



UNITED NATIONS ECONOMIC AND SOCIAL COMMISSION

FOR ASIA AND THE PACIFIC

AND

WORLD METEOROLOGICAL ORGANIZATION

REPORT OF THE TYPHOON COMMITTEE

ON ITS ELEVENTH SESSION

**Bangkok, Thailand
3 - 9 October 1978**



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FOR PARTICIPANTS ONLY

WRD/TC.11/9
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ORIGINAL: ENGLISH

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I. ORGANIZATION OF THE SESSION

1. The eleventh session of the Typhoon Committee was held at Bangkok from 3 to 9 October 1978.

Attendance

2. The session was attended by representatives of China, Hong Kong, Japan, Malaysia, the Philippines, the Republic of Korea and Thailand and by observers from France, the Federal Republic of Germany, the Union of Soviet Socialist Republics, the United States of America and Viet Nam. Observers representing the Office of the United Nations Disaster Relief Co-ordinator (UNDRO), the United Nations Development Programme (UNDP), the United Nations Environment Programme (UNEP), the International Civil Aviation Organization (ICAO), the League of Red Cross Societies (LRCS), the Committee for Co-ordination of Investigations of the Lower Mekong Basin, and the Technical Support Unit of the WMO/ESCAP Panel on Tropical Cyclones were also present.

Opening addresses

3. Opening addresses were made by the Executive Secretary of ESCAP and the representative of the Secretary