic)	
Philippines)	
Thailand (night-time reception))	National/bilateral projects/ external assistance needed
Viet Nam)	

(2) Regional telecommunication links

Bangkok-Hanoi (1981)		National project
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(3) Other telecommunication facilities

Thailand - Strengthening of RTH Bangkok		National/external assistance needed
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B. HYDROLOGICAL COMPONENT
(Agenda item 4 (b))

22. The Committee reviewed the accomplishments during the past year as reported in documents WRD/TC.13/1 and WRD/TC.13/2 under the hydrological component. The Committee noted with satisfaction that a great deal had been accomplished by the members and TCS in achieving the goals set at the twelfth session.

23. The representative of Malaysia reported that a survey had been carried out for the 1979 floods in the Kelantan and Johore river basins for the purpose of preparing flood risk maps.

24. He also expressed his Government's appreciation to the Government of Japan for its assistance in carrying out a technical survey required for the establishment of a flood forecast and warning system in the Kinabatangan and Sadong river basins. He also thanked TCS, Japan and ESCAP for organizing the advisory team visit to Malaysia.

25. The Committee heard with interest a report by Japan on the development, testing and installation of a radar rain gauge system in the Yodo river basin, which was expected to become operational by the next flood season. Radar rain gauges had been previously installed and used in the Tone and Chikugo river basins.

26. The Committee was also informed that Japan regularly prepared detailed flood forecasts for 17 major river basins. Japan had 249 control stations; 194 relay stations; 946 rainfall stations and 770 water stage stations. Another 183 stations measured both water stage and rainfall. In addition, 513, other stations were equipped to give warning to local residents by sirens or loud speakers.

27. The representative of Thailand reported that his country had been able to complete a model for a flood forecasting system for the Chao Phya River basin using its own national resources. A report on the performance of that model during the 1980 flood season was given during the scientific lectures.

28. The Committee recorded its appreciation to the Government of Japan for:

(a) Sending a technical survey mission to Malaysia in connexion with the establishment of flood-forecasting systems in Sabah and Sarawak;

(b) Providing experts and sending an advisory team to assist members in the selection of pilot areas for comprehensive flood-loss prevention and management;

(c) The assistance provided to the Philippines in designing and establishing a flood-forecasting and warning system for the Agno, Bicol and Cagayan

C. DISASTER PREVENTION AND PREPAREDNESS
(Agenda item 4 (c))

29. The Committee noted the information on disaster prevention and preparedness given in document WRD/TC.13/1.

30. The Committee was pleased to learn that Dr. K. Seevaratnam of LRCS would carry out a consultancy for the Committee during 1981. He would be available for consultations with members on their disaster preparedness activities. The Committee welcomed his forthcoming mission and assured him of the fullest co-operation of the members. Further information on that subject was given in paragraph 74 of the report.

D. TRAINING
(Agenda item 4 (d))

31. The Committee reviewed the training activities for 1980 reported in WRD/TC.13/1. It noted that a large number of training opportunities had been available to the members during the year. Those mentioned were the following:

- (1) Seminar on Asian Disaster Preparedness sponsored by the United States Agency for International Development, held at Manila from 27 January to 2 February 1980 for disaster mitigation planners
- (2) Group training course entitled "Seminar on forecasting movement and intensification of tropical cyclones" held at Manila from 12 to 29 May 1980, attended by 29 meteorologists from PAGASA (Philippine Atmospheric Geophysical and Astronomical Services Administration)
- (3) WMO Workshop on Storm Surges held at Rangoon from 10 to 15 November 1980 under the programme of the Panel on Tropical Cyclones. Participants from seven members of the Committee were present (China, Hong Kong, Malaysia, Philippines, Republic of Korea, Thailand and Viet Nam).

32. The Committee expressed the need to have countries offering training courses and fellowships more effectively identified so that applications could be submitted in a timely way. Very often the announcements for such courses were too late. The Committee requested TCS to look into that matter. TCS was also requested to assist in identifying universities or agencies where suitable training courses of relevance to the Committee's programme could be conducted for Typhoon Committee members.

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The Committee expressed its appreciation to UNDP, ESCAP and WMO for their assistance in providing training opportunities to the members during 1980. The following were included:

- (a) Training fellowships to the Philippines and Thailand;
- (b) Training Course on Flood Loss Prevention and Management;
- (c) Group study visit to China on methods of flood control.

The Committee also expressed its appreciation to Japan for providing free group training courses in:

- (a) Meteorology;
- (b) River engineering;
- (c) Flood loss prevention and management.

The Committee was informed that Japan was conducting a seminar on disaster prevention which was ending on 16 December 1980.

With regard to future training activities, the Committee heard with appreciation that the Government of Japan was again planning to conduct the following three group training courses during 1981:

- (a) Meteorology;
- (b) River engineering;
- (c) Flood loss prevention and management.

The Committee urged members to try to take advantage of those training opportunities.

The Committee noted with appreciation the offer by the USSR of training fellowships in hydrology and hydrometeorology that could be provided for short-term and long-term periods at both the professional and technician levels.

The Committee was informed that Australia was planning to conduct a regional disaster preparedness seminar for two weeks in March 1981.

The Committee was further informed that the WMO Roving Seminar on Phenomenological Models for Hydrological Forecasting, organized under the UNDP regional programme (RAS/79/111), scheduled for Malaysia, would now be held in March 1981.

E. RESEARCH (Agenda item 4 (e))

The Committee reviewed the research activities for 1980 reported in document WRD/TC.13/1. The Committee noted with appreciation the lists of research reports and papers given to TCS by China, Hong Kong, Japan, the Philippines,

41. The Committee expressed appreciation of the offer made by Japan to extend co-operation and exchange views, information and results of research in the area of non-structural flood control.

42. The representative of Malaysia expressed concern that the Committee's research activities were all oriented toward meteorology and suggested that they should be expanded to include research being undertaken in other fields related to the Committee's programme.

43. The Committee was informed that in the Philippines research was also conducted on:

- (a) Disaster risk mapping;
- (b) The effectiveness of various types of warning systems;
- (c) The sociological impact of typhoons on community behaviour.

44. The representative of the United States called the attention of the Committee to the annual publication of research summaries prepared by WMO. That publication could be used as a guide by members in obtaining information.

45. The Committee was informed that it had been recommended at the storm surge workshop at Rangoon that research bodies should communicate to WMO information on advances in storm surge theory for distribution to all WMO members and others interested.

46. The Committee decided to request the LRCS consultant to compile a list of research work in the field of disaster preparedness and response to warnings during his mission to the region in 1981.

III. TYPHOON OPERATIONAL EXPERIMENT (TOPEX) (Agenda item 5)

- (a) Report on the First Planning Meeting for TOPEX (agenda item 5(a))
(WRD/TC.13/3)

47. The Committee recorded its appreciation to the Government of Japan for providing facilities for the First Planning Meeting for TOPEX, held at Tokyo from 17 to 26 June 1980. It noted that that Meeting represented an important step forward in advancing the planning process and on the arrangements for the Pre-Experiment scheduled for August 1981. It reviewed the main decisions made at the meeting.

meteorological component

The Committee noted that under the planning of the meteorological component it had been decided that the TOPEX observational network should be based primarily upon full implementation of the World Weather Watch network with augmented programmes during experimental periods. It expressed its agreement with that decision.

With regard to the proposal that two tropical cyclones would be selected for each of the First and Second Operational Experiments in 1982 and 1983 with mandatory observing programmes, the view was expressed that it would be desirable to increase the number of tropical cyclones to three or four for each of the Experiments, with intensified observations being mandatory.

It was further pointed out that the decision to reduce the Pre-Experiment period to three weeks in August 1981 made it difficult to persuade Governments to allocate the funds required to upgrade the observing systems and to agree to second scientists to the International Experiment Centre (IEC). From a scientific point of view there was also a serious risk that no tropical cyclone meeting the criteria adopted at PM-I would occur during the three-week period.

The Committee decided that both those questions should be referred to the second session of the Management Board for further consideration.

Serious concern was expressed by several members of the Committee over the need to convince their Governments of the important benefits likely to result from TOPEX in order that national resources might be made available for their participation and to ensure that scientists could be seconded to IEC during experiment periods. The views of the Committee on that point were recorded below under the heading agenda item 5(b).

hydrological component

The Committee endorsed the decisions of PM-I on the planning of the hydrological component of TOPEX.

training dissemination and information exchange component

The Committee noted that the additional information sought from participating members on their plans to implement the short- and long-term plans of action had not yet been made available. Those members that had not yet done so were urged to provide the necessary information directly to UNDRO and LRCS, through WMO, as soon as possible.

/Co-ordination

Co-ordination of the three TOPEX components

55. The Committee endorsed the decisions of PM-I.

Common system for the identification of tropical cyclones

56. The Committee also took up the proposals made by PM-I for a common system for the identification of tropical cyclones. It was agreed that the system proposed should be adopted for use as from 1 January 1981. Japan agreed to accept responsibility for the Japan Meteorological Agency (JMA), Tokyo, to assign numbers. With regard to the procedures for the assignment of numbers following notification of a tropical cyclone by a member of the Committee, it was agreed that Japan would inform all countries in the Pacific area and WHO of those procedures. The Committee requested WHO to convey that information to all members of WHO.

(b) Report on the first session of the Management Board for TOPEX
(Agenda item 5(b)) (WHO/TC.13/II and Add.1)

57. The Committee noted with satisfaction the steps taken to establish the Management Board for TOPEX and that eight participating members had designated their representatives to the Board. It expressed the hope that the remaining members of the Committee would soon find it possible to participate in the Board's work. The Committee further noted that Mr. I. Shimizu (Japan) had been elected Chairman of the Board and Mr. Zuo Ming (China) as its Vice-Chairman. It reviewed the report of the Chairman on the Board's short first session which had taken place at Tokyo on 25 and 26 June 1980 immediately following the First Planning Meeting. It recognized that the report on that Meeting constituted the main report to the Committee on the preparations for TOPEX and that the report on the first session of the Management Board was confined to those supplementary matters taken up at the first session.

58. The report on the decisions of the Board at its first session was presented by the Chairman of the Board. Information was also provided on the measures taken by WHO in order to investigate the possibility of setting up a special fund for TOPEX as requested at the Board's first session.

59. The Committee was informed of the willingness of the Secretary-General of WHO to use his authority under Regulations 9.6 and 9.7 of the WHO Financial Regulations to establish a special temporary voluntary TOPEX fund. Draft terms of reference for the fund were submitted to the Committee for comments. The Committee considered, however, that it did not have sufficient time to study the draft and therefore requested the Management Board to give urgent attention to

e matter at its second session so that formal establishment of the fund might proceed as rapidly as possible. It further noted that a circular letter would be sent to prospective donors once the fund had been set up.

The Committee drew attention to the very short period remaining before the beginning of the Pre-Experiment and the consequent need for rapid action if contributions to the fund were to be used to ensure the efficient execution of that first part of the Experiment. The results of the Pre-Experiment would be of significant importance for the later First and Second Experiments. It therefore called upon WMO members and organizations willing to contribute to the fund to do so as rapidly as possible so that the maximum use could be made of their contributions. The Committee further wished to stress that the potential benefits of TOPEX would extend far beyond the typhoon area; it considered that accordingly there were valid reasons for seeking substantial international support.

However, the Committee also laid considerable stress on the need to take early action to ensure the maximum participation of members through the allocation of additional national resources. It felt that it was desirable for WMO and ESCAP to approach member Governments at the highest level and to convince them of the benefits for development and other purposes likely to ensue from the successful execution of TOPEX. It wished to draw particular attention to the need for Governments, as a matter of priority, to:

- (a) Give their full approval for participation;
- (b) Ensure that seconded scientists could be present at IEC during experiment periods;
- (c) Establish experiment subcentres (ESCs) with adequate facilities;
- (d) Upgrade observing, telecommunication and data processing and archiving facilities to meet the needs of TOPEX.

In requesting WMO and ESCAP to make that approach, the Committee requested the Management Board at its second session to give further attention to the material that it felt should be submitted to Governments in order to obtain the maximum support from them.

The Committee considered that the Board should give special attention to arrangements for the Pre-Experiment which would serve as a dress rehearsal for the first and second TOPEX experiments in 1982 and 1983. It considered that the success of TOPEX as a whole was dependent upon the Pre-Experiment being

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carried out in the most efficient way. It proposed that the Board should endeavour to prepare a detailed programme of the work to be done in the time remaining. In so doing, two programme levels were foreseen, the first being national and concerned with those items of work necessary to bring the systems operated by participating members to a full state of readiness. National commitments to TOPEX would need careful scrutiny to determine how to bring them to the required level in those cases where the members were unable to meet them all. Observing and telecommunication facilities, to ensure the full availability of data to all concerned in real time, should be a prime consideration. Attention should also be given by the Board to analysis, forecasting and warning systems, and the ability of members to establish ESCs capable of fully performing their functions.

64. The second level would be regional or international and should mainly encompass the activities of IEC and the plans of participating members to play an active role in those activities.

65. The Committee requested the Management Board at its second session to give careful attention to the above proposal and, to the extent possible in the available time, to prepare programmes with implementation dates. The Committee also advised the Board to make full use of the existing mechanisms available to assist in the further planning. Apart from the Board itself, these consisted of the focal points for each of the three components, the WMO, ESCAP, UNDR0 and LRCS secretariats, and TCS. Some consultant services or seconded experts might also become available.

66. In view of the large amount of work still to be done, and the need for close co-ordination between all involved, the Committee also wished to seek the view of the Board at its second session on the need for the Board itself, or focal points, to meet in the period leading up to the Pre-Experiment.

67. The Committee was of the opinion that the directives and guidance it had given would suffice for the Board at its second session to take the necessary action and further decisions required for the Pre-Experiment.

IV. SUPPORT FOR THE COMMITTEE'S PROGRAMME
(Agenda item 6)

8. In accordance with the normal practice at its annual sessions the committee examined the existing position in relation to its need for support, and its expected future requirements, as set out in document WTD/TC.13/5.

Typhoon Committee Secretariat (TCS)

9. It considered first the staffing of TCS, taking into account the central role which that body played in all its activities. The new arrangements introduced in 1980 following the phased withdrawal of UNDP institutional support were felt to have worked well. Three of the four full-time professional posts had been filled by the members themselves, permitting a smooth transition from the earlier UNDP-financed arrangements. The Committee wished to record its appreciation to the Governments of Japan and the Philippines which had played a major part in making that possible.

10. With regard to the post of Co-ordinator, the functions of which had been carried out by the Director-General of PAGASA, the Committee noted that the arrangement had been of an interim nature. It felt that it was highly desirable that the existing arrangements should be continued for at least the time being. The Philippines agreed that it was willing to continue to perform that function on the understanding that serious consideration was given by other members to the possibility of their taking turns to carry out those functions.

11. Similarly, the Committee expressed the hope that the Philippines and Japan would continue to provide the TCS meteorologist and hydrologist respectively. Both indicated their willingness to do so for the time being.

12. The post of telecommunications/electronics expert, funded by UNDP until the end of 1981, was one giving rise to more concern. Not only did that expert play a leading role in the running of the operational warning system as a normal part of the Committee's programme, but his services were felt to be crucial to the success of that system for TOPEX. It was felt that his withdrawal at a time when the TOPEX activities were approaching their peak would have serious consequences for many of the participating members. The Committee accordingly emphasized its view that steps must be taken to

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make sure that those services could be continued uninterruptedly throughout the period of the Experiment, i.e. at least for the years 1982 and 1983. It requested ESCAP and WHO to make a further request to UNDP to consider the continued funding of the post as an operational contribution to its programme.

73. The Committee learnt that the efforts made by ESCAP to obtain the services of a flood-control expert to assist in carrying out its responsibilities in comprehensive flood-loss prevention and management had so far been unsuccessful. It was of the opinion that ESCAP should renew its efforts to fill that post without which the activities in that field might be seriously hampered. Members with suitably qualified staff were asked to give serious attention to the possibility of seconding an expert to TCS for that purpose.

74. The outcome of the efforts made by WHO, UNDP and LRCS to provide TCS with a consultant in disaster prevention and preparedness for a six-month period was explained to the Committee. It learned with great appreciation of the generous offer made by LRCS to provide one of its own experienced senior staff members, Dr. K. Seevaratnam, to carry out that assignment. It noted that the consultant would carry out his mission in two three-month periods in 1981. It considered that the League's offer was very much in the tradition of close co-operation in the Committee's work which had characterized its participation over many years. The Committee also wished to thank UNDP, WHO and UNDP for their contributions to that consultancy.

75. Under the current UNDP project for support to the regional typhoon programme, provision also existed for occasional consultant services in fields not justifying a full-time expert in TCS, and for the funding of the travel of counterpart staff. The Committee was of the opinion that that provision had been extremely valuable and expressed its strong desire that UNDP should consider the continuation of that support beyond 1981, taking into account the efforts being made by members to provide the full-time staff of TCS.

Programme activities

76. Following the decision made at its twelfth session, the Committee recorded its thanks to UNDP for augmenting the funds available

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for equipment and fellowships for China, the Lao People's Democratic Republic and Viet Nam. Valuable extra support had also been received from UNDP for TOPEX, for study tours in China, and for training seminars.

77. As the next session of the Committee would fall close to the end of the current UNDP support period, it went on to consider its needs for assistance for the years 1982 and 1983 bearing in mind that that period would also cover the operational phase of TOPEX.

78. It was assisted in that respect by the representative of UNDP who outlined the possibilities for further support from UNDP. He thanked the speakers who had expressed appreciation of the support given by UNDP to the Committee's activities and added that UNDP was happy to co-operate in the work of the Committee. He welcomed the decision of the Committee to invite Dr. Roman Kintanar to continue to be the Co-ordinator of TCS and said that it had been a pleasure to be associated with him.

79. As several representatives had referred to requests for additional assistance from UNDP and for assistance from the United Nations Interim Fund for Science and Technology for Development, he wished to stress that both sources of funding were related to development and hence projects to be eligible for assistance should have the potential to enhance social or economic development; secondly, both sources assisted in projects of Governments and hence there should be a clear picture of inputs by the Governments; thirdly, in inter-country projects, the role and responsibilities of each participating Government should be clear; lastly, the Interim Fund had, as one of its prime objectives, the enhancement of the technological capacity of developing countries.

80. He appealed to members of the Committee to also bear in mind the fact that the resource situation, for both UNDP and the Interim Fund, was tight. The increase in total pledges of voluntary contributions over the previous year's pledges, as announced at the recent pledging conference, would not be sufficient to meet even the increases caused by inflation in expenditure on planned activities. Despite that difficult situation UNDP was prepared to support some of the requests for assistance made at that meeting and would be prepared to consider others, as follows:

(a) UNDP would support the extension of the duration of the post of telecommunication and electronics expert until the end of 1982 to enable him to assist in the installation and initial operation of the satellite receiving station which would be installed under the project in member countries in 1980 and 1981. That extension was independent of any activities related to TOPEX;

(b) UNDP would support, in a sum of \$10,000 in 1981 an equal sum in 1982, the travel costs of counterpart staff in the TCS and of exchange visits by key meteorological personnel;

(c) UNDP would require justification for requests for any additional equipment;

(d) UNDP would in principle support training activities, but the amount would depend on justification;

(e) UNDP would require maximum TCDC arrangements with regard to consultant services;

(f) In regard to TOPEX, UNDP had not received a clear picture of the proposed project to enable it to make a judgement on its eligibility for UNDP or Interim Fund support.

81. The UNDP representative said that the project was extended from the end of 1978 with additional UNDP inputs, for two reasons: one was to implement the recommendations of the review mission of 1978 and the other was to enable China and Viet Nam to benefit from the project, having commenced their participation only in 1979. It was time to think of terminating the current project of assistance which would have lasted eight years by the end of 1981. That would not preclude or prejudice the possibility of support for programme activities after that. UNDP was also somewhat embarrassed to "have in its books" for eight years a project of assistance to a secretariat which would connote institutional support, though of course such support was no longer included in the project. It was also necessary to present to participating Governments a terminal report on that project.

82. The Committee expressed its gratitude to UNDP for the assistance already provided and for its willingness to consider some further aid under a new project. It requested WMO and ESCAP to prepare a proposal

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for a new project request to UNDP incorporating its expected requirements for the years 1982 and 1983. In relation to TOPEX there was a need to demonstrate the ways in which it was expected to promote regional development. It was pointed out that the Typhoon Committee had been established because of the economic impact of typhoons in developing countries where progress was often set back many years by a single devastating typhoon. Improvement of the warning system was bound to contribute to the development of the region by the reduction of typhoon damage. The Committee requested that the new request to UNDP should be supported by sound arguments on the ways in which the successful carrying out of TOPEX could contribute to development. In that connexion the Committee drew attention to the need to secure the maximum support from all available sources. In addition to seeking support from UNDP, it felt that approaches should be made to international bodies such as the United Nations Environment Programme (UNEP) to explore their readiness to assist in supporting TOPEX. The Committee was informed of the steps being taken by WMO to hold discussions at UNEP headquarters in Nairobi later in December 1980 on the possible submission of a project request. The Committee urged UNEP to provide support for TOPEX bearing in mind the economic and humanitarian reasons for which the experiment was being conducted.

83. The Committee further pointed out that its short- and long-term programmes listed the following training seminars under the hydrological component:

- (a) Flood vulnerability analysis;
- (b) Principles of flood plain management for flood loss prevention and management;
- (c) Hydrological forecasting.

Those training seminars could be organized by ESCAP and/or WMO during 1982-1983 and should therefore be included in the new project proposal to UNDP.

84. In conclusion, the Committee expressed its opinion that priority should be given in the 1981-1983 period to supporting TOPEX. It pointed out that many of the facilities needed for TOPEX would continue to be of value to its broader programme after the Experiment had ended.

V. PROGRAMME FOR 1981
(Agenda item 7)

85. In considering its programme for 1981 as set out in document WRD/TC.13/6, the Committee took into account the short-term and long-term activities and expected assistance from external sources. The fact that the execution of TOPEX would bring new activities in the years ahead was fully considered.

86. Recognizing that a number of national activities of particular interest to the Committee would be carried out by the members, the Committee directed that special attention should be given, with the assistance of TCS, to the following items of work in 1981.

Meteorological component

(a) Operation and maintenance of electronic equipment (RS/RW, radar, radar picture transmission, satellite receiving and telecommunication equipment);

(b) Establishment of new radar stations in Malaysia and the Philippines;

(c) Provision of equipment, spare parts and training of technicians for proper calibration and maintenance of weather radars and satellite receiving equipment;

(d) Provision for improvement of meteorological and telecommunication facilities included in the priority list established by the Committee;

(e) Establishment of satellite receiving equipment for reception of cloud imagery and other data from GMS and TIROS-N satellites in the Philippines and Thailand;

(f) Review of national data collection facilities and data exchanges needed for typhoon warning services and taking remedial measures, where necessary;

(g) Review of the existing arrangements for dissemination of typhoon and flood warnings with a view to introducing improvements, where necessary;

/(h)

(h) Preparation for and execution of the Pre-Experiment of TOPEX, on the basis of the tentative programme recommended by the First Planning Meeting in June 1980;

(i) Collection and dissemination of tide gauge and water level data for use in storm surge prediction;

(j) Procurement and installation of equipment and spare parts for telecommunication, radar, satellite receivers etc. under the UNDP fund provided for 1981.

Hydrological component

(a) Survey and preparation of plans in the selected areas for comprehensive flood loss prevention and management;

(b) Further improvement in the operation of existing flood forecasting systems in China, Malaysia, the Philippines and the Republic of Korea;

(c) Establishment of flood forecasting systems in the Agno, Bicol and Cagayan river basins in the Philippines, the Kinabatangan River basin in Sabah and the Sadong River basin in Sarawak, Malaysia, and the Pasak River basin in Thailand;

(d) Development of flood forecasting and warning systems for dam operation in the Philippines;

(e) Continuation of determination of magnitudes and frequency of floods in flood-prone zones subject to heavy damage and assessment of potential flood damage;

(f) Evaluation of existing flood forecasting systems in the selected river basins under the hydrological component of TOPEX;

(g) Visit under TCDC arrangements by a group of hydrologists from Malaysia to other members during the flood season to observe and participate in the actual operation of flood-forecasting and warning systems.

Disaster prevention and preparedness

(a) Follow-up action on the joint LRCS/WMO/ESCAP missions in 1973-1976 the recommendations of the regional seminar held at Tokyo in 1976, the review mission in 1976 and the consultant's reports on Malaysia, the Philippines and Thailand in 1978-1979;

(b) Follow-up action on the Philippine proposal to establish a Philippine training and research centre for disaster prevention and preparedness;

(c) Advice and assistance with training in the field of disaster prevention and community preparedness through consultancy services where appropriate;

(d) Improvement in the dissemination of timely warnings on typhoons, floods and storm surges, with particular attention to remote areas.

Training

→ Technical Cooperation Bureau Manila (TCBC)

(a) Training of personnel through group training courses in Japan and through fellowships available under the UNDP project, TCDC, from VCP and through bilateral assistance schemes. Short-term training courses and fellowships on maintenance of satellite receiving equipment, radar and telemetering equipment might be given special consideration;

(b) Assistance to members in exploring the possibility of providing long-term training courses in meteorology, hydrology and electronics. The VCP scheme might be further exploited for that purpose;

(c) Training by TCS experts assisted by counterpart staff in meteorology and hydrology. On-the-job training by TCS experts, particularly in the operation and maintenance of radar, satellite receiver and telecommunication equipment;

(d) Exchange of information and identification of training facilities available among WMO members in the areas of concern and a survey of available fellowships and scholarship assistance;

(e) Participation in study tours and seminars relevant to the Committee's programme organized by members or international bodies;

(f) Organization of training under TCDC in flood forecasting, including study tours;

(g) Provision of short-term fellowships and organization of other training in the field of storm/surge prediction.

Research

- (a) Stimulation of research activities through advisory services, visits of study groups and exchange visits by research personnel;
- (b) Undertaking of research on typhoons, particularly during the TOPEX period, and the promotion of joint collaboration on selected topics, such as studies directed towards the development of improved storm surge prediction methods, disaster preparedness and flood forecasting;
- (c) Promotion of exchange of information on typhoon and allied research activities, including developments on related matters outside the region;
- (d) Initiation of provisional studies on disaster risk evaluation in typhoon-prone areas, including flood risk mapping.

VI. CO-ORDINATION WITH OTHER ACTIVITIES OF THE WMO TROPICAL CYCLONE PROGRAMME (TCP) (Agenda item 8)

87. The sixth status report on the implementation of the WMO Tropical Cyclone Programme (TCP) (document WRD/TC.13/7) was examined by the Committee, which was also given later information on development since 30 June 1980. It noted with satisfaction that the decision of the Eighth Congress of WMO to strengthen and intensify the activities under TCP had begun to be implemented in 1980.

88. Under the general component, work on a number of subprojects had been accelerated and several new publications providing guidance and advice for members would become available in the period before the Committee's fourteenth session. The Committee was informed that a new series of publications had been initiated under TCP and that the report of the First Planning Meeting for TOPEX had already been issued in that series. Two other TOPEX publications, the Operational Plan and a general description of the Experiment, were under preparation. Of the various subprojects, the texts for No. 3, Automatic Weather Stations, and No. 4, Radar, had been completed and received for publication in the WMO secretariat. A meeting of the subproject team on No. 12, "Human response to tropical cyclone warnings and their content," had been held at Bangkok from 17 to 21 November 1980 and the final text for publication was expected to be available by May 1981. It was hoped that it would be possible to distribute an advance copy of that text to each member in time for the TOPEX Pre-Experiment scheduled to begin on 1 August 1981.

89. The Committee was also informed of the developments that had taken place in the programmes of the other three regional cyclone bodies since its twelfth session. It noted, in particular, that a very useful Workshop on Storm Surges had taken place at Rangoon from 10 to 15 November 1980 and that seven members of the Committee had designated participants to the Workshop. It considered that co-operation of that sort between members of the different cyclone bodies was of great value in co-ordinating activities under TCP. Similarly, the Symposium on Typhoons, which had taken place at Shanghai from 6 to 11 October 1980, had contributed greatly to spreading knowledge of the latest developments in typhoon forecasting techniques. The Committee requested ESCAP and WMO to continue whenever possible to arrange such activities bringing together scientists from different areas affected by tropical cyclones.

90. It expressed its appreciation to all who had contributed to the success of those activities during 1980 and especially to UNDP for making available the funds needed to support the Shanghai Symposium and the Rangoon Workshop.

91. The Committee further examined the international hurricane scale which had been recommended by the RA IV (Regional Area IV, as defined by WMO) Hurricane Committee at its third session and since adopted by the President of RA IV on behalf of his regional association. It noted that the Hurricane Committee had recommended that the scale should be submitted to other regional cyclone bodies for their consideration and possible adoption.

92. The Committee considered that it was necessary to have further background information on the scale and that it was too early to adopt it without further study. It felt that considerable damage could still be caused by tropical cyclones which did not reach minimum hurricane intensity (64 kt). It accordingly requested WMO to furnish further information on the scale to TCS for distribution to all members. The Committee agreed to give the scale further consideration at a later date.

VII. CONSIDERATION OF THE AGENDA FOR THE FOURTEENTH
SESSION OF THE COMMITTEE
(Agenda item 9)

93. The Committee requested the ESCAP and WMO secretariats, in consultation with TCS, to prepare the detailed agenda for the fourteenth session. It was agreed that members would inform ESCAP, WMO and the TCS at an early date of any appropriate subjects which they might wish to propose for the next session.

VIII. DATE AND PLACE OF THE FOURTEENTH SESSION
(Agenda item 10)

94. The Committee welcomed and accepted with appreciation the offer of the representative of the Philippines to provide host facilities for the fourteenth session to be held at Manila from 10 to 16 November 1981.

IX. SCIENTIFIC LECTURES
(Agenda item 11)

95. The following scientific lectures were presented:

- (1) "Disaster prevention and disaster preparedness - a perspective for the future" by Mr. Roger T. Jones (Australia).
- (2) "Assessment of the flood forecasting operation of the Chao Phya River, Thailand, during the 1980 season" by Dr. Tawatchai Tingsanchali (Thailand).

The Committee expressed its appreciation and thanks for those presentations.

X. ADOPTION OF THE REPORT
(Agenda item 12)

96. The Committee adopted its report on 8 December 1980.

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8 December 1980

ORIGINAL: ENGLISH

ECONOMIC AND SOCIAL COMMISSION FOR ASIA AND THE PACIFIC
AND
WORLD METEOROLOGICAL ORGANIZATION

Typhoon Committee
Thirteenth session
2-8 December 1980
Bangkok

DRAFT REPORT OF THE TYPHOON COMMITTEE ON ITS
THIRTEENTH SESSION

I. ORGANIZATION OF THE SESSION

1. The thirteenth session of the Typhoon Committee was held at Bangkok from 2 to 8 December 1980.

Attendance

2. The session was attended by representatives of Democratic Kampuchea, Hong Kong, Japan, Lao People's Democratic Republic, Malaysia, the People's Republic of China, the Philippines, the Republic of Korea, Thailand and the Socialist Republic of Viet Nam. Observers from the Union of Soviet Socialist Republics and the United States of America attended the session. Observers were also present from Office of the United Nations Disaster Relief Co-ordinator (UNDRO), the United Nations Development Programme (UNDP), the International Civil Aviation Organization (ICAO), the League of Red Cross Societies (LRCS), and the Committee for Co-ordination of Investigations of the Lower Mekong Basin.

Opening addresses

3. A message from Mr. J.B.P. Maramis, Executive Secretary of ESCAP was delivered by Mr. B. X. Zhang, Chief of the Natural Resources Division. A statement was also made by Mr. Peter Rogers, the representative of the Secretary-General of WMO.
4. In his message, the Executive Secretary of ESCAP noted that the Committee was entering a new phase in its history as the executive leadership in the Typhoon Committee Secretariat had passed from UNDP project personnel to an official of a member of the Committee. He urged

/the members

the members to continue to look after their own needs. He expressed optimism that the long- and short-term goals of the Committee would be achieved. He assured the Committee that ESCAP was prepared to support the Committee to the fullest extent possible.

5. The Secretary-General of WMO expressed the view that arrangements for TOPEX would tend to dominate discussions at the thirteenth session. He felt that the ultimate success or failure of TOPEX would depend upon the efforts made by the members themselves but that the seeking of international support to supplement purely national resources was fully justified by the benefits expected from the Experiment. Subject to the comments of the Committee and the Management Board, he was willing to authorize the establishment of a special voluntary fund for TOPEX to which contributions could be made in cash, equipment or expert services.

Election of officers

6. The Committee elected Dr. Roman L. Kintanar (Philippines) as Chairman of the Committee for the year 1980/1981 and Mr. Itsuro Shimizu (Japan) as Vice-Chairman. Mr. Ho Tong Yuen (Malaysia) was elected Chairman of the Drafting Committee.

Agenda

7. The Committee adopted the following agenda:
1. Opening of the session
 2. Election of officers
 3. Adoption of the agenda
 4. The Committee's activities during 1980
 - (a) Meteorological component
 - (b) Hydrological component
 - (c) Disaster prevention and preparedness component
 - (d) Training
 - (e) Research
 5. Typhoon Operational Experiment (TOPEX)
 - (a) Report on the First Planning Meeting for TOPEX
 - (b) Report on the first session of the Management Board for TOPEX
 6. Support for the Committee's programme
 7. Programme for 1981
 8. Co-ordination with other activities of the WMO Tropical Cyclone Programme

9. Consideration of the agenda for the fourteenth session
10. Date and place of the fourteenth session
11. Scientific lectures
12. Adoption of the report.

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II. THE COMMITTEE'S ACTIVITIES DURING 1980
(WRD/TC.13/1)
(Agenda item 4)

8. The Committee reviewed and assessed the progress made in implementing its programme during 1980. It considered in turn each of the five components, namely (a) meteorological, (b) hydrological, (c) disaster prevention and preparedness, (d) training, and (e) research. The main features of the discussions and decisions taken for each component are reported below:

A. METEOROLOGICAL COMPONENT
(Agenda item 4 (a))

9. The Committee noted with interest the large amount of information given in document WRD/TC.13/1 on the steps taken by members to improve their capabilities for typhoon forecasting and warning. Its review covered meteorological satellites, upper-air observations, radar stations and the exchange of fixes, ocean weather ships and buoys, reconnaissance flights, and meteorological telecommunications. The following additional information was made available during the discussion:

10. Hong Kong informed the Committee that funding had been approved for the purchase of a new replacement 10 cm radar set. It would be equipped with DVIP, CAPPI, and facilities for recording and remote display of the radar data. It was expected to be installed before the TOPEX-Pre-Experiment in 1981. A new NAVOID upper-air system was also being installed and would be in operation late in 1980 or early in 1981.

11. Japan reported that although there were some difficulties with the full disk image, GMS-I continued to operate satisfactorily. Plans were proceeding on schedule for the launching of GMS-II in August 1981. The operation of its four ocean buoys had continued to be satisfactory even in storm conditions.

12. The Lao People's Democratic Republic explained that difficulties in the transmission of data from NMC, Vientiane to the RTH, Bangkok were due to the fact that only six of the 10 stations operating were equipped to transmit their observations. It was ready to receive the visit of the TCS expert to assist in rectifying the present position.

13. In the Philippines five new 10 cm radars were in the course of delivery. They were expected to become operational in 1981. Steps had

been initiated to purchase 12 SSB sets to improve national data collection. External assistance would be necessary to make up the total of 25 required. A request had been made for the supply of upper-air equipment under the WMO VCP.

14. Thailand announced that the GMS HR receiver was now expected to be installed in mid-1981. The installation of the TIROS-N HR receiver would follow later that year. The installation of the three new radars would take place in early 1982 and not in 1981 as previously reported.

15. Viet Nam was ready to discuss, with the help of WMO and TCS, arrangements for the implementation of a direct point-to-point link between Hanoi and Bangkok. The Committee was informed that these discussions would take place immediately after TC. 13.

16. USA confirmed that it expected to continue to carry out meteorological reconnaissance flights in the typhoon area in the years ahead.

17. The Committee welcomed the supplementary information provided during the discussion of this item and reiterated the importance of all members making strenuous efforts to implement fully the requirements of the World Weather Watch Plan. It recalled that the networks for TOPEX were based primarily on that Plan.

18. In the light of the information available it revised the priority list established at the twelfth session as shown below:

Observing facilities

(i) Upper-air stations

98223 Laoag (Philippines))	
98645 Cebu (Philippines))	-- 12 GMT RS/RW-national projects
47187 Cheju (Republic of Korea))	External assistance needed

(ii) Weather radar

Cheju (Republic of Korea)	External assistance needed
Tanay (near Manila, Philippines)	National project
Haiphong (Viet Nam)	External assistance needed

/(iii)

- (iii) Satellite receiving equipment (GMS/TIROS-N satellites)
- | | | |
|----------------------|---|----------------------------|
| Manila (Philippines) |) | |
| Bangkok (Thailand) |) | -- National projects |
| Hanoi (Viet Nam) |) | External assistance needed |

Telecommunication facilities

- (i) Improvement of national data collection facilities
- | | | |
|----------------------------------|---|------------------------------|
| Lao People's Democratic Republic |) | |
| Philippines |) | National/bilateral projects/ |
| Thailand (night-time reception) |) | external assistance needed |
| Viet Nam |) | |
- (ii) Regional telecommunication links
- | | | |
|----------------------|--|------------------|
| Bangkok-Hanoi (1981) | | National project |
|----------------------|--|------------------|
- (iii) Other telecommunication facilities
- | | | |
|---|--|-------------------------------------|
| Thailand - Strengthening of RTH Bangkok | | National/external assistance needed |
|---|--|-------------------------------------|

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B. HYDROLOGICAL COMPONENT
(Agenda item 4 (b))

19. The Committee reviewed the accomplishments during the past year as reported in document WRD/TC.13/1 and WRD/TC.13/2 under the hydrological component. The Committee noted with satisfaction that a great deal was accomplished by the members and the TCS in achieving goals set at the last session.
20. The representative of Malaysia reported that a survey was carried out for the 1979 floods in the Kelantan and Johore River basins for the purpose of preparing flood risk maps.
21. He also expressed his Government's appreciation to the Government of Japan for its assistance in carrying out a technical survey required for the establishment of a flood forecast and warning system in the Kinabatangan and Sadong River basins. He also thanked the TCS, Japan and ESCAP for organizing the advisory team visit to Malaysia.
22. The Committee heard with interest a report by Japan on the development, testing and installation of a radar rain gauge system in the Yodo River basin, which was expected to become operational by the next flood season. Radar rain gauges had been previously installed and used in the Tone and Chikugo River basins.
23. The Committee was also informed that Japan regularly prepared detailed flood forecasts for 17 major river basins which used data from 249 control stream gauging stations; 194 relay stations; 946 rainfall stations and 770 water stage stations. In addition 513 other stations were equipped to give warning to local residents by siren or loud speakers.
24. The representative of Thailand reported that it was able to complete a model for a flood forecasting system for the Chao Phya River basin using its own national resources. A report on the performance of this model during the 1980 flood season was given during the scientific lectures.

25. The Committee recorded its appreciation to the Government of Japan for:

- (i) Sending a technical survey mission to Malaysia in connexion with the establishment of flood forecasting systems in Sabah and Sarawak;
- (ii) Providing experts and sending an advisory team to assist members in the selection of pilot areas for comprehensive flood loss prevention and management;
- (iii) The assistance provided to the Philippines in designing and establishing a flood forecasting and warning system for the Agno, Bicol and Cagayan River basins.

C. DISASTER PREVENTION AND PREPAREDNESS
(Agenda item 4c)

26. The Committee noted the information on disaster prevention and preparedness in WRD/TC.13/1.

27. The Committee was pleased to learn that Dr. K. Seevaratnam of the League of Red Cross Societies would carry out a consultancy for the Committee during 1981. He would be available for consultations with members on their disaster preparedness activities. The Committee welcomed his forthcoming mission and assured him of the fullest co-operation of the members. (See also para 71.)

D. TRAINING
(Agenda item 4d)

28. The Committee reviewed the training activities for 1980 reported in WRD/TC.13/1. The Committee noted that a large number of training opportunities had been available to the members during the year. Those mentioned were:

- a USAID sponsored seminar on Asian Disaster Preparedness held in Manila from 27 January to 2 February 1980 for disaster mitigation planners;

- a group training course entitled "Seminar in Forecasting Movement and Intensification of Tropical Cyclones" held in Manila from 12 to 29 May 1980 in which 29 meteorologists from PAGASA attended;
- the WMO Workshop on Storm Surges held in Rangoon, Burma from 10 to 15 November 1980 under the programme of the Panel on Tropical Cyclones. Participants from seven members of the Committee were present (China, Hong Kong, Malaysia, Philippines, Republic of Korea, Thailand and Viet Nam).

29. The Committee expressed a need to have countries offering training courses and fellowships more effectively identified so that applications could be submitted in a timely way. Very often the announcements for such courses were too late. The Committee requested the TCS to look into this matter. The TCS was also requested to assist in identifying universities or agencies where suitable training courses of relevance to the Committee's programme could be conducted for Typhoon Committee members.

30. The Committee expressed its appreciation to the UNDP, ESCAP and WMO for their assistance in providing training opportunities to the members during 1980. These included:

- (i) Training Fellowships to Thailand and the Philippines;
- (ii) Training Course on Flood Loss Prevention and Management;
- (iii) Group Study Visit to China on the Methods of Flood Control.

31. The Committee also expressed its appreciation to Japan for providing three group training courses in:

- (i) Meteorology;
- (ii) River Engineering;
- (iii) Flood Loss Prevention and Management.

32. The Committee was informed that Japan was conducting a Seminar on Disaster Prevention which was ending on 16 December 1980.

33. With regard to future training activities the Committee heard with appreciation that the Government of Japan was again planning to conduct three group training courses during 1981:

- (i) Meteorology;
- (ii) River Engineering;
- (iii) Flood Loss Prevention and Management.

The Committee urged members to try to take advantage of these training opportunities.

34. The Committee noted with appreciation the offer by the USSR that training fellowships could be provided in Hydrology and Hydro-meteorology for both short-term and long-term periods on both the professional and technician levels.

35. The Committee was informed that Australia was planning to conduct a Regional Disaster Preparedness Seminar for two weeks in March 1981.

36. The Committee was further informed that the WMO Roving Seminar on Mathematical Models for Hydrological Forecasting organized under the UNDP regional programme (RAS/79/111) scheduled for Malaysia would now be held in March 1981.

E. RESEARCH (Agenda item 4e)

37. The Committee reviewed the research activities for 1980 reported in document WRD/TC.13/1. The Committee noted with appreciation the lists of research reports and papers given to the TCS by China, Hong Kong, Japan, the Philippines and Thailand.

38. The Committee expressed appreciation for the offer made by Japan to extend co-operation and exchange views, information and results of research in the area of non-structural flood control.

39. The representative of Malaysia expressed concern that the Committee's research activities were all oriented toward meteorology and suggested that they be expanded to include research being undertaken in other fields related to the Committee's programme.

40. The Committee was informed that in the Philippines research was also conducted on:

- (i) Natural disasters;
- (ii) Disaster risk mapping;
- (iii) Effectiveness of various types of warning systems;
- (iv) Sociological impact of typhoons on community behaviour.

41. The representative of the USA called the attention of the Committee to the annual publication of research summaries prepared by WMO. This publication could be used as a guide by members in obtaining information.

42. The Committee was informed that it was recommended at the storm surge workshop in Rangoon that research bodies should communicate to WMO information on advances in storm surge theory for distribution to all WMO members and others interested.

43. The Committee decided to request the LRCS consultant to compile a list of research work in the field of disaster preparedness and response to warnings during his mission to the region in 1981.

III. TYPHOON OPERATIONAL EXPERIMENT (TOPEX)
(Agenda item 5)

(a) Report on the First Planning Meeting for TOPEX (Agenda item 5(a))
(WRD/TC.13/3)

44. The Committee recorded its appreciation to the Government of Japan for providing facilities for the First Planning Meeting for TOPEX (PM-I), held in Tokyo from 17 to 26 June 1980. It noted that PM-I represented an important step forward in advancing the planning process and on the arrangements for the Pre-Experiment scheduled for August 1981. It reviewed the main decisions made at the meeting.

Meteorological component

45. The Committee noted that under the planning of the Meteorological Component it had been decided that the TOPEX observational network should be based primarily upon full implementation of the WWW network with augmented programmes during experimental periods. It expressed its agreement with this decision.

46. With regard to the proposal that two tropical cyclones would be selected for each of the First and Second Operational Experiments in 1982 and 1983 with mandatory observing programmes, the view was expressed that it would be desirable to increase the number of tropical cyclones to three or four for each of the Experiments with intensified observations being mandatory.

47. It was further pointed out that the decision to reduce the Pre-Experiment period to three weeks in August 1981 made it difficult to persuade governments to allocate the funds required to upgrade the observing systems and to agree to second scientists to the International Experiment Centre (IEC). From a scientific point of view there was also a serious risk that no tropical cyclone meeting the criteria adopted at PM-I would occur during the three-week period.

48. The Committee decided that both these questions should be referred to the second session of the Management Board for further consideration.

49. Serious concern was expressed by several members of the Committee over the need to convince their governments of the important benefits likely to result from TOPEX in order that national resources might be made available for their participation and to ensure that scientists could be seconded to the IEC during experiment periods. The views of the Committee on this point are recorded below under agenda item 5(b).

Hydrological component

50. The Committee endorsed the decisions of PM-I on the planning of the Hydrological Component of TOPEX.

Warning dissemination and information exchange component

51. The Committee noted that the additional information sought from participating members on their plans to implement the short- and long-term plans of action had not yet been made available. Those members which had not yet done so were urged to provide the necessary information directly to UNDRO and LRCS, or through WMO, as soon as possible.

Co-ordination of the three TOPEX components

52. The Committee endorsed the decisions of PM-I.

Common system for the identification of tropical cyclones

53. The Committee also took up the proposals made by PM-I for a common system for the identification of tropical cyclones. It was agreed that the system proposed be adopted for use as from 1 January 1981. Japan agreed to accept responsibility for JMA, Tokyo, to assign members. With regard to the procedures for the assignment of numbers following notification of a tropical cyclone by a member of the Committee, it was agreed that Japan would inform all countries in the Pacific area and WMO of these procedures. The Committee requested WMO to convey this information to all Members of WMO.

(b) Report on the first session of the Management Board for TOPEX
(Agenda item 5(b)) (WRD/TC.13/4 and WRD/TC.13/4/Add.1)

54. The Committee noted with satisfaction the steps taken to establish the Management Board for TOPEX and that eight participating members had designated their representatives to the Board. It expressed the hope that

/the remaining

the remaining members of the Committee would soon find it possible to participate in the Board's work. The Committee further noted that Mr. I. Shimizu (Japan) had been elected Chairman of the Board and Mr. Zuo Ming (China) as its Vice-Chairman. It reviewed the report of the Chairman on the Board's short first session which had taken place in Tokyo on 25-26 June 1980 immediately following PM-I. It recognized that the report on PM-I constituted the main report to the Committee on the preparations for TOPEX and that the report on MB-I was confined to those supplementary matters taken up at the first session.

55. The report on the decisions of MB-I was presented by the Chairman of the Board. Information was also provided on the measures taken by WMO in order to investigate the possibility of setting up a special fund for TOPEX as requested at the Board's first session.

56. The Committee was informed of the willingness of the Secretary-General of WMO to use his authority under Regulations 9.6 and 9.7 of the WMO Financial Regulations to establish a Special Temporary Voluntary TOPEX Fund. Draft terms of reference for the Fund were submitted to the Committee for comments. The Committee considered, however, that it did not have sufficient time to study the draft and therefore requested the Management Board to give urgent attention to this matter at its second session so that formal establishment of the Fund might proceed as rapidly as possible. It further noted that a circular letter would be sent to prospective donors once the Fund had been set up.

57. The Committee drew attention to the very short period remaining before the beginning of the Pre-Experiment and the consequent need for rapid action if donations to the Fund were to be used to ensure the efficient execution of this first part of the Experiment. The results of the Pre-Experiment would be of significant importance for the later First and Second Experiments. It therefore called upon WMO Members and organizations willing to contribute to the Fund to do so as rapidly as possible so that the maximum use could be made of their donations. The Committee further wished to stress that the potential benefits of TOPEX would extend far beyond the typhoon area; it considered that there were accordingly valid reasons for seeking substantial international support.

58. However, the Committee also laid considerable stress on the need to take early action to ensure the maximum participation of members through the allocation of additional national resources. It felt that it was desirable for WMO and ESCAP to approach member governments at the highest level and to convince them of the benefits for development and other purposes likely to ensue from the successful execution of TOPEX. It wished to draw particular attention to the need for governments, as a matter of priority, to:

- (i) give their full approval for participation;
- (ii) ensure that seconded scientists could be present at the IEC during experiment periods;
- (iii) establish ESCs with adequate facilities;
- (iv) upgrade observing, telecommunication and data-processing and archiving facilities to meet the needs of TOPEX.

59. In requesting WMO and ESCAP to make this approach, the Committee requested MB-II to give further attention to the material it felt should be submitted to governments in order to obtain the maximum support from them.

60. The Committee considered that the Board should give special attention to the arrangements for the Pre-Experiment which would serve as a dress rehearsal for the first and second TOPEX experiments in 1982 and 1983. It considered that the success of TOPEX as a whole was dependent upon the Pre-Experiment being carried out in the most efficient way. It proposed that the Board should endeavour to prepare a detailed programme of the work to be done in the time remaining. In so doing, two programme levels were foreseen, the first being national and concerned with those items of work necessary to bring the systems operated by participating members to a full state of readiness. National commitments to TOPEX would need careful scrutiny to determine how to bring them to the required level in those cases where the members are unable to meet them all. Observing and telecommunication facilities, to ensure the full availability of data to all concerned in real time, should be a prime consideration. Attention

should also be given by the Board to analysis, forecasting and warning systems, and the ability of members to establish ESCs capable of fully performing their functions.

61. The second level would be regional or international and should mainly encompass the activities of the IEC and the plans of participating members to play an active role in these activities.

62. The Committee requested MB-II to give careful attention to the above proposal and, to the extent possible in the available time, to prepare programmes with implementation dates. The Committee also advised the Board to make full use of the existing mechanisms available to assist in the further planning. Apart from the Board itself, these consisted of the focal points for each of the three components, the WMO, ESCAP, UNDRO and LRCS Secretariats, and the TCS. Some consultant services or seconded experts might also become available.

63. In view of the large amount of work still to be done, and the need for close co-ordination between all involved, the Committee also wished to seek the view of MB-II on the need for the Board itself, or focal points, to meet in the period leading up to the Pre-Experiment.

64. The Committee was of the opinion that the directives and guidance it had given would suffice for MB-II to take the necessary action and further decisions required for the Pre-Experiment.

/IV.

IV. SUPPORT FOR THE COMMITTEE'S PROGRAMME
(WRD/TC.13/5)
(Agenda item 6)

65. In accordance with the normal practice at its annual sessions the Committee examined the present position in relation to its need for support, and its expected future requirements.

Typhoon Committee Secretariat (TCS)

66. It considered first the staffing of the TCS, taking into account the central role which this body plays in all its activities. The new arrangements introduced in 1980 following the phased withdrawal of UNDP institutional support were felt to have worked well. Three of the four full-time professional posts had been filled by the members themselves, permitting a smooth transition from the earlier UNDP-financed arrangements. The Committee wished to record its appreciation to the Governments of Japan and the Philippines which had played a major part in making this possible.

67. With regard to the post of Co-ordinator, the functions of which had been carried out by the Director-General of PAGASA, the Committee noted that the arrangement had been of an interim nature. It felt that it was highly desirable that the present arrangements be continued for at least the time being. The Philippines agreed that it was willing to continue to perform this function on the understanding that serious consideration be given by other members to the possibility of them taking turns to carry out these functions.

68. Similarly, the Committee expressed the hope that the Philippines and Japan would continue to provide the TCS meteorologist and hydrologist respectively. Both indicated their willingness to do so for the time being.

69. The post of telecommunications/electronics expert, funded by UNDP until the end of 1981, was one giving rise to more concern. Not only did this expert play a leading role in the running of the operational warning system as a normal part of the Committee's programme, but his services were felt to be crucial to the success of this system for TOPEX. It was felt that his withdrawal at a time when the TOPEX activities were approaching their peak would have serious consequences for many of the participating members. The Committee accordingly emphasized its view that

/steps must be

steps must be taken to make sure that these services could be continued uninterruptedly throughout the period of the Experiment, i.e., at least for the years 1982 and 1983. It requested ESCAP and WMO to make a further request to UNDP to consider the continued funding of the post as an operational contribution to its programme.

70. The Committee learned that the efforts made by ESCAP to obtain the services of a flood control expert to assist in carrying out its responsibilities in comprehensive flood loss prevention and management had so far been unsuccessful. It was of the opinion that ESCAP should renew its efforts to fill this post without which the activities under this field might be seriously hampered. Members with suitably qualified staff were asked to give serious attention to the possible seconding of an expert to the TCS for this purpose.

71. The outcome of the efforts made by WMO, UNDRO and LRCS to provide the TCS with a consultant in disaster prevention and preparedness for a six-month period was explained to the Committee. It learned with great appreciation of the generous offer made by LRCS to provide one of its own experienced senior staff members, Dr. K. Seevaratnam, to carry out this assignment. It noted that the consultant would carry out his mission in two three-month periods in 1981. It considered that the League's offer was very much in the tradition of close co-operation in the Committee's work which had characterized its participation over many years. The Committee also wished to thank UNDP, WMO and UNDRO for their contributions to this consultancy.

72. Under the current UNDP project for support to the regional typhoon programme provision also existed for occasional consultant services in fields not justifying a full-time expert in the TCS, and for the funding of travel of counterpart staff. The Committee was of the opinion that this provision had been extremely valuable and expressed its strong desire that UNDP consider the continuation of this support beyond 1981, taking into account the efforts being made by members to provide the full-time staff of the TCS.

Programme activities

73. Following the decision made at its twelfth session, the Committee recorded its thanks to UNDP for augmenting the funds available

/for equipment

for equipment and fellowships for China, the Lao People's Democratic Republic and Viet Nam. Valuable extra support had also been received from UNDP for TOPEX, for study tours in China, and for training seminars.

74. As the next session of the Committee would fall close to the end of the current UNDP support, it went on to consider its needs for assistance for the years 1982 and 1983 bearing in mind that this period would also cover the operational phase of TOPEX.

75. It was assisted in this respect by the representative of UNDP who outlined the possibilities for further support from UNDP. He thanked the speakers who had expressed appreciation of the support given by UNDP to the Committee's activities and added that the UNDP was happy to co-operate in the work of the Committee. He welcomed the decision of the Committee to invite Dr. Roman Kintanar to continue to be the Co-ordinator of TCS and said that it had been a pleasure to be associated with him.

76. As several representatives had referred to requests for additional assistance from the UNDP and for assistance from the Interim Fund for Science and Technology for Development (IFSTD) he wished to stress that both sources of funding were related to development and hence projects to be eligible for assistance should have the potential to enhance social or economic development; secondly, both sources assist in projects of governments and hence there should be a clear picture of inputs by the governments; thirdly in inter-country projects, the role and responsibilities of each participating government should be clear; lastly, the IFSTD has as one of its prime objectives, the enhancement of the technological capacity of developing countries.

77. He appealed to members of the Committee to also bear in mind the fact that the resource situation, for both UNDP and IFSTD, was tight. The increase in total pledges of voluntary contributions over last year's pledges, as announced at the recent pledging conference, would not be sufficient to meet even the increases caused by inflation in expenditure on planned activities. Despite this difficult situation UNDP was prepared to support some of the requests for assistance made at this meeting and would be prepared to consider others, as follows:

/(a)

(a) UNDP would support the extension of the duration of the post of telecommunication and electronics expert till the end of 1982 to enable him to assist in the installation and initial operation of satellite signal receiving station which will be installed under the project in member countries in 1980 and 1981. This extension is independent of any activities related to TOPEX.

(b) UNDP would support, in a sum of \$10,000 in 1981 and in 1982, the travel costs of counterpart staff in the TCS and of exchange visits by key meteorological personnel.

(c) UNDP would require justification for requests for any additional equipment.

(d) UNDP would in principle support training activities but the amount will depend on justification.

(e) UNDP would require maximum TCDC arrangements in regard to consultant services.

(f) In regard to TOPEX, UNDP has not received a clear picture of the proposed project to enable it to make a judgement on its eligibility for UNDP or IFSTD support.

78. The UNDP representative said that the project was extended from the end of 1978 with additional UNDP inputs, for two reasons: one was to implement the recommendations of the Review Mission of 1978 and the other was to enable the People's Republic of China and Viet Nam to benefit from the project, having commenced their participation only in 1979. It was time to think of terminating the present project of assistance which would have lasted 8 years by the end of 1981. This would not preclude or prejudice the possibility of support for programme activities after that. The UNDP was also somewhat embarrassed to "have in its books" for 8 years a project of assistance to a secretariat which would connote institutional support, though of course, such support was no longer included in the project. It was also necessary to present to participating governments a terminal report on this project.

79. The Committee expressed its gratitude to UNDP for assistance already provided and for its willingness to consider some further aid under a new project. It requested WMO and ESCAP to prepare a proposal for

/a new

a new project request to UNDP incorporating its expected requirements for the years 1982 and 1983. In relation to TOPEX there was a need to demonstrate the ways in which it was expected to promote regional development. It was pointed out that the Typhoon Committee had been set up because of the economic impact of typhoons in developing countries where progress was often set back many years by a single devastating typhoon. Improvement of the warning system was bound to contribute to the development of the region by the reduction of typhoon damage. The Committee requested that the new request to UNDP should be supported by sound arguments on the ways in which the successful carrying out of TOPEX could contribute to development. In this connexion the Committee drew attention to the need to secure the maximum support from all available sources. In addition to seeking support from UNDP, it felt that approaches should be made to international bodies such as the United Nations Environment Programme (UNEP) to explore their readiness to assist in supporting TOPEX. The Committee was informed of the steps being taken by WMO to hold discussions at the UNEP headquarters in Nairobi later in December 1980 on possible submission of a project request. The Committee urged UNEP to provide support for TOPEX bearing in mind the economic and humanitarian reasons for which the experiment was being conducted.

80. The Committee further pointed out that its short- and long-term programmes listed the following training seminars under the hydrological component:

- (i) Flood vulnerability analysis;
- (ii) Principles of flood plain management for flood loss prevention and management;
- (iii) Hydrological forecasting.

These training seminars could be organized by ESCAP and/or WMO during 1982-1983 and should therefore be included in the new project proposal to UNDP.

81. In conclusion, the Committee expressed its opinion that priority should be given in the 1981-1983 period to supporting TOPEX. It pointed out that many of the facilities needed for TOPEX would continue to be of value to its broader programme after the Experiment had ended.

/V.

V. PROGRAMME FOR 1981

(WRD/TC.13/6)

(Agenda item 7)

82. In considering its programme for 1981, the Committee took into account the short-term and long-term and expected assistance from external sources. The fact that the execution of TOPEX would bring new activities in the years ahead was fully considered.

83. Recognizing that a number of national activities of particular interest to the Committee would be carried out by the members, the Committee directed that special attention be given, with the assistance of TCS to the following items of work in 1981.

Meteorological component

(a) Operation and maintenance of electronic equipment (RS/RW, radar, radar picture transmission, satellite receiving and telecommunication equipment);

(b) Establishment of new radar stations in Malaysia and the Philippines;

(c) Provision of equipment, spare parts and training of technicians for proper calibration and maintenance of weather radars and satellite receiving equipment;

(d) Provision for improvement of meteorological and telecommunication facilities included in the priority list established by the Committee;

(e) Establishment of satellite receiving equipment for reception of cloud imagery and other data from GMS and TIROS-N satellites in the Philippines and Thailand;

(f) Review of national data collection facilities and data exchanges needed for typhoon warning services and taking remedial measures, where necessary;

(g) Review of the present arrangements for dissemination of typhoon and flood warnings with a view to introducing improvements, where necessary;

(h) Preparation for and execution of the Pre-Experiment of the Typhoon Operational Experiment (TOPEX), on the basis of the tentative programme recommended by the First Planning Meeting in June 1980;

(i) Collection and dissemination of tide gauge and water level data for use in storm surge prediction;

(j) Procurement and installation of equipment and spare parts for telecommunication, radar, satellite receiver etc. under the UNDP fund provided for 1981.

Hydrological component

(a) Survey and preparation of plans in the selected areas for comprehensive flood loss prevention and management;

(b) Further improvement in the operation of existing flood forecasting systems in China, Malaysia, the Philippines and the Republic of Korea;

(c) Establishment of flood forecasting systems in Agno, Bicol and Cagayan River basins in the Philippines, Kinabatangan River basin in Sabah and the Sadong River basin in Sarawak, Malaysia, and Pasak River basin in Thailand;

(d) Development of flood forecasting and warning systems for dam operation in the Philippines;

(e) Continuation of determination of magnitudes and frequency of floods in flood-prone zones subject to heavy damage and assessment of potential flood damage;

(f) Evaluation of existing flood forecasting systems in the selected river basins under the hydrological component of TOPEX;

(g) Visit under TCDC arrangements by a group of hydrologists from Malaysia to other members during the flood season to observe and participate in the actual operation of flood forecasting and warning systems.

/Disaster

Disaster prevention and preparedness

(a) Follow-up action on the joint LRCS/WMO/ESCAP missions (1973-1976), the recommendations of the Regional Seminar held at Tokyo in 1976, the Review Mission in 1976 and the consultant's reports on Malaysia, the Philippines and Thailand in 1978-1979;

(b) Follow-up action on the Philippine proposal to establish a Philippine training and research centre for disaster prevention and preparedness;

(c) Advice and assistance with training in the field of disaster prevention and community preparedness through consultancy services where appropriate;

(d) Improvement in the dissemination of timely warnings on typhoons, floods and storm surges, with particular attention to remote areas.

Training

(a) Training of personnel through group training courses in Japan and through fellowships available under the UNDP project, TCDC, from VCP and through bilateral assistance schemes. Short-term training courses and fellowships on maintenance of satellite receiving equipment, radar and telemetering equipment might be given special consideration;

(b) Assistance to members in exploring the possibility of providing long-term training courses in meteorology, hydrology and electronics. The VCP scheme may be further exploited for this purpose;

(c) Training by TCS experts assisted by counterpart staff in meteorology and hydrology. On-the-job training by TCS experts, particularly in the operation and maintenance of radar, satellite receiver and telecommunication equipment;

(d) Exchange of information and identification of training facilities available among WMO members in the areas of concern and a survey of available fellowships and scholarship assistance;

/(e)

(e) Participation in study tours and seminars relevant to the Committee's programme organized by members or international bodies;

(f) Organization of training under TCDC in flood forecasting, including study tours;

(g) Organization of training in the field of storm surge prediction.

Research

(a) Stimulation of research activities through advisory services, visits of study groups and exchange visits by research personnel;

(b) Undertaking of research on typhoons, particularly during the TOPEX period, and the promotion of joint collaboration on selected topics, such as studies directed towards the development of improved storm surge prediction methods, disaster preparedness and flood forecasting;

(c) Promotion of exchange of information on typhoon and allied research activities including developments on related matters outside the region;

(d) Initiation of provisional studies on disaster risk evaluation in typhoon-prone areas, including flood risk mapping.

/VI.

VI. CO-ORDINATION WITH OTHER ACTIVITIES OF
THE WMO TROPICAL CYCLONE PROGRAMME (TCP)
(WRD/TC.13/7)(Agenda item 8)

84. The sixth status report on the implementation of the WMO Tropical Cyclone Programme (TCP) was examined by the Committee which was also given later information on developments since 30 June 1980. It noted with satisfaction that the decision of Eighth Congress to strengthen and intensify the activities under the TCP had begun to be implemented in 1980.

85. Under the general component work on a number of sub-projects had been accelerated and several new publications providing guidance and advice for members would become available in the period before the Committee's fourteenth session. It was informed that a new series of publication had been initiated under the TCP and that the report of the First Planning Meeting for TOPEX had already been issued in this series. Two other TOPEX publications - the Operational Plan and a general description of the Experiment - were under preparation. Of the various sub-projects, the texts for No. 3 - Automatic Weather Stations - and No. 4 - Radar - had been completed and received for publication in the WMO Secretariat. A meeting of the sub-project team on No. 12 - Human response to tropical cyclone warnings and their content - had been held in Bangkok from 17 to 21 November 1980 and the final text for publication was expected to be available by May 1981. It was hoped that it would be possible to distribute an advance copy of this text to each member in time for the TOPEX Pre-Experiment scheduled to begin on 1 August 1981.

86. The Committee was also informed of the developments that had taken place in the programmes of the other three regional cyclone bodies since its twelfth session. It noted, in particular, that a very useful Workshop on Storm Surges had taken place in Rangoon from 10 to 15 November 1980 and that seven members of the Committee had designated participants to the Workshop. It considered that co-operation of that sort between members of the different cyclone bodies was of great value in co-ordinating activities under the TCP. Similarly, the Symposium on Typhoons which had taken place in Shanghai from 6 to 11 October 1980 had contributed greatly to spreading knowledge of the latest developments in typhoon forecasting

techniques. The Committee requested ESCAP and WMO to continue to arrange whenever possible such activities bring together scientists from different areas affected by tropical cyclones.

87. It expressed its appreciation to all who had contributed to the success of these activities during 1980 and especially to UNDP for making available the funds needed to support the Shanghai symposium and the Rangoon workshop.

88. The Committee further examined the International Hurricane Scale which had been recommended by the RA IV Hurricane Committee at its third session and since adopted by the President of RA IV on behalf of his regional association. It noted that the Hurricane Committee had recommended that the IHS be submitted to other regional cyclone bodies for their consideration and possible adoption.

89. The Committee considered that it was necessary to have further background information on the scale and that it was too early to adopt it without further study. It felt that considerable damage could still be caused by tropical cyclones which did not reach minimum hurricane intensity (64 kt). It accordingly requested WMO to furnish further information on the IHS to the TCS for distribution to all members. The Committee agreed to give the scale further consideration at a later date.

VII. CONSIDERATION OF THE AGENDA FOR THE
FOURTEENTH SESSION OF THE COMMITTEE
(Agenda item 9)

90. The Committee requested the ESCAP and WMO secretariats, in consultation with the TCS, to prepare the detailed agenda for the fourteenth session. It was agreed that members would inform ESCAP, WMO and the TCS at an early date of any appropriate subjects which they might wish to propose for the next session.

VIII. DATE AND PLACE OF THE MEETING OF THE FOURTEENTH SESSION
(Agenda item 10)

91. The Committee welcomed and accepted with appreciation the offer of the representative of the Philippines to provide host facilities for the fourteenth session to be held in Manila from 10 to 16 November 1981.

IX. SCIENTIFIC LECTURES
(Agenda item 11)

92. The following scientific lectures were presented:

1. "Disaster Prevention and Disaster Preparedness - A Perspective for the Future" by Mr. Roger T. Jones of Australia;
2. "Assessment of the Flood Forecasting Operation of the Chao Phya River, Thailand during the 1980 Season" by Dr. Tawatchai Tingsanchali of Thailand.

93. The Committee expressed its appreciation and thanks to Mr. Jones and Dr. Tawatchai for their presentations.

X. ADOPTION OF THE REPORT
(Agenda item 12)

94. The Committee adopted its report on December 1980.

FOR PARTICIPANTS ONLY

2 December 1980

ECONOMIC AND SOCIAL COMMISSION FOR ASIA AND THE PACIFIC
AND
WORLD METEOROLOGICAL ORGANIZATION

Typhoon Committee
Thirteenth session
2-8 December 1980
Bangkok

PROVISIONAL LIST OF DOCUMENTS

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8 December 1980

ECONOMIC AND SOCIAL COMMISSION FOR ASIA AND THE PACIFIC
AND
WORLD METEOROLOGICAL ORGANIZATION

Typhoon Committee
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LIST OF PARTICIPANTS

MEMBERS OF THE TYPHOON COMMITTEE

CHINA

Representative: Mr. Fang Qi, Director of Operation Management Department,
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Alternate : Mr. Ji Feng, First Secretary and Alternate Permanent
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Advisers: Mr. Chen Lian-Shou, Expert, Central Weather Office, Beijing

Mr. Wang Juemou, Chief, Technical Division, Hydrological
Bureau of Ministry of Water Conservancy, Beijing

Mrs. Zhao Wenxu, Secretary of the Office of Foreign Affairs of
the Central Meteorological Bureau, Beijing

DEMOCRATIC KAMPUCHEA

Representative: S.E. Monsieur Pech Bun Ret, Représentant permanent du Kampuchea
Démocratique auprès de la CESAP à Bangkok

Alternates: Madame So Se, Conseiller de la Mission permanente du Kampuchea
Démocratique auprès de la CESAP à Bangkok

Monsieur Khay Chhiek Bun Kim, Assistant du Représentant
permanent du Kampuchea Démocratique auprès de la CESAP à
Bangkok

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HONG KONG

Representative: Mr. P. Sham, Assistant Director, Royal Observatory,
Kowloon, Hong Kong

JAPAN

Representatives: Mr. Itsuro Shimizu, Director-General, Forecast Department,
Meteorological Agency, Tokyo

Mr. Takashi Kishida, Director-General, River Department,
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Alternates: Mr. Tamotsu Arafune, Head, 3rd. Research Group, National
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Mr. Morikuni Akiguchi, First Secretary, Embassy of Japan,
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Mr. Kenichi Fukaya, Second Secretary and Deputy Permanent
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Mr. Kobo Inamura, Second Secretary, Embassy of Japan, Bangkok

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MALAYSIA

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Mr. Osman Bin Haji Hassan, Principal Assistant Secretary,
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Mr. Tan Ah Ghee, Second Secretary and Assistant Permanent
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Representative: Dr. Roman L. Kintanar, Director-General, Philippine
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Mr. Hak Joong Seang, Chief, Forecast Management Section,
Central Meteorological Office, Seoul

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Alternates: Mr. Prachoom Boonpraong, Deputy Director-General, The Local
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Mr. Jate Chailapo, Director, Hydrometeorology Division, The
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Mr. Damrong Jaraswathana, Director, Hydrology Division, The
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VIET NAM

Representative:

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Alternate:

Monsieur Lu Ky, Conseiller, Représentant permanent de la République socialiste du Viet Nam à la CESAP, Bangkok

OTHER ESCAP MEMBER COUNTRIES

UNION OF SOVIET SOCIALIST REPUBLICS

Representative: Mr. Eugene A. Konygin, Chief, Division of International Organizations, USSR State Committee on Hydrometeorology and Control of Natural Environment, Moscow

Alternate: Mr. A. A. Vassiliev, Deputy Director, Administration for International Affairs, USSR State Committee on Science and Technology, Moscow

UNITED STATES OF AMERICA

Representative: Mr. Nels E. Johnson, Director, International Affairs, National Oceanic and Atmospheric Administration, Rockville, M.D.

Alternate: Mr. William Schramm, Naval Environment Prediction Research Facility, California

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United Nations Development Programme (UNDP)

Mr. Bhagirathan Devarajan, Resident Representative, UNDP, Manila

Mr. W.A. Clemente, Regional Programme Adviser, UNDP, Bangkok

United Nations Disaster Relief Co-ordinator (UNDRO)

Mr. Kalus Wiersing, Relief Co-ordination Officer in the Asia and the Pacific Section, UNDRO, Geneva

SPECIALIZED AGENCY

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Mr. G.S. Buldovsky, Technical Officer, Meteorology, ICAO Regional Office for Far East and Pacific, Bangkok

NON-GOVERNMENTAL ORGANIZATION

League of Red Cross Society (LRCS)

Dr. Kingsley Seevaratnam, Regional Officer for Asia and the Pacific, LRCS, Geneva

SECRETARIAT

Mr. C. Roy Smith Officer-in-Charge for the Executive
Secretary

Mr. B.X. Zhang Chief, Natural Resources Division

Mr. A.S. Manalac Chief, Water Resources Section, Natural
Resources Division

Mr. C.D. Wang Senior Economic Affairs Officer, Water
Resources Section, Natural Resources
Division

Mr. E.F. Schulz Economic Affairs Officer, Water Resources
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Miss S. Takahashi Chief, Programme Co-ordination and
Monitoring Office

Mr. Khin Maung Lwin Economic Affairs Officer, Programme
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Mr. C. Roy Smith Chief, Division of Administration

Mr. S.F. Tsao Chief, Conference and General Services
Section, Division of Administration

Mr. Shih-ching Hsu Chief, Information Service

Mrs. N. Suthimai Chief, Language Services

Mr. R. MacDonald Interpreter

Ms. R. Dirks Interpreter

Mr. G. Germanos Interpreter

Mr. R. Krasker Interpreter

Mr. C. Massaux Interpreter

COMMITTEE FOR CO-ORDINATION OF INVESTIGATIONS OF THE
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Mr. Somnook Sudhamoun Hydrometeorologist

WORLD METEOROLOGICAL ORGANIZATION (WMO)

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WMO, Geneva

Mr. Peter Rogers Special Projects Officer, World Weather
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TYPHOON COMMITTEE SECRETARIAT (TCS)

Dr. Roman L. Kintanar Co-ordinator, c/o UNDP, Manila

Mr. C.H. Tang Telecommunication and Electronics Expert,
c/o UNDP, Manila

Mr. Osamu Machida Hydrologist and Flood Forecasting Expert,
c/o UNDP, Manila

Mr. Claro S. Doctor Meteorologist, c/o UNDP, Manila

INVITED LECTURERS

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College, Macedon, Victoria

Dr. Tawatchai Tingsauchali Associate Professor, Division of Water
Resources Engineering, A.I.T., Bangkok

LIMITED

WRD/TC.13/L.1
13 August 1980

ORIGINAL: ENGLISH

ECONOMIC AND SOCIAL COMMISSION FOR ASIA AND THE PACIFIC
AND
WORLD METEOROLOGICAL ORGANIZATION

Typhoon Committee
Thirteenth session
2-8 December 1980
Bangkok

PROVISIONAL AGENDA

1. Opening of the session
2. Election of officers
3. Adoption Of the agenda
4. The Committee's activities during 1980
 - (a) Meteorological component
 - (b) Hydrological component
 - (c) Disaster prevention and preparedness component
 - (d) Training
 - (e) Research
5. Typhoon Operational Experiment (TOPEX)
 - (a) Report on the First Planning Meeting for TOPEX
 - (b) Report on the first session of the Management Board for TOPEX
6. Support for the Committee's programme
7. Programme for 1981
8. Co-ordination with other activities of the WMO Tropical Cyclone Programme
9. Consideration of the agenda for the fourteenth session
10. Date and place of the fourteenth session
11. Scientific lectures
12. Adoption of the report

ECONOMIC AND SOCIAL COMMISSION FOR ASIA AND THE PACIFIC
AND
WORLD METEOROLOGICAL ORGANIZATION

Typhoon Committee

Thirteenth session
2-8 December 1980
Bangkok

ANNOTATED PROVISIONAL AGENDA

1. Opening of the session

The thirteenth session of the Typhoon Committee will begin at Bangkok on 2 December 1980.

2. Election of officers

Rule 6 of the rules of procedures of the Typhoon Committee states: "The Committee shall, at its first meeting of the year, elect from among its representatives a chairman and a 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 ESCAP and WMO in close consultation with the Typhoon Committee Secretariat (TCS). Representatives of participating Governments may propose additions or changes to the agenda if they so desire.

4. The Committee's activities during 1980

A review of the activities of the Committee since the twelfth session will be made under this item (WRD/TC.13/1). The review will cover each of the five components of the programme, namely: (a) meteorological, (b) hydrological, (c) disaster prevention and preparedness, (d) training and (e) research. A brief report on the Advisory Mission on Flood Loss Prevention and Management will be submitted to the Committee. The Committee is invited to assess the progress made since its twelfth session, comment

on the activities undertaken in 1980 and offer suggestions for accelerating those not completed. The members may also wish to report on the establishment in their countries in 1980 of any relevant facilities not covered by the report.

5. Typhoon Operational Experiment (TOPEX)

(a) Report on the First Planning Meeting for TOPEX

At its twelfth session, the Typhoon Committee endorsed the report of the Preparatory Meeting for TOPEX held at Tokyo in July 1979 which drew up a time-table for the period of the Experiment. The time-table included provision for planning meetings, the first of which was held at Tokyo in June 1980. The purpose of the meeting was to advance the planning process with particular emphasis on the national commitments to TOPEX and on the arrangements for the Pre-Experiment scheduled to take place in 1981. The report of the First Planning Meeting being too voluminous for reproduction as a document for the thirteenth session, a summary of the proceedings will be submitted to the Committee in a short document (WRD/TC.13/3). Participants are advised, whenever possible, to bring with them to the session the full report of the First Planning Meeting for reference during the discussion of the item.

(b) Report on the first session of the Management Board for TOPEX

At its twelfth session the Committee decided that a Management Board for TOPEX should be established and drew up its terms of reference. The formal establishment of the Board took place during the First Planning Meeting in June 1980 and a short first session was held immediately after that meeting. The Board made a number of important decisions on the future planning and execution of TOPEX and those will be reported to the Committee at its thirteenth session in a document (WRD/TC.13/4) submitted by the Chairman of the Board. The document will also contain proposals for further action in preparing for the Pre-Experiment on which the Committee may wish to express its views.

6. Support for the Committee's programme

One of the main sources of external support to the Committee's activities is that provided by UNDP under its project RAS/73/034 - Support to the regional typhoon programme. This project terminates in December 1981 and the thirteenth session of the Committee is therefore the last opportunity for members to discuss whether they wish to seek a continuation

/of UNDP

of UNDP support and, if so, what form of support they consider necessary. Proposals for some possible future support from UNDP, based on members' known requirements for external support, will be made in a document (WRD/TC.13/5) submitted under this item.

The document will also review some of the needs of members for support for their participation in TOPEX based mainly on the results of the consultant's visits to members in the second half of 1980. The possible sources of such support, apart from UNDP, should also be considered by the Committee. These may include the WMO Voluntary Co-operation Programme (VCP), bilateral and multilateral aid, the Office of the United Nations Disaster Relief Co-ordinator (UNDRO), the United Nations Environment Programme (UNEP) and the League of Red Cross Societies (LRCS). The steps taken by WMO in response to the request made by the Management Board for TOPEX at its first session that it investigate the possible establishment of a TOPEX trust fund to assist members in meeting their obligations under the Experiment will also be reported in the document.

7. Programme for 1981

The Committee will make a selection of specific items of work on which it wishes to concentrate, with the assistance of TCS, during 1981. For this purpose, it may wish to take account of the short- and long-term programmes of work recommended by the Typhoon Committee Review Mission and endorsed at the eleventh session.

8. Co-ordination with other activities of the WMO Tropical Cyclone Programme

Developments in the WMO Tropical Cyclone Programme will be reported to the Committee under this item. A status report on the implementation of TCP is issued each year and the report up to 30 June 1980 will form the basis of the document submitted to the Committee at its thirteenth session (WRD/TC.13/7) giving information on the general and regional activities under the programme. 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.

9. Consideration of the agenda for the fourteenth session

To conform to the ESCAP conference requirements as laid down by the Advisory Committee of Permanent Representatives and Other Representatives Designated by Members of the Commission, the Committee is requested to draw up a provisional version of the agenda it would wish to consider at its fourteenth session, it being understood that additions or changes may be made to that agenda at any time.

10. Date and place of the fourteenth 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". The Philippines has offered to host the fourteenth session at Manila from 10 to 16 November 1981. The Committee may wish to welcome and accept this invitation.

11. Scientific lectures

In accordance with the wishes expressed by the Committee, a programme of scientific lectures will be arranged during the thirteenth session. Details will be announced later.

12. Adoption of the report

The Committee's report on its thirteenth session should be adopted at the final meeting.

all report
11.1.1980

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FOR PARTICIPANTS ONLY

WRD/TC.13/2
28 August 1980

ORIGINAL: ENGLISH

ECONOMIC AND SOCIAL COMMISSION FOR ASIA AND THE PACIFIC
AND
WORLD METEOROLOGICAL ORGANIZATION

Typhoon Committee

Thirteenth session
2-8 December 1980
Bangkok

THE COMMITTEE'S ACTIVITIES DURING 1980

HYDROLOGICAL COMPONENT

(Item 4 (b) of the provisional agenda)

REPORT OF THE ADVISORY MISSION ON FLOOD LOSS
PREVENTION AND MANAGEMENT

Note by the ESCAP secretariat

In accordance with a recommendation of the Typhoon Committee at its twelfth session, ESCAP, with the co-operation and support of the Government of Japan organized a team of experts to visit some members of the Committee and advise them on the selection of a pilot river basin for the implementation of flood loss prevention and management practices. Five countries requested the services of this team, namely, the Republic of Korea, China, Thailand, the Philippines and Malaysia.

The members of the advisory team were:

1. Dr. T. Takenouchi, hydrologist from the Defense Academy of Japan;
2. Dr. A. Tsuchiya, flood loss prevention specialist from the Public Works Research Institute, Ministry of Construction, Japan;
3. Mr. S. Matsuura, river engineering expert from the Ministry of Construction, Japan;
4. Mr. H. Oi, hydrologist and flood forecasting expert, Typhoon Committee secretariat (TCS);
5. Mr. E.F. Schulz, technical secretary, ESCAP.

The itinerary of the team was as follows:

18 January 1980: Bangkok assembly and briefing of the team;

21-25 January 1980: Thailand - Pasak River basin;

26 January-2 February 1980: Malaysia - Klang River basin;

3-9 February 1980: Republic of Korea - An Yang River basin;

9-20 February 1980: Philippines - Pampanga and Marikina River basins;

21-28 February 1980: China - Beijing and Dong Jiang River basin.

The advisory team assisted national staff in these five countries in the selection of seven pilot basins and advised them on additional practices which might be implemented further to reduce flood losses in these basins. The basins selected were: An Yang in the Republic of Korea, Dong Jiang in China, Pasak in Thailand, Pampanga and Marikina-Pasig-Laguna de Bay in the Philippines and Kelantan and Klang in Malaysia.

In each country, the advisory team made a one-half day presentation of the general principles of flood loss prevention and management. The

/presentation

presentation was illustrated by numerous slides and several reports. Finally a 40-minute sound motion picture entitled, "Urban sprawl - an invitation to floods" was shown. At the end of the visit, a report outlining a future programme was prepared jointly by the team and their counterparts. A report giving a synopsis of the general principles of flood loss prevention and management together with a description of the features of each pilot basin was prepared by the team and printed and sent by ESCAP to the countries involved.

Action proposed

The Typhoon Committee may wish to:

- (a) Acknowledge the generous support of the Government of Japan in providing the services of three specialists as members of the Advisory Team and providing financial support for the mission;
- (b) Urge the other members of the Committee to select a pilot basin for comprehensive flood loss prevention and management as called for in the short-term programme of the Committee;
- (c) Urge the countries visited by the Advisory Team to study the report and recommendations of the Team and determine what further assistance they might require to implement the recommendations and to prepare comprehensive plans for flood loss prevention and management for the selected pilot basins.

ECONOMIC AND SOCIAL COMMISSION FOR ASIA AND THE PACIFIC
AND
WORLD METEOROLOGICAL ORGANIZATION

Typhoon Committee

Thirteenth session
2-8 December 1980
Bangkok

TYPHOON OPERATIONAL EXPERIMENT (TOPEX)

REPORT ON THE FIRST PLANNING MEETING FOR TOPEX.

(Item 5 (a) of the provisional agenda)

Note by the WMO secretariat

Introduction

1. At its twelfth session the Committee endorsed the report of the Preparatory Meeting for TOPEX. The report of the Preparatory Meeting included a timetable for the further planning and execution of TOPEX which, in turn, made provision for a series of planning meetings spread over the years 1980 to 1983. In conformity with the timetable, the First Planning Meeting for TOPEX (PM-I) was held in Tokyo from 17 to 26 June 1980. It was attended by representatives of eight of the 10 members of the Typhoon Committee, by observers from UNDRO and LRCS and by an invited expert from the United States of America.

The main purpose of PM-I was to advance the planning process with particular emphasis on national commitments to TOPEX and on the arrangements for the Pre-Experiment scheduled to take place in 1981. In view of the length of the report of PM-I it is not possible to reproduce it as a document for the thirteenth session of the Typhoon Committee and this document therefore presents a summary of the main decisions taken. Participants are, however, advised to bring with them to TC.13 their copies of the full report for reference purposes. In this summary, which follows the order in which the items were considered by PM-I, cross-references are given to the appropriate paragraphs of the full report.

Review of TOPEX (Paras. 9-10)

2. The past planning of TOPEX was reviewed. Considerable concern was expressed over the need for members to receive assistance in order to carry out fully their responsibilities. WMO and ESCAP were requested to secure support from all available sources.

Establishment of TOPEX Management Board (Paras. 11-14)

3. The Management Board for TOPEX was formally established by PM-I. WMO was requested to encourage those Typhoon Committee members which had not done so to make early designations to the Board. A short first session of the Board was held immediately after PM-I (see document WRD/TC.13/4).

Planning of the Meteorological Component (Paras. 15-51)

4. When dealing with the Core Experiment the meeting agreed that the observational network should be based primarily on full implementation of the WWW network. Observational programmes will be intensified during experimental periods, mainly by increasing the frequency of observations to hourly at surface stations and 6-hourly at upper-air stations when the typhoon centre is within 300 and 500 km respectively. Other decisions covered the need for more ship observations, radar observations at hourly intervals and more tide gauge stations. The improvement of national data collection systems for the real-time distribution of data to all concerned was considered essential.

5. The meeting decided that the common procedures to be followed should be published as the "TOPEX Operational Manual", its two parts covering mandatory and recommended operations. As part of the implementation plan, criteria were set for the selection of tropical cyclones for the Experiment. One will be selected for the Pre-Experiment in 1981 and two during each of the First and Second Operational Experiments in 1982 and 1983, intensified observations being mandatory. Two or three additional tropical cyclones will be selected in 1982 and 1983, with the additional observations being optional.

6. In considering the common system for the identification of tropical cyclones as requested by TC.12, the meeting proposed assigning numbers to those west of the international date line and north of the equator with a maximum wind speed of 34 kts. It formally requested Japan to designate JMA, Tokyo as the centre responsible for assigning numbers. TC.13 should consider this proposal and adopt it if it agrees.

7. National commitments to TOPEX were presented by participating members and are summarized in Appendix G to the report. The need for assistance to members was reiterated.

8. The meeting felt that the International Experiment Centre (IEC), to be set up in Tokyo, should operate on a 24-hour real-time basis in co-operation with the Japanese Experiment Sub-Centre (ESC) during periods when selected tropical cyclones were being followed. It went on to list the activities in which scientists assigned to the IEC should participate. The meeting recommended that all participating members should assign at least one scientist to the Centre and the tentative plans of members show that all intend to do so for at least part of the experimental periods. Some financial aid will be needed by most for this purpose. All members confirmed they will establish ESCs.

9. The discussion revealed that little detailed consideration has so far been given to the activities under the Sub-Experiment. Noting the scientific aims set at the Preparatory Meeting, PM-I requested the Management Board to develop the planning of the Sub-Experiment in accordance with those aims.

Planning of the Hydrological Component (Paras. 52-61)

10. The Preparatory Meeting had agreed that the Hydrological Component should concentrate on three listed activities. With regard to the evaluation of existing flood forecasting systems in designated river basins, the meeting drew up a programme of the activities to be undertaken by members (Appendix J). It includes the preparation of detailed descriptions of the existing systems, monitoring of their operation and performance in real-time for all significant flood events and the developing of plans to overcome any problems encountered. Standard Formats were prepared to assist members in this work. The programme laid particular stress on the need to collect rainfall records, especially those continuously recorded, in all seriously affected areas during periods when typhoons nominated by the IEC were being studied as such data would be valuable for the development, improvement or testing of quantitative precipitation forecasting methods of use in the preparation of flood forecasts.

11. The selection and comparison of appropriate models was seen by the meeting as being the responsibility of members which were encouraged to install additional models for comparison with those already in use in order to improve forecasting efficiency and accuracy.

12. The meeting noted that considerable work was being undertaken nationally to study and map flood risk. Members were requested to supply details of their studies and to describe how these studies and maps are used in operational flood forecasting and warning. Japan offered to compile this material and to prepare a report by 1982 as a contribution to TOPEX. Similarly, the Philippines will make a report on the computing and mapping of the risk of storm surge/river flooding.

Planning of the Warning Dissemination and Information Exchange (WD/IE) Component (Paras. 62-68)

13. The meeting summarized the objectives of TOPEX under this component and drew up lists of the short- and long-term measures required to attain these objectives. The short-term measures cover the institutional, technical and social aspects of the action necessary. The long-term plan of action prepared by the meeting is intended to fill the gaps found as a result of the discussion of the WD/IE component. Some participating members were able to establish a timetable for the plan during the meeting, the others being requested to provide information as soon as possible. All are requested to give urgent consideration to this component and to provide information on the action they take to implement both the short- and long-term plans of action.

Co-ordination of the three TOPEX components (Paras. 69-79)

14. The meeting reviewed the interim management and co-ordination arrangements made by the Preparatory Meeting in setting up a Preparatory Committee (Meteorological Component) and a system of focal points. It noted the further action taken by TC.12 in setting up a Management Board for TOPEX and the request that it should decide upon the arrangements required to ensure future co-ordination. It was unanimously agreed that the system of focal points for each component should be maintained. Japan agreed to continue to provide the co-ordinator for the Meteorological Component. There being no offers from participating members, PM-I decided that WMO would continue to co-ordinate activities under the Hydrological Component and requested UNDRO (in co-operation with LRCS) to assume this function for the WD/IE component.

15. The need was stressed for members of the Management Board to be fully aware of all work on TOPEX being carried out by their own focal points. At sessions of the Board they should, if possible, be accompanied by advisers for those items for which they did not possess specialist knowledge.

16. PM-I agreed to a proposal that a series of TOPEX publications be initiated. Suggestions were made for a number of publications to be issued in the series. The need for all concerned to provide the WMO Secretariat with material for inclusion in the TOPEX Newsletter was emphasized.

Action proposed

17. The Typhoon Committee is invited to:

- (a) Examine this summary of the main decisions of PM-I, in conjunction as may be required with the full report of the meeting;
- (b) Express its views on the decisions made, taking into account the further planning of TOPEX and, especially, the Pre-Experiment;
- (c) Refer to the Management Board for consideration at its second session those questions on which further early action is required.

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ECONOMIC AND SOCIAL COMMISSION FOR ASIA AND THE PACIFIC
AND
WORLD METEOROLOGICAL ORGANIZATION

Typhoon Committee
Thirteenth session
2-8 December 1980
Bangkok

TYPHOON OPERATIONAL EXPERIMENT (TOPEX)

REPORT ON THE FIRST SESSION OF THE
MANAGEMENT BOARD FOR TOPEX

(Item 5 (b) of the provisional agenda)

Note by the Chairman of the Management Board

Introduction

1. In pursuance of a decision of the Typhoon Committee at its twelfth session, the Management Board for TOPEX was formally established during the First Planning Meeting for TOPEX, held at Tokyo from 17 to 26 June 1980. The Board held a brief first session on 25-26 June 1980 immediately following the Planning Meeting. It was attended by the representatives of the eight members of the Typhoon Committee which have to date designated members to the Board, and by a number of advisers to the Board members.

2. The main purpose of this document is to present to the thirteenth session a short summary of the main decisions made at the first session of the Board and thereby to meet the requirement included in its terms of reference that the Board should report on progress to the Committee at its annual sessions. In this particular instance, where the Board session was preceded by a planning meeting which took up in detail the many aspects of the planning of TOPEX, it is felt that the report of that meeting in effect constitutes the main report to the Committee (see document WRD/TC.13/3). This report is therefore confined to those supplementary matters taken up by the Board at its brief session. It is further proposed that under this item the Committee will wish to consider the broader aspects of the further arrangements for TOPEX, and especially for the Pre-Experiment scheduled for August 1981, and consequently to give the Management Board directives to guide its work in the period between the thirteenth and fourteenth sessions of the Committee.

Decisions of the Board at its first session

3. The Board elected Mr. I. Shimizu (Japan) as Chairman and Mr. Zuo Ming (China) as Vice-Chairman. It prepared rules of procedure to guide its work and adopted them subject to confirmation by the member from Japan. Japan agreed to provide supporting secretarial services during the period of its chairmanship to permit the Board to continue its work through direct contacts between the Chairman and its members.
4. The Board reviewed the time-table for TOPEX prepared by the Preparatory Meeting held in July 1979. It decided that the Second and Third Planning Meetings, scheduled for March 1982 and March 1983, should, if possible, be held a little earlier. The Board accepted the offer of Japan to host the Second Planning Meeting at Tokyo in February or early March 1982.
5. The Board supported a proposal that scientists seconded to the International Experiment Centre (IEC) for the Pre-Experiment (August 1981) should meet as a Sub-Committee of the Board at the IEC a few days before the Pre-Experiment began to consider their activities in more detail. Financial assistance would be required for that purpose and the Board decided to give the matter further consideration at its second session.
6. Consideration was also given to other matters to be taken up at its second session. It was agreed that the Board would need to give careful attention to the arrangements for the Pre-Experiment and to the national commitments thereto, and that the recommendation of the First Planning Meeting that a sub-committee be set up to plan the activities forming the Sub-Experiment should also be discussed. On the latter point, the Co-ordinator (Meteorological Component) was requested to consult focal points and present ideas to the Board at its second session.
7. In view of the different types of assistance that members would require for TOPEX, the Board proposed that WMO investigate the possibility of setting up a trust fund for TOPEX to which WMO members could contribute, specifying the particular activity they wished to support. It was further suggested that ESCAP and WMO should inquire whether TOPEX would qualify for assistance under the Interim Fund for Science and Technology for Development set up in 1979 under the administration of UNDP.
8. A proposal to invite non-members of the Typhoon Committee to participate in TOPEX was examined by the Board, which decided that it was not necessary to extend such invitations at present. The Board decided that its second

/session

session should be held at Bangkok on 9-10 December 1980, immediately following the thirteenth session of the Typhoon Committee.

Planning for the Pre-Experiment

9. To assist its discussion of TOPEX, the Committee will have been informed of the outcome of the First Planning Meeting (WRD/TC.13/3) and of the first session of the Management Board. The question of future support to the Committee's activities, including TOPEX, will be dealt with in a separate document (WRD/TC.13/5). Additional information on the activities pursued in the period between the Management Board session and the Committee's thirteenth session will be presented orally by the Chairman of the Board. No doubt other members of the Board - and the importance of their presence at the session - must be stressed and any focal points attending the session will wish to report on the work they have carried out. The report of the consultant engaged to visit members participating in TOPEX to define, clearly their needs for assistance in meeting their obligations in observing and telecommunication facilities will also be brought to the attention of the Committee.
10. These various elements will, it is expected, enable the Committee to have an up-to-date picture of the state of preparations for TOPEX in general and for the Pre-Experiment in particular. At the time of the session, some nine months will remain before the Pre-Experiment and it is certain that a great deal of further work will be required in this period if the Pre-Experiment is to achieve the maximum success possible and serve effectively as a dress rehearsal for the First and Second Operational Experiments planned for 1982 and 1983 respectively.
11. The task of the Committee will therefore be to make a complete review of the preparations to date and, as a result of that review, to provide guidance to the Management Board on the further conduct of the TOPEX planning process. It may therefore wish to request the Board at its second session to prepare as detailed a programme as possible of the work to be done in the time remaining. This work programme, it is suggested, might be carried out on two levels. The first of these levels would be national, in which attention would be given to all those items of work necessary to bring the various systems operated by participating members to a full state of readiness. Thus, it would be necessary to scrutinize the national commitments to TOPEX and to determine how they should be raised to the desired level in those cases where the member is unable to meet them all. Observing and telecommunication facilities, to ensure the full availability of data to all concerned in real time, would be a prime consideration.

/Analysis,

Analysis, forecasting and warning systems and the ability to establish ESCs capable of fully performing their functions should also receive attention.

12. The other level would be regional (or international) and would mainly encompass the activities of the IEC and the plans of participating members to play an active role in these activities.

13. If this proposal is acceptable to the Committee, it will no doubt wish to request the Board to prepare programmes with implementation dates to ensure that the preparations for the Pre-Experiment are completed in an orderly fashion in good time. It is further proposed that full use be made of the various mechanisms available for the planning of TOPEX. These include:

- (a) The Management Board itself;
- (b) The focal points for each of the three components;
- (c) The Typhoon Committee secretariat;
- (d) The ESCAP and WMO secretariat;
- (e) The UNDRO and LROB secretariats;
- (f) Consultant services or seconded experts.

In preparing programmes, the Board should indicate, to the extent possible, where the responsibility will rest for completion of each part.

14. The Committee will wish to note that the present schedule for TOPEX does not provide any opportunity for the Management Board or for the focal points for each of the three components to have consultations (except by correspondence) in the period between December 1980 and August 1981, when the Pre-Experiment will take place. The complexity of the planning for TOPEX calls for a high degree of co-ordination for its success. The Committee may therefore also wish to seek the view of the Board on the need for co-ordination meetings between focal points for the individual components, or for the Management Board itself to have an opportunity to review the final preparations for the Pre-Experiment. In the interests of economy, proposals for such meetings should be limited to the minimum compatible with the efficient completion of preparations for the Pre-Experiment. Whenever possible, subject to the agreement of the participating members, use may be made of consultants or seconded experts to assist in completing the preparations.

/Action

Action proposed

15. The Committee is invited to:

- (a) Endorse the report of the Management Board for TOPEX on its first session;
- (b) Review the present state of preparations for TOPEX and, in particular, for the Pre-Experiment scheduled for August 1981;
- (c) Request the Board to (i) prepare a work programme, at the national and regional levels, with implementation dates, for the further activities necessary in the period prior to the Pre-Experiment; and (ii) consider the need for co-ordination meetings of focal points or the Management Board to complete arrangements for the Pre-Experiment;
- (d) Provide for the Management Board any guidance or directives which it feels will contribute to the successful planning and execution of the Pre-Experiment.

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TERMS OF REFERENCE: SPECIAL TEMPORARY VOLUNTARY TOPEX FUND

1. The fund is a temporary fund that will terminate no later than 30 June 1985.
2. The fund will be used exclusively to support activities forming part of the Typhoon Operational Experiment (TOPEX). At the termination of the fund any money remaining will be returned to contributors on a pro-rata basis of the contributions made in cash.
3. An annual report of income and expenditures will be made to the Executive Committee, which will designate one of its members to review and report on the operation of the fund. A copy of this report will be provided to all contributors.
4. Members and organizations which wish to contribute to the fund can do so in US dollars or in equipment, facilities and services required for the planning and execution of TOPEX.
5. The Secretary-General, or his authorized representative, shall ensure that the priority requirements established by the Typhoon Committee and by the Management Board for TOPEX are followed in the allocation of funds and other contributions to the fund.
6. The normal accounting and fiscal procedures used for other WMO funds will be followed.
7. The Secretary-General will not enter into any financial commitments unless he is satisfied that the funds required are readily available in the fund.
8. Administrative costs arising from the management of the fund shall be borne by the fund. These costs shall be computed as a percentage of the expenditures made from the fund. The percentage rate applicable will be identical to that employed generally for the computation of similar costs of all other voluntary and trust funds administered by WMO.

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FOR PARTICIPANTS ONLY

WRD/TC.13/4/Add.1
28 November 1980

ORIGINAL: ENGLISH

ECONOMIC AND SOCIAL COMMISSION FOR ASIA AND THE PACIFIC
AND
WORLD METEOROLOGICAL ORGANIZATION

Typhoon Committee
Thirteenth session
2-8 December 1980
Bangkok

TYPHOON OPERATIONAL EXPERIMENT (TOPEX)

TERMS OF REFERENCE: SPECIAL TEMPORARY VOLUNTARY
TOPEX FUND

(Item 5 (b) of the provisional agenda)

Note by the Chairman of the Management Board

Addendum

FOR PARTICIPANTS ONLY

WRD/TC.13/5
22 September 1980

ORIGINAL: ENGLISH

ECONOMIC AND SOCIAL COMMISSION FOR ASIA AND THE PACIFIC
AND
WORLD METEOROLOGICAL ORGANIZATION

Typhoon Committee
Thirteenth session
2-8 December 1980
Bangkok

SUPPORT FOR THE COMMITTEE'S PROGRAMME

(Item 6 of the provisional agenda)

Note by the WMO and ESCAP secretariats

Introduction

1. Over the years since it began its activities, the Typhoon Committee has received support from a variety of different sources. These sources have included other international organizations, notably UNDP, various developed countries which have provided assistance either bilaterally or through the WMO Voluntary Co-operation Programme (VCP) and TCDC arrangements between the members of the Committee themselves. The sum of assistance received has been considerable and has had a major impact upon the ability of the Committee to pursue its programme successfully.

2. It has become the practice for the Committee at each of its annual sessions to review its need for assistance in the light of the particular programme activities it is carrying out. The intention of the present agenda item is therefore to permit the Committee to carry out such a review at its thirteenth session; the purpose of this document is to assist the Committee in its discussion by providing information on the present position with regard to the support available from different sources and by making proposals for future support on the basis of the expected needs.

Present position

(a) Typhoon Committee secretariat (TCS)

3. TCS performs a central role in the day-to-day execution of the Committee's programme. Its staffing has therefore always been a matter of concern if the

programme is to be carried out as expeditiously as possible. In the past, substantial assistance has been given by UNDP in providing this institutional support but, with the phasing-out of that support, the onus for staffing TCS now falls mainly upon the members themselves. New arrangements to meet this situation were introduced from the beginning of 1980. The present position is as follows:

- (i) Co-ordinator - With the phasing-out of UNDP financing for the post of Chief Technical Adviser at the end of 1979, his functions have been assumed by the Director-General of PAGASA (Philippines). It is understood that the Philippines will continue to provide the Co-ordinator for the present;
- (ii) Meteorologist - The Philippines has seconded a meteorologist to TCS on a full-time basis. It is expected to continue doing so;
- (iii) Hydrologist - Japan is providing a full-time expert. It is expected to continue doing so;
- (iv) Telecommunication/electronics expert - This post is filled with a full-time expert through UNDP financing. Funding is available up to the end of 1981;
- (v) Disaster prevention and preparedness expert - A six-month consultancy to assist TCS was being arranged jointly by WMO, UNDRO and LRCS at the time of preparing this document. It was expected to begin later in 1980.

4. In addition to the above posts, China is expected to second a meteorologist to TCS for a period of about four to six months starting in 1980. The need for a flood control expert for TCS was also stressed at the previous session of the Committee.

(b) Programme activities

5. At the twelfth session of the Committee (November 1979), it was felt that new developments, such as TOPEX and the admission of Viet Nam as a member, gave rise to requirements additional to those already covered in the 1980-1981 UNDP project for support to the regional typhoon programme. At the request of the Committee, an approach was made to UNDP early in 1980 to make provision for these requirements. Subsequently UNDP agreed to revise the project to

include a further \$US200,000 for equipment for China, the Lao People's Democratic Republic and Viet Nam, 10 man-months of fellowships for Viet Nam and 6 man-months of consultant services to advise and assist in the preparation of the TOPEX programme. In addition, UNDP confirmed the financing of two study tours in China, one in 1980 on flood control and the other in 1981 on watershed management for flood loss prevention and management, and three training seminars, one on principles of flood loss prevention and management, which was held in July 1980, and two to be held in 1981 on urban hydrology and on repair and maintenance of electronic equipment used in flood forecasting and warning systems.

6. This valuable extra support from UNDP has greatly facilitated both the planning of TOPEX in 1980 and the implementation of the broader programme of the Committee. The TOPEX man-months have been divided into two periods of three months each, the first to provide advice on observing and telecommunication facilities and the second on analysis and forecasting techniques.

7. Other support to the Committee's programme has continued in 1980 through, for example, group training courses in Japan and the provision by Japan of experts for an advisory mission to assist members in the selection of pilot basins for comprehensive flood loss prevention and management. Further details are given in document WRD/TC.13/1, "The Committee's activities during 1980".

Expected needs and sources of support

(a) Typhoon Committee secretariat (TCS)

8. As may be seen from paragraph 3 above, the members of the Committee have responded well to the need to assume responsibility for the staffing of its secretariat. Omitting the need for consultancy services in specialized fields on an occasional basis, three of the four professional posts are now filled by counterpart staff and there are good prospects that members will continue to provide these staff in the longer term. At its twelfth session, the Committee, in accepting with gratitude the offer of the Philippines to provide a Co-ordinator to replace the former Chief Technical Adviser, as well as the Philippines itself, regarded that arrangement as being of an interim nature. The Committee may wish to review the present situation and express its views on the arrangements for the future.

9. The post giving rise to the most concern is that of the telecommunication/electronics expert. Present UNDP funding provides for his continuation throughout the year 1981 but, by the time the fourteenth session of the Committee takes

place in November 1981, his service will be almost at an end. Members of the Committee will be well aware of the value of this post, which is not of an institutional nature but is directly related to the operational efficiency of the warning system. His function of providing on-the-spot technical advice to members on the installation, operation and maintenance of telecommunication and electronic equipment is crucial to this system. A high proportion of his time is spent in the field and the frequent requests from members for his services testifies to the value they attach to these services. The advent of TOPEX, the success of which will depend on the operational, real-time acquisition and exchange of data, will further accentuate the importance of the work for which the post was initially created.

10. The foregoing facts suggest that the termination of this post at the end of 1981 would constitute a serious set-back in the programmes the Committee has set itself. It is therefore thought that at its thirteenth session the committee will wish to place considerable stress on the need for a continuation of those functions. If such is the view of the Committee, sources of funding the post from January 1982 will need to be sought. At its thirteenth session, the Committee is invited to express its views on this matter and, if it desires that an approach be made to UNDP to continue the post, to indicate the further period for which it feels the expert's services will be needed.

11. On the basis of the recommendation of the Typhoon Committee Review Mission, the Committee agreed to include the subject of comprehensive flood loss prevention and management in its long- and short-term programmes, for which the services of a flood control expert would be required to strengthen TCS. Efforts by the ESCAP secretariat to secure the services of this expert have so far not reached a successful conclusion. Without the services of this expert, it might be difficult for the Committee to implement this portion of its programme. The Committee may therefore wish to make suggestions for filling this post.

12. As far as the counterpart staff in TCS are concerned, UNDP has so far agreed to provide funds for the periodic travel to members that is an inseparable part of their duties. It is believed that the Committee will wish this support to be continued after 1981. Similarly, provision is now made for occasional consultant services in particular, specialized fields of activity which do not justify the full-time presence of staff in TCS. It would appear desirable that further, limited provision be made for continuation of this support.

/(b)

(b) Programme activities

13. As explained in the annotated agenda, the thirteenth session provides the last opportunity for the Committee to discuss the need to seek further UNDP support if this support is to continue uninterrupted into 1982 and beyond. It is accordingly proposed that the Committee at its present session should give careful attention to the need for external assistance for the execution of its programme over at least the years 1982 and 1983. This period would also cover the operational phase of TOPEX.

14. While the Committee should consider the whole of its programme, it is clear that those needs related to TOPEX will form a major part of the requirement for the period in question. It should also be mentioned that, in many cases, facilities installed for TOPEX will continue to support the Committee's activities for a period extending beyond the TOPEX schedule. Their value in the longer term will therefore probably influence the priorities assigned to different categories of aid. Some further considerations regarding assistance for TOPEX and possible sources are given in paragraphs 7-9 below.

15. If the Committee decides that part of its requirements should form the subject of a project covering the years 1982 and 1983 for submission to UNDP, it is suggested that it will wish to specify these requirements under the following headings:

- (a) Equipment, including expendables;
 - (b) Training - fellowships and seminars/workshops;
 - (c) Consultant services;
 - (d) Travel and per diem costs for TCS counterpart staff)
-) (see para. 12 above)

To assist the secretariats in drawing up a project document, as much detail as possible should be given and it is hoped that the report of the Committee on its present session could include an annex listing the requirements and indicating priorities.

16. It is likely that the requirements will exceed those which might reasonably secure UNDP support and the Committee may wish to consider which items should be the subject of efforts to secure support from other sources. The possibility of meeting some of the needs through TCDC arrangements within the Committee's membership should also be considered.

17. Both the First Planning Meeting for TOPEX (see document WRD/TC.13/3) and the Management Board at its first session (see document WRD/TC.13/4)

/underlined

underlined the need for external assistance to supplement national commitments in meeting the requirements for TOPEX. The Board requested WMO to investigate the possibility of establishing a trust fund for TOPEX to which WMO members could contribute specifying, if they desired, the particular activity they wished to support. At the time of preparing this document, this question was under study in the WMO secretariat. However, it appears that the setting-up of such a fund is feasible and steps were being taken to explore the best way of doing so. It is confidently expected that by the time the thirteenth session convenes positive action in this direction will have been taken. A full report on developments will be made orally at the session. Another proposal made by the Management Board that WMO and ESCAP should inquire whether TOPEX would qualify for assistance under the Interim Fund for Science and Technology for Development set up in 1979 under the administration of UNDP was also being investigated. An approach to this Fund, at this preliminary stage at least, seemed less likely to be successful.

18. Although some definite items in the TOPEX programme for which support will be needed have emerged, others are as yet poorly defined. Thus, it is clear that there will be a need for funds to assist members in attending planning meetings and sessions of the Management Board, and for the secondment of scientists to the International Experiment Centre (IEC) in Tokyo during the experimental periods. However, the major requirements are likely to be for the upgrading of observing and telecommunication systems in members' territories to ensure that the standards set for TOPEX are met, and they are not yet clear. The main purpose of the first of the consultancies mentioned in paragraph 6 above is to obtain a clear idea of the extent of these needs. The consultant's report is expected early in October 1980 so that the Committee will be able to discuss these requirements at its thirteenth session and to make proposals for meeting them.

19. Once this information is to hand, the Committee will be able to consider how best to solicit the necessary support. The question of a co-ordinator for TOPEX may also require further discussion, although UNDP has expressed its firm view that this work should be carried out through TCDC. The Committee may wish to consider this possibility. The need for further short-term consultant services for TOPEX will also need discussion.

20. The Committee may recall that the short- and long-term programmes adopted at its eleventh session listed the following training seminars under the hydrology component:

/(a)

- (a) Flood vulnerability analysis;
- (b) Principles of flood plain management for flood loss prevention and management;
- (c) Hydrological forecasting.

If resources are available, these training seminars could be organized by ESCAP and/or WMO during the period 1982-1983 in support of the Committee's activities. The Committee may wish to express its views on this matter.

21. Finally, it is suggested that the Committee should endeavour to make a consolidated statement reflecting all known requirements for external assistance over the period up to the end of 1983 making, wherever possible, proposals for the sources from which the necessary support may be secured.

Action proposed

22. The Typhoon Committee is invited to:

- (a) Note the action taken with UNDP to secure additional support and record its appreciation therefore;
- (b) Review the staffing needs of TCS and decide whether:
 - (i) The present arrangements for the Co-ordinator should continue if the Philippines is willing;
 - (ii) UNDP should be approached to extend the services of the telecommunication/electronics expert, and for what period;
 - (iii) To request UNDP to consider the continued provision of consultant services beyond 1981, and also to support travel and per diem costs for counterpart staff;
 - (iv) ESCAP should continue its efforts to seek the services of a flood control expert.
- (c) Decide whether a further request should be made to UNDP to support programme activities after 1981, including equipment and training facilities;
- (d) Consider other potential sources of support for its programme, including TCDC arrangements;
- (e) Examine the requirements for support for TOPEX in the light of the consultant's report and the progress made towards the establishment of a trust fund to provide that support;

/(f)

- (f) Compile, if possible, a consolidated statement of requirements for assistance for the execution of its programme up to the end of 1983, indicating priorities and possible sources of support.

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FOR PARTICIPANTS ONLY

WRD/TC.13/6
22 September 1980

ORIGINAL: ENGLISH

ECONOMIC AND SOCIAL COMMISSION FOR ASIA AND THE PACIFIC
AND
WORLD METEOROLOGICAL ORGANIZATION

Typhoon Committee
Thirteenth session
2-8 December 1980
Bangkok

PROGRAMME FOR 1981

(Item 7 of the provisional agenda)

Note by the Typhoon Committee secretariat

Introduction

It is recognized that many activities of interest to the Typhoon Committee will be carried out by the individual members. However, under this item, the Committee may wish to consider only those items of work on which it will concentrate during 1981, which the assistance of the Typhoon Committee secretariat (TCS). For this purpose, the short-term and long-term programmes of the Committee approved at the eleventh session should provide the necessary guidance. The extension of the assistance to the Committee for 1980-1981 approved by UNDP should also be taken into consideration.

The Typhoon Operational Experiment (TOPEX), which constitutes one of the major items of the work programme for the Committee for 1981, must also be taken into account.

On the basis of the above considerations, the following tentative programme of work is drawn up for special attention during 1981.

Meteorological component

- (a) Operation and maintenance of electronic equipment (RS/RW, radar, radar picture transmission, satellite receiving and telecommunication equipment);
- (b) Establishment of new radar stations in Malaysia, the Philippines and the Republic of Korea;
- (c) Provision of equipment, spare parts and training of technicians for proper calibration and maintenance of weather radars and satellite receiving equipment;
- (d) Provision for improvement of meteorological and telecommunication facilities included in the priority list established by the Committee;
- (e) Establishment of satellite receiving equipment for reception of cloud imagery and other data from GMS and TIROS-N satellites in the Philippines and Thailand;
- (f) Review of national data collection facilities and data exchanges needed for typhoon warning services and taking remedial measures, where necessary;
- (g) Review of the present arrangements for dissemination of typhoon and flood warnings with a view to introducing improvements, where necessary;
- (h) Preparation for and execution of the Pre-experiment of the Typhoon Operational Experiment (TOPEX), on the basis of the tentative programme recommended by the First Planning Meeting in June 1980;

- (i) Procurement and installation of equipment and spare parts for telecommunication, radar, satellite receiver etc. under the UNDP fund provided for 1981.

Hydrological component

- (a) Survey and preparation of plans in the selected areas for comprehensive flood loss prevention and management;
- (b) Further improvement in the operation of existing flood forecasting systems in China, Malaysia, the Philippines and the Republic of Korea;
- (c) Establishment of flood forecasting systems in Agno Bicol and Cagayan River basins in the Philippines, Kinabatangan River basin in Sabah and the Sadong River basin in Sarawak, Malaysia, and the Pasak River basin in Thailand;
- (d) Development of flood forecasting and warning systems for dam operation in the Philippines;
- (e) Continuation of determination of magnitudes and frequency of floods in flood-prone zones subject to heavy damage and assessment of potential flood damage;
- (f) Evaluation of existing flood forecasting systems in the selected river basins under the hydrological component of TOPEX.

Disaster prevention and preparedness

- (a) Follow-up action on the joint LRCS/WMO/ESCAP missions (1973-1976), the recommendations of the Regional Seminar held at Tokyo in 1976, the Review Mission in 1976 and the consultants' reports on Malaysia, the Philippines and Thailand in 1978-1979;

- (b) Follow-up action on the recommendations of the UNDRO mission to the Philippines in 1979;

- (c) Advice and assistance with training in the field of disaster prevention and community preparedness through consultancy services where appropriate;

- (d) Improvement in the dissemination of timely warnings on typhoons, floods and storm surges, with particular attention to remote areas.

Training

- (a) Training of personnel through group training courses in Japan and through fellowships available under the UNDP project, from VCP and through bilateral assistance schemes. Short-term training courses on maintenance of satellite receiving equipment, radar and telemetering equipment might be given special consideration

/(b)

- (b) Assistance to members in exploring the possibility of providing long-term training courses in meteorology, hydrology and electronics. The VCP scheme may be further exploited for this purpose;

- (c) Training by TCS experts assisted by counterpart staff in meteorology and hydrology. On-the-job training by TCS experts, particularly in the operation and maintenance of radar, satellite receiver and telecommunication equipment;

- (d) Exchange of information on training facilities available among the WMO members in the areas of concern and a survey of available fellowships and scholarship assistance;

- (e) Participation in study tours and seminar relevant to the Committee's programme organized by members or international bodies.

Research

- (a) Stimulation of research activities through advisory services, visits of study groups and exchange visits by research personnel;

- (b) Undertaking of research on typhoons, particularly during the TOPEX period, and the promotion of joint collaboration on selected topics, such as studies directed towards the development of improved storm surge prediction methods;

- (c) Promotion of exchange of information on typhoon research activities, including developments on related matters outside the region;

- (d) Initiation of provisional studies on disaster risk evaluation in typhoon-prone areas, including flood risk mapping;

Action proposed

The Committee may wish:

- (a) To approve in principle or suggest amendments to the items of work outlined above, on which the Committee should concentrate during 1981;

- (b) To urge members to take all possible measures, with the assistance of TCS, to accelerate implementation of the Committee's programmes.

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ECONOMIC AND SOCIAL COMMISSION FOR ASIA AND THE PACIFIC
AND
WORLD METEOROLOGICAL ORGANIZATION

Typhoon Committee
Thirteenth session
2-8 December 1980
Bangkok

CO-ORDINATION WITH OTHER ACTIVITIES OF THE
WMO TROPICAL CYCLONE PROGRAMME

(Item 8 of the provisional agenda)

Note by the WMO secretariat

Introduction

1. The purpose of this document is to inform the Committee of the various activities related to its own work which are being carried out under the WMO Tropical Cyclone Programme (TCP), of which this work forms part. The annex to the document consists of the sixth status report on the implementation of the TCP which provides a summary of the developments that have taken place in the year up to 30 June 1980. Later information covering the period between the issue of the status report and the thirteenth session of the Committee will be presented by the representative of the WMO Secretariat of the session.

Action proposed

2. The Committee is invited to:
- (a) Note and comment on the information provided in the annex to this document and on any later developments reported to the session;
 - (b) Review the measures taken to ensure effective co-ordination of the Committee's activities with those performed under the TCP as a whole;
 - (c) Make proposals for any new measures which it feels would enhance this co-ordination.

WORLD METEOROLOGICAL ORGANIZATION

Sixth Status Report on the Implementation of the
WMO Tropical Cyclone Programme
(30 June 1980)Introduction

1. In 1971 the Sixth World Meteorological Congress initiated the Tropical Cyclone Project in response to Resolution 2733 (XXV) of the United Nations General Assembly which expressed concern at the loss of human life and material damage caused by tropical cyclones and other natural disasters and requested international action for the mitigation of the harmful effects of such disasters. A Plan of Action, which was first adopted by the Executive Committee one year later, forms the basis of its activities. Seventh Congress in 1975 confirmed that the objectives of the project are inter alia:

- (a) Strengthening the capabilities of detection, tracking and forecasting of tropical cyclones;
- (b) Fostering the application of the most appropriate techniques of quantitative storm surge prediction;
- (c) Improving tropical cyclone warning systems;
- (d) Providing support to disaster prevention and community preparedness and related activities;
- (e) Providing basic data on risk of loss by winds, storm surges and floods to meet the needs for development planning and other purposes.

2. The United Nations General Assembly has maintained a close interest in the project and in 1977 adopted a further resolution (A/RES/32/196) calling on WMO to intensify its efforts in this field. Eighth Congress reviewed the progress made up to 1979 and decided that it should be upgraded to be the Tropical Cyclone Programme (TCP) from 1980 onwards. It unanimously agreed that it was essential to strengthen and intensify the programme in the years ahead and that WMO should co-ordinate these activities. Eighth Congress adopted an implementation programme for 1980-1983.

3. The further implementation and development of the TCP will promote the establishment and strengthening of national and regionally co-ordinated systems to ensure that the loss of life and damage caused by tropical

/cyclones

cyclones are reduced to a minimum and thus to offset their dramatic impact upon the populations and economies of the countries affected. In particular, it is expected that the following benefits will increasingly be derived from the programme:

- (a) Improved capability to issue accurate and timely warnings of tropical cyclones and their effects, particularly those caused by strong winds, storm surges and floods;
- (b) Co-ordinated planning and execution of disaster prevention and preparedness measures;
- (c) Reduction of the loss of human lives;
- (d) Minimization of tropical cyclone damage and its impact upon the national economies.

4. The TCP covers a wide range of activities mainly of an operational character and is conducted in close association with other programmes, particularly the WMO's World Weather Watch and Operational Hydrology Programmes on which it relies. Research and development are also required for a number of activities. In view of the scope of the programme, its implementation programme continues the division of the activities under a general component dealing with those activities of application to all Members affected by tropical cyclones and a regional component devoted to activities of more restricted application, normally those directly related to the programmes of the regional tropical cyclone bodies.

5. Following the structure of the TCP, the information on activities and developments during the period of the report is presented below under two main headings, the general component and regional component. Additionally information of a more general nature, information on the action taken jointly with other international organizations and on the programmes envisaged for 1980-1981 are also given. The status of implementation of the various sub-projects under the general component, in summary form, is shown in an appendix to this report.

6. Eighth Congress in 1979 requested the Executive Committee to revise and update the present plan of action in the light of the developments and changes that have taken place since its preparation. An outline of a revised plan was adopted by the thirty-second session of the Executive Committee (May 1980), which made arrangements for the further preparation, approval and publication of the revised plan.

7. As outlined above, following on from the decision of Eighth Congress, the Tropical Cyclone Project was upgraded at the beginning of 1980 to become the Tropical Cyclone Programme (TCP).

General component

8. The aim of the general component is to convey information and provide guidance to Members, mainly through the publication of manuals and reports, to enable increased application of scientific knowledge and technological developments to the introduction or improvement of the components of the warning and disaster preparedness and prevention systems. It encompasses the broader aspects of training for the TCP.

9. The principal steps taken within the general component during the period of the report have been the continuation of activities under a number of sub-projects. A summary of the status of implementation of each of the 14 sub-projects is given in the appendix. It shows that prior to July 1979 reports had been prepared and distributed under sub-projects Nos. 2, 5, 7, 8 and 10 and that sub-project No. 11 had been successfully accomplished. Further action on these sub-projects, such as the updating of publications when significant new information becomes available, will be taken when appropriate.

10. The objective of sub-project No. 6 - 'Forecasting tropical cyclone intensity and movement' was to prepare a manual on available techniques at cyclone warning centres for the prediction of intensity and direction of motion of tropical cyclones. The sub-project was executed by USA in collaboration with Hong Kong, India, Japan and the Typhoon Committee Secretariat, and in August 1979 WMO Publication No. 528 "Operational techniques for forecasting tropical cyclone intensity and movement" was distributed to all Members. It is expected that this publication, which contains an up-to-date review of the existing empirical, statistical and dynamical prediction techniques and devotes attention to the verification of tropical cyclone forecasts, will be of considerable value to those with the heavy responsibility of issuing forecasts and warnings of tropical cyclones.

11. Draft reports prepared under sub-projects No. 1 - 'Special tropical cyclone observing network' and No. 3 - 'Automatic weather stations' have been in the final stage of review and it is expected that the former will be distributed and the latter will be published during the ensuing months.

12. Sub-project No. 4 - "Radar" aims at providing guidance information to assist Members in selecting and installing storm warning radar equipment and in making the best use of it in tropical cyclone tracking, forecasting and warning. An expert from USA, in consultation with experts designated by Australia, France, Japan and the WMO Commission for Instruments and Methods of Observation (CIMO), prepared a draft report which was submitted to the WMO Secretariat in June 1980 for publication.

13. Work has continued on sub-project No. 9 - 'Tropical cyclone warning systems' and a draft report is being finalized by the sub-project team leader and his collaborators.

14. Preparation of a first draft of a report under sub-project No. 12 - 'Human response to tropical cyclone warnings and their contents' under the leadership of the USA with the help of experts designated by Australia, India and the Philippines commenced. It is planned that the draft will be reviewed by the sub-project team towards the end of 1980.

15. Two sub-projects, on the regional aspects of storm surge prediction in the hurricane areas and on public information and education, which were developed on the basis of proposals made by the RA IV Hurricane Committee, are in the early stages of implementation. In regard to the former, plans were completed for conducting an inquiry with all Members represented on the RA IV Hurricane Committee and are well advanced for the initial processing during 1980 of the information so obtained. The second phase of this sub-project is expected to be executed by a number of the Members participating in the work of the Hurricane Committee. There have been positive responses to the invitations issued to UNDR0 and LRCS to take part in sub-project No. 14 - 'Public information and education' which will therefore be a joint WMO/UNDR0/LRCS project.

16. In accordance with the directives of Congress and the Executive Committee, the Commission for Atmospheric Sciences (CAS) is continuing to give attention to the research aspects of the TCP.

Regional Component

17. The regional component of the TCP is concerned mainly with the development of co-ordinated regional systems to combat loss of life and damage resulting from tropical cyclones. Its main thrust therefore is for the efficient operation of tropical cyclone early warning systems, including warnings of associated phenomena such as storm surges and floods and of the relevant disaster prevention and preparedness organization.

18. The TCP, and particularly its regional component, is organized around three main elements:

- (a) Meteorological, based on the World Weather Watch, which is concerned with the provision of the basic meteorological data required for tropical cyclone forecasting and the application of the appropriate techniques to ensure timely and accurate forecasts;
- (b) Hydrological, based on the Operational Hydrology Programme, which is concerned with the basic hydrological data required for flood forecasting and the application of the appropriate techniques to ensure timely and accurate forecasts;
- (c) Prevention and Preparedness, which is concerned with all other structural and non-structural measures required to ensure the maximum safety of human life and the reduction of damage to a minimum. In this connexion, WMO's role of assisting Members to ensure the co-ordination measures to protect life and property will be performed in close co-operation with UNDR0, LRCS and other appropriate bodies with special expertise in these fields.

19. Under the regional component work is carried out through two inter-governmental groups: the ESCAP/WMO Typhoon Committee and the WMO/ESCAP Panel on Tropical Cyclones and two groups established by regional associations: the RA I Tropical Cyclone Committee for the South-West Indian Ocean and the RA IV Hurricane Committee. Close liaison has been maintained between the four regional cyclone bodies.

ESCAP/WMO Typhoon Committee

20. The membership of the Typhoon Committee increased to 10 when Viet Nam formally took its seat at the twelfth session (Bangkok, November 1979). In December 1979 the institutional support provided for the Typhoon Committee Secretariat by UNDP since 1968 came to an end, the Committee members themselves assuming the responsibility for the future running of the Secretariat. The present staffing consists of a Co-ordinator and a meteorologist provided by the Philippines, a hydrologist provided by Japan and a telecommunications/electronics expert whose functions are of an operational nature and who will continue to be funded by UNDP for the years 1980 and 1981. UNDP is also continuing to provide support to a number of programme activities, notably through the supply of equipment and fellowships. At its thirteenth session (December 1980) the Committee will consider the extent to which further support for its activities is necessary.

21. These important changes have come at a time when the Committee's programme has taken on a new dimension with the planning of the Typhoon Operational Experiment (TOPEX). The year since the issue of the fifth status report has seen a sound start in the preparations for this major undertaking. In July 1979 a Preparatory Meeting was held in Tokyo at which the objective and composition of TOPEX was defined, together with the experimental area, a time schedule for its conduct, and interim arrangements were made for the management of the further planning and execution of the Experiment.

22. The report of the Preparatory Meeting was endorsed by the twelfth session of the Committee which decided to establish a Management Board for TOPEX comprised of a representative of each member wishing to participate in the management of the Experiment. Terms of reference were drawn up giving the Board wide powers to take all the decisions necessary to achieve the objectives of TOPEX. The Board was formally established at the First Planning Meeting for TOPEX, held in Tokyo from 17 to 26 June 1980.

23. The Planning Meeting gave considerable attention to the observational, data-processing and telecommunication requirements for the three experimental periods scheduled for 1981, 1982 and 1983, with particular emphasis on the Pre-Experiment which is to take place in August 1981. A draft of an operational manual setting forth the mandatory and recommended operations to be applied by all participating members was studied in detail and, after incorporation of the decisions of the meeting, will be published later in 1980. Criteria for the selection of the tropical cyclones to be followed during the experimental periods were agreed and a recommendation made to the Typhoon Committee for a common system for the identification of tropical cyclones. One tropical cyclone will be selected for the Pre-Experiment and two for each of the First and Second Operational Experiments in 1982 and 1983, with augmented observations on a mandatory basis. In these two years two or three other tropical cyclones may be selected, with additional observations being made on an optional basis.

24. The meeting, in accepting the functions already laid down for the International Experiment Centre which is to be set up in Tokyo, considered that it should operate on a 24-hour basis in real-time in co-operation with the Japanese Experiment Sub-Centre during the periods when selected tropical cyclones are being followed. It drew up a list of activities in which scientists seconded to the International Experiment Centre should participate. Tentative plans for the secondment of scientists by participating members were announced and each confirmed that Experiment Sub-Centres would be established in their respective countries.

25. The discussion revealed the recurrent feeling of participating members that national commitments to TOPEX would need to be supplemented by external support if the Experiment is to be fully implemented as planned.

26. Although mainly of national rather than regional significance, good progress was made by the meeting in further developing the Hydrological and the Warning Dissemination and Information Exchange components of TOPEX.

27. It was agreed that the hydrological component of TOPEX should concentrate on the following activities:

- (a) the evaluation of flood forecasting systems established in the area;
- (b) the identification, selection and intercomparison of operational forecasting models used by national services in the area, and
- (c) the evaluation of the separate and/or combined hydrological effects of typhoons.

28. In reply to a WMO questionnaire circulated in January 1980 to the members of the Typhoon Committee, six members had replied and designated seven river basins within which these activities could be conducted. It was agreed that members which had not done so would soon designate focal points for the hydrological component and designate areas with flood forecasting systems for study. The above activities will be supported, as appropriate, by the WMO Hydrological Operational Multi-purpose Sub-programme (HOMS) approved by the WMO Eighth Congress in 1979. The results of these activities will be included, for each forecasting system, in a descriptive report, annual monitoring reports and annual reports on forecasting accuracy, to be prepared by members in accordance with standard formats. It was also agreed that this material would be reviewed at the evaluation meeting foreseen for 1984 and valuable conclusions and recommendations could then be prepared for the benefit of all concerned.

29. The short- and long-term measures needed to attain the objectives of the Warning Dissemination and Information Exchange component were set out by the meeting, and it was agreed that participating members would provide information on the steps being taken by them. UNDR0 and LRCS were jointly assigned the task of co-ordinating the activities under this component.

30. A short first session of the TOPEX Management Board was held immediately after the Planning Meeting. The Board elected Mr. I. Shimizu (Japan) as chairman and Mr. Zuo Ming (China) as vice-chairman, and adopted rules of procedure to govern its work. It reviewed the timetable for TOPEX, making only minor changes. The most important decision of the Board was to propose the setting up of a Trust Fund for TOPEX to which WMO Members could contribute, specifying the particular activity they wished to support. The WMO Secretariat was given the task of exploring how this proposal could be translated into reality.

WMO/ESCAP Panel on Tropical Cyclones

31. The fifth status report gave information on the situation in mid-1979 on the question of support for the Panel's programme and, particularly, on the staffing needs for its Technical Support Unit (TSU). It may be recalled that the current UNDP institutional support to the TSU runs to the end of 1980 and the future arrangements for this purpose were, therefore, a major topic for discussion at the Panel's seventh session in Bangkok in March 1980. Briefly, it may be said that further UNDP support after 1980 was conditional upon evidence that the TSU would receive progressively increased support from members and that it would continue to operate after the withdrawal of UNDP funding.

32. The Panel was unanimously of the view that the TSU played a central role in the execution of its programme and that it should continue for the foreseeable future. It accordingly drew up a timetable for the phased withdrawal of UNDP - funded staff and their replacement by counterpart staff provided by the members. Under this arrangement the responsibilities of all the international staff will be taken over by Panel members by 1985. This undertaking implies the need for continued UNDP support for a Chief Technical Adviser for two years after 1980 and for a further four years for the telecommunication/electronics expert. A draft submission to UNDP for the continuation of institutional and other support after 1980 was in preparation at the time of preparing this status report.

33. The Panel further decided that the TSU should rotate its location from time to time in order that the services of the experts may be of maximum benefit to members. It was decided tentatively that the TSU should be transferred from its present location in New Delhi to Colombo on a date to be agreed with the authorities. It is hoped that the transfer will take place in the course of 1981.

34. Whilst these decisions are clearly of major importance in providing a solid foundation on which the Panel can base its programme, they should not be allowed to obscure the fact that the presence of the Chief Technical Adviser and the telecommunication/electronics expert in the period since early 1979 have given the programme activities a new impetus. Substantial improvements have been made in the effectiveness of the basic observing and telecommunication systems with the installation of new equipment and facilities. These improvements are continuing and may be expected to have substantial repercussions on the warning systems in the Panel area. Increased attention is also being given to the serious problem of storm surges and a workshop on this subject is scheduled to be held in Rangoon (Burma) in November 1980.

RA I Tropical Cyclone Committee for the South-West Indian Ocean

35. The Committee was re-established by the seventh session of Regional Association I held in November 1978 and the Members participating in its work are: Comoros, France (La Réunion), Madagascar, Malawi, Mauritius, Mozambique, Seychelles and United Republic of Tanzania. The fourth session of the Committee was held in Maputo, Mozambique from 15 to 22 October 1979. The session reviewed the state of implementation of the various elements constituting the observing system and the telecommunication system called for in its Technical Plan, which it had established some five years earlier. With the aim of attaining quantum jumps in the functioning of the tropical cyclone warning system, the Committee decided to include in its Technical Plan new requirements regarding the exchange of radar information between Members and the concept of setting up air reconnaissance flights. A hydrological component was also included in this plan.

36. However, one of the most important decisions taken by the session was that of developing a Tropical Cyclone Operational Plan for the South-West Indian Ocean. To that effect the Committee entrusted the task initially to a study group which should report to its next session in 1981. The operational plan would be intended to better define the observing, forecasting and warning responsibilities of all co-operating countries participating in the tropical cyclone warning system of the area and to strengthen, through regional co-ordination, the cohesiveness of the system. In basic principle, its relationship with the existing Technical Plan would be similar to that between the plans developed by the Hurricane Committee (see paragraph 38 below).

37. The Committee identified the main areas in which support for its activities is required and extended an appeal to the UNDP to give favourable consideration to its request for assistance. In response to the directives of the Committee, the Secretariat prepared a draft project document which has been submitted to UNDP.

RA IV Hurricane Committee

38. As one of its first activities the RA IV Hurricane Committee, in 1978, developed on RA IV Hurricane Operational Plan and its Technical Plan and Implementation Programme. The Operational Plan describes the co-ordinated system of warnings of tropical cyclones (called hurricanes in that area) for the entire region and sets out the agreed sharing of responsibilities, among the countries concerned, for its component parts and for the necessary inputs. The Technical Plan identifies the steps to be taken to improve the warning systems and to strengthen the disaster prevention and preparedness measures. The plans are complementary. Implementation of requirements in the technical plan resulting in improvements to the warning system may lead to consequential changes in the operational plan and conversely shortcomings identified in the operational plan may be addressed as requirements for inclusion in the technical plan.

39. At its third session, held in Mexico City from 24 to 31 March 1980, the Committee reviewed the hurricane season of 1979. In August to September 1979 two memorable hurricanes had traversed the region. Hurricane David was the worst in Dominica since 1834; it killed some 2,000 people in the Dominican Republic and caused severe human distress in both countries, while Hurricane Frederic, the costliest in U.S. history, inflicted damage estimated at US\$2,300 million on that country. The Committee took advantage of the lessons learned from the severe tests of the systems by these hurricanes to identify weaknesses as a springboard from which to further develop the warning and protective arrangements. It was felt that the RA IV Hurricane Operational Plan had in general worked well. However, the Committee recommended changes to the plans as well as several further actions to be taken to strengthen the existing disaster prevention and preparedness arrangements. The main changes proposed to the operational plan were modification of the list of names to be used for identifying hurricanes, including the retirement of the names "David" and "Frederic" and, more importantly, the introduction of an International Hurricane Scale. This scale is a numerical classification of hurricanes according to their intensity, based on energy computations, starting from "1" for a minimal hurricane and is open-ended above. It is intended to be the only numerical intensity classification scale for international use in the hurricane areas.

40. The session also discussed the assistance required for the implementation of the technical and operational plans. It endorsed a proposed project, which had been prepared by the Secretariat at its request and which it classified as being of paramount importance to the attainment of its goals. Consequently a request for a regional project is being prepared for submission to UNDP, as a follow-up to

41. As indicated in the fifth status report, the RA IV Hurricane Committee had proposed that a seminar/workshop on the use of satellite data for hurricane detection and predication should, if possible, be held immediately prior to its third session. This was done and the workshop took place in Mexico City from 17-22 March 1980. Its main objective was to expose senior hurricane forecasters in the national Meteorological Services of the region to knowledge of and practical training in the effective operational use of satellite data as inputs to the hurricane forecasting and warning system. The workshop was conducted in English and Spanish and attended by 42 participants nominated by 15 Members of WMO. Major contributory factors to the outstanding success of the workshop were the generous provision by the U.S. of the Director of the Workshop and two instructors as well as much of the technical material, and the financial assistance provided by UNEP to support attendance of participants and preparation of material.

Co-operation with other organizations

42. In accordance with the wishes of Eighth Congress, close co-operation with other international organizations active in disaster prevention and preparedness has continued. Thus there has been close consultation with ESCAP, UNDP, UNEP, UNDRO and LRCS on a variety of matters of common concern. Items previously mentioned in this report include the planned execution of TCP sub-project No. 14 as a WMO/UNDRO/LRCS project, UNDRO/LRCS involvement in TOPEX through its warning dissemination and information exchange component and UNEP's support to the Workshop on the use of satellite data for hurricane detection and prediction. Other joint activities include the planning for a consultant on disaster prevention and preparedness to assist the ESCAP/WMO Typhoon Committee members, a roving seminar on disaster preparedness and fellowships for the WMO/ESCAP Panel on Tropical Cyclones, a joint UNDRO/WMO/LRCS mission to the South-West Indian Ocean area and strengthening of disaster preparedness in the Caribbean area.

Programme for 1980-1981

43. The activities of the WMO Tropical Cyclone Programme are of a continuing and long-term nature. The programme covers a wide range of activities which, on the technical and operational side are closely related to and dependent on the WMO's World Weather Watch and Operational Hydrology Programmes. There are also research aspects of the project which fall largely within the area of research in tropical meteorology and to which the Commission for Atmospheric Sciences is giving attention, in response to the directives of Congress and the Executive Committee. In preceding sections of this report, information has been given on some of the on-going activities and also, in some instances, of the plans for the period ahead.

The activities set out below represent an overview of the main parts of the 1980-1981 programme.

General component

- (a) revision of the Plan of Action for the Tropical Cyclone Programme;
- (b) examination of the feasibility of setting up an aerial reconnaissance facility with international participation;
- (c) implementation of TCP sub-projects (see Appendix): preparation, editing and publication of reports;
- (d) conducting a survey and processing of information for TCP sub-project No. 14 on public information and education;
- (e) meeting of experts on TCP sub-project No. 12 - "Human response to tropical cyclone warnings and their content". (Bangkok, Thailand, 17-21 November 1980);
- (f) other meetings of experts required for the implementation of the TCP sub-projects listed in the appendix to this report.

Regional component

Under the regional component the programme will be chiefly concerned with the activities undertaken by the regional tropical cyclone bodies and the implementation of the decisions they make. The activities will be centred on the meteorological, hydrological, disaster prevention and preparedness, training and research elements of the programme. A provisional schedule of meetings of regional bodies in the period 1 July 1980 to 30 June 1981 and for the further planning of TOPEX is given below:

- (a) seminar on flood loss prevention and management (organized by ESCAP) (Bangkok, Thailand, 7-18 July 1980);
- (b) symposium on typhoons (Shanghai, China, 6-11 October 1980);
- (c) workshop on storm surges (Rangoon, Burma, 10-15 November 1980);
- (d) ESCAP/WMO Typhoon Committee - thirteenth session (Bangkok, Thailand, 2-8 December 1980);
- (e) Management Board for TOPEX - second session (Bangkok, Thailand, 9-10 December 1980);
- (f) seminar on urban hydrology (tentatively late 1980/early 1981, place and date to be decided);
- (g) WMO/ESCAP Panel on Tropical Cyclones - eighth session (tentatively Colombo, Sri Lanka, February/March 1981);
- (h) RA IV Hurricane Committee - fourth session (tentatively Santo Domingo, Dominican Republic, 24-31 March 1981);
- (i) Seminar on the application of satellite data to cyclone forecasting (date and place to be decided).

APPENDIX

WMO TROPICAL CYCLONE PROGRAMME - GENERAL COMPONENT

Status of Implementation on 30 June 1980

A. Sub-projects completed or under which reports have been issued

<u>Sub-project number and title</u>	<u>Title of report and date of issue</u>	<u>Remarks</u>
No. 2 - Observations from mobile ships	"Observations from mobile ships" distributed on 16 March 1977	
No. 5 - Geostationary satellites	"The use of Satellite Imagery in Tropical Cyclone Analysis" (WMO Technical Note No.153) published in November 1977	
No. 6 - Forecasting tropical cyclone intensity and movement	"Operational Techniques for Forecasting Tropical Cyclone Intensity and Movement" (WMO No. 528) published in August 1979	
No. 7 - Storm surge prediction	"Present techniques of tropical storm surge prediction" (WMO No. 500) issued in March 1978	
No. 8 - Risk evaluation techniques	"The quantitative evaluation of the risk of disaster from tropical cyclones - report of a WMO/UNEP project on the meteorological and hydrological aspects" (WMO No. 455) published at the end of 1976	
No. 10 - Community preparedness and disaster prevention	"Guidelines for Disaster Prevention and Preparedness in Tropical Cyclone Areas" (WMO) published in English in June 1977 and in French and Spanish during the first half of 1978.	Requests for copies may be addressed to WMO ESCAP or LRCS Secretariat.

<u>Sub-project number and title</u>	<u>Title of report and date of issue</u>	<u>Remarks</u>
No. 11 - Flood forecasting and warning	---	A joint ESCAP/WMO mission visited the Tropical Cyclone Panel member countries to assess facilities available and evaluate the improvements required. Significant progress has been made in improving hydrological facilities in the Typhoon Committee area. A roving seminar was organized to train local personnel in the analysis and prediction of intense precipitation and floods in Asia and S.W. Pacific.

B. Other sub-projects

<u>Sub-project number, title and objectives</u>	<u>Mode of implementation</u>	<u>Status</u>
No. 1 - <u>Special tropical cyclone observing network</u> (anemometer and barometer networks) Objectives: To produce a report on the desirability and feasibility of establishing a relatively dense network of wind and pressure observing stations	Australia, with the collaboration of Japan, India and the Typhoon Committee Secretariat (TCS) Leader: Australia Experts nominated: Dr. M. Komabayashi (Japan) Shri V. Balasubramaniam (India) Dr. S.N. Sen (TCS)	Draft report completed and received in the WMO Secretariat and expected to be distributed shortly.
3 - <u>Automatic weather stations</u> Objectives: Production of a report, sufficiently comprehensive complete and detailed to enable developing countries with suitable sites to obtain and install automatic weather stations at strategic points to obtain additional data for tropical cyclone detection and warning	Japan, with the collaboration of Australia, France, India, Thailand, USA and CIMO Leader: Dr. J. Kobayashi (Japan) Mr. P.J.R. Shaw (Australia) Mr. M.C. Fichaux (France/CIMO) Shri S.V. Datar (India) Mr. P. Patvivatsiri (Thailand) Dr. J. Giraytys (U.S.A.)	Draft report entitled: "The role of automatic weather stations in tropical cyclone monitoring" has been completed and received for publication in the WMO Secretariat.
No. 4 - <u>Radar</u> Development of guides which will assist Members in selecting storm warning radar equipment, installing it in the best practical location and making the best use of it in tropical cyclone tracking, forecasting and warning	U.S.A., with the collaboration of Australia, France, Japan and CIMO Leader: Mr. D. Holmes (USA) Dr. P. Barclay (Australia) Mr. M. Malick (France) Mr. J. Aoyagi (Japan) Dr. N. Kodaira (CIMO)	Draft report entitled: "Weather radars for monitoring tropical cyclones" has been completed and received in the Secretariat for publication.
No. 9 - <u>Tropical cyclone warning systems</u> Objectives: The production of guidelines describing the main principles and practical considerations to be followed in setting up a tropical cyclone warning system	India, in collaboration with Australia, France (La Réunion), Japan and U.S.A. Experts nominated: Shri V. Balasubramaniam Leader (India) Dr. R. Tatehira (Japan) Mr. F. Herry (Australia)	A first draft has been prepared for circulation to collaborators. A revised text is expected shortly.

Sub-project number, title
and objectives

Mode of implementation

Status

No. 12 - Human response to tropical
cyclone warnings and their
content

Objectives:

To prepare a publication for
use in countries exposed to
tropical cyclones providing
information and guidance on
the most effective wording
for use in tropical cyclone
warnings.

U.S.A. with the collaboration
of Australia, India,
Philippines and UNDRO

A first draft of
a report is under
preparation.

Leader: Mr. Richard I.
Coleman (U.S.A.)
Mr. R.L. Southern (Australia)
Mr. B. Rajagopal (India)
Mr. A.K. Sen Sarma (India)
Mr. L.A. Amadore (Philippines)

No. 13 - Regional aspects of storm
surge prediction (Caribbean,
Central America and Eastern
Pacific)

Main objectives:

- to carry out studies
needed for the establish-
ment of an adequate tide
gauge network;
- compilation of data on
past storm surges in the
area;
- recommendations for the
techniques to be used for
storm surge forecasting;
- consideration of the need
for modelling studies aimed
at improving these
techniques

Members represented on the
RA IV Hurricane Committee
with assistance from the
WMO Secretariat and consul-
tant services

Implementation
commenced mid-
1980.

No. 14 - Public information and
education

Objectives:

To prepare a sample kit of
public information material
and guidance material to
assist Members in the
improvement of their public
education programmes

Joint project WMO/UNDRO/LRCS

In the planning
phase - implementa-
tion to commence
during the third
quarter of 1980.

ECONOMIC AND SOCIAL COMMISSION FOR ASIA AND THE PACIFIC
AND
WORLD METEOROLOGICAL ORGANIZATION

Typhoon Committee
Thirteenth session
2-8 December 1980
Bangkok

CO-ORDINATION WITH OTHER ACTIVITIES OF THE
WMO TROPICAL CYCLONE PROGRAMME

(Item 8 of the provisional agenda)

Note by the WMO secretariat

Introduction

- In paragraph 39 of the annex to document WRD/TC.13/7 the Committee was informed of a recommendation by the RA IV Hurricane Committee for the introduction in the RA IV Hurricane Operational Plan of an International Hurricane Scale (IHS). Since the preparation of that report the IHS has been adopted by the president of Regional Association IV on behalf of RA IV.
- The RA IV Hurricane Committee recommended that the scale be submitted to the other regional bodies of the WMO Tropical Cyclone Programme for their consideration and possible adoption.
- A note on the International Hurricane Scale adopted for use in RA IV is annexed to this document.

Action proposed

- The Committee is invited, as requested by the RA IV Hurricane Committee, to give consideration to the IHS and possibly to adopt such a scale for use in its area.

THE INTERNATIONAL HURRICANE SCALE (IHS)

The International Hurricane Scale (IHS) was adopted in 1980 by Regional Association IV as the scale of numbers to be used for the international classification of hurricanes. The IHS value for a hurricane is, in effect, the kinetic energy per unit mass at the point of maximum surface wind speed relative to the corresponding value of a threshold (minimum) hurricane.

Kinetic energy, E , is given by:

$$E = cv^2$$

where c is a constant and v is the speed.

Thus, the IHS number n , which is based on relative kinetic energy, is given by:

$$\frac{n}{n_0} = \frac{v_n^2}{v_0^2}$$

where v_n is the maximum surface wind speed in the hurricane, n_0 , v_0 are the corresponding values for a threshold hurricane and, clearly, $n_0 = 1$

It follows that:

$$v_n = v_0 \sqrt{n}$$

In ISO units

$$v_0 = 32.7 \text{ metres/sec}$$

hence

$$v_n (\text{ms}^{-1}) = 32.7 \sqrt{n}$$

However n is not a function of the units used and formulae for other units may readily be derived by applying conversion factors.

All values of n derived from the above-mentioned formulae are to be rounded off to the nearest 0.5. The IHS is open ended above and

$$n \geq 1$$

The wind speeds corresponding to values of n , up to $n = 5$, are as follows:

IHS NUMBER	CORRESPONDING WIND SPEED (V_n)				
n	m/s	km/h	knots	m.p.h.	
1.0	33	118	64	73	
1.5	40	144	78	90	
2.0	46	166	90	103	
2.5	52	186	100	116	
3.0	57	204	110	127	
3.5	61	220	119	137	
4.0	65	235	127	146	
4.5	69	250	135	155	
5.0	73	263	142	164	

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DISASTER PREVENTION AND DISASTER PREPAREDNESS

A PERSPECTIVE FOR THE FUTURE

by

R.T. Jones, Deputy Director,
Australian Counter Disaster College, Macedon, Australia

SUMMARY

Introduction

The terms 'disaster prevention' and 'disaster preparedness' have international meanings in the senses given them by the United Nations Office of the Disaster Relief Co-ordinator (UNDRO). The key distinction between them is that while prevention seeks to place a barrier (physical, legislative or regulatory) between a hazard and the community which may otherwise suffer its effects, preparedness accepts that some disasters may be unavoidable or may overwhelm the barriers of prevention and therefore seeks, in such an event, to reduce loss of life and damage to a minimum.

National strategies for counter-disaster response comprise a 'mix' of prevention and preparedness elements appropriate to national requirements. Within any national strategy, other 'mixes' may be more appropriate to regional or local needs.

The purpose of this presentation is to explore the factors which determine the nature of the required 'mix' of prevention and preparedness elements in any counter-disaster strategy, and to suggest, in the light of these factors, how such strategies may be more effectively determined in future.

The Factors

Most of the factors which determine the appropriate 'mix' of prevention and preparedness elements in any counter-disaster strategy can be considered under one of the following heads:

- the nature of the threat;
- demographic considerations;
- economic and social considerations, and
- administrative considerations.

The nature of the threat. This includes evaluation of types of hazard (both natural and man-made) and their characteristics, the possibility of heightened hazard through the interaction of natural and human-use systems, and problems relating to risk analysis.

Demographic considerations. These include concentrations of population and resources and the imbalances which may result from these, the 'proneness to disaster' of specific elements of the population, and changing patterns of resource use.

Economic and social considerations. These include the relative 'costs' of prevention and preparedness measures, questions of equity in meeting such costs, and the relation of such measures to community economic and social development.

Administrative considerations. These include the appropriateness of normal administrative structures to cope with counter-disaster response requirements, the division of responsibility for counter-disaster response activities, and relations between government and non-government sectors.

It is worth noting that, on an international scale, the loss of life from natural hazards is declining annually in most countries, but that in 'exceptional' years the loss of life is greater. In developed countries, however, there is a long-term trend towards declining loss of life but an exponential increase in the cost of damage and loss from disaster impacts, while developing countries with a rapid growth rate seem particularly at risk in both loss of life and costs associated with disaster (Burton et al).

Determining the 'Mix'

Clearly, the 'mix' of prevention and preparedness elements appropriate to a counter-disaster strategy must be determined in relation to the relevant factors. In general, however:

- a. the main prevention effort should be directed against high-risk or specific-to-locality hazards, especially those with potentially-high economic or social costs;
- b. preparedness efforts should be directed mainly towards:
 - (1) support of prevention measures;
 - (2) larger-scale and less high-risk hazards, and
 - (3) maximising administrative capability for coping with disasters and their effects.

All factors should be regularly monitored to ensure that changes can be reflected appropriately in the 'mix'.

Priorities for the Future

To enable proper analysis of the relevant factors, there is a need, in particular, for research into:

- a. high-risk hazards, particularly those associated with demographic trends and imbalances, transportation and technological development;
- b. the economic and social cost of disasters, and
- c. cost-benefit analysis of the relationship between prevention and preparedness measures in coping with particular types of hazard.

Ultimately, the aim must be to develop the prepared community, as it is communities which are at risk and which must be given the capability to cope with disaster. However, it is generally only government at the national level which can command the resources (financial, physical and administrative) to give proper effect to any strategy for coping with disaster.

Macedon
December 1980

ESCAP/WMO

Typhoon Committee

Thirteenth session

2 - 8 December 1980

Bangkok

Seminar on Technology for Disaster Prevention

(October - December, 1980)

2. Participants

Participants to this seminar were nominated by their government, and were university graduates or those who possess equivalent technical qualifications in this field. Furthermore, they were those who have an academic background in disaster prevention or those having actual experience of more than seven years regarding disaster prevention.

December 2, 1980

3. Institutions

The Government of Japan

This technical seminar is executed by National Research Center for Disaster Prevention, government research institute belonging to Science and Technology Agency.

Financial arrangements for this seminar were administered by Japan International Cooperation Agency (referred to as JICA).

1. Introduction

The seminar on Technology for Disaster Prevention in fiscal 1980 is conducted by the Government of Japan as part of its Technical Cooperation Programmes for developing countries with a view to contributing to upgrading of their techniques in this field, and thus to promoting friendly relations between them and Japan.

The purpose of this seminar are introduce beneficial knowledge on disaster prevention from viewpoints of recent science and technology to participants, to exchange their idea and information with each other, through lectures, discussions and observation tours, and to contribute to improve the disaster prevention systems in their own countries.

2. Participants

Participants to this seminar were nominated by their government, and were university graduates or those who possess equivalent technical qualifications in this field. Furthermore, They were those who have an academic background in disaster prevention or those haning actural experience of more than seven years regarding disaster prevention.

3. Institutions

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- 2 -

4. Preparation for Participating in the Seminar

Every participant was requested to take the below materials with him.

- (1) The documents or papers which explain the existing technical regulation or standards of disaster prevention in his country (for example, building code).
- (2) The flow chart or equivalent clear description about the operational system for disaster prevention in his country.
- (3) The data or statistics which show problems of disaster prevention in his country (for example, the technical report on the past flood).

5. Duration

From October 2, 1980 to December 16, 1980

6. Seminar Programme

The Seminar consists of lecture sessions, field trip and final report presentation.

The lecture sessions contain four sessions.

Session 1 : Disaster prevention legislation

Session 2 : Disaster induced by meteorological events, especially heavy rain fall

Session 3 : Disaster by earthquake and volcano

Session 4 : Advanced study

Session 5 : Fire, community preparedness and others

At the end of each session, every participant has to express some comments on the situation of his own country and his opinion related to the session. He presents a final report on proposals for improvement of disaster prevention systems in his own country.

- 3 -

He is requested to bring adequate materials and data such as technical regulation of disaster prevention, disaster prevention planning, records and statistics of disaster in his own country.

ANNEX I

Seminar on Technology for Disaster Prevention

Year	1977	1978	1979	1980
Period	Oct.27 - Dec.19	Oct.26 - Dec.18	Oct.4 - Dec.14	Oct.2 - Dec.16
Number	7	9	10	9
Country	Honduras, Iran, Iraq, Indonesia, (2), Peru, Turkey,	Bangladesh, Philippin- es,Chile, Indonesia (2), Iraq, Malaysia, Nepal, Pakistan	Bangladesh, Honduras, Indonesia, Iraq, Iran, Nepal, Pakistan, Peru, Philippin- es, Thailand,	Bangladesh (2), India Indonesia, Egypt, Pakistan, Chile(2), Peru,

ANNEX II

Themes of scientific and technological lectures in the seminar

1. Current state of R&D activities on disaster prevention
2. The River Law and the Flood River Law
3. Study on heavy rainfall
4. Flood disaster
5. Relation between disaster and natural geographical condition
6. Nature of cloud
7. Meteorological monitoring method making use of radar
8. Land development and disaster prevention
9. Flood forecasting and disaster prevention
10. Landslides
11. Weathered Materials related to mass movements
12. Volcano
13. Earthquake prediction
14. Earthquake disaster
15. Earthquake prevention
16. Relation between disasters and human aspects
17. Community disaster preparedness
18. Remote Sensing technology
19. Fire damage and fire-extinguish
20. Urban development plan
21. The highest flood tide and storm-wave
22. Snowfall and study on the development of techniques for preventing snow damages related to the snowy life
23. Activities of Red Cross Societies (RCS)
24. relief activities, rescue, and repair

The seminar is annually held at NRCDP (National Research Center for Disaster Prevention). Please send requests to receive more detail informations to

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National Research Center for
Disaster Prevention,
Tennodai, Sakura-mura,
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305 Japan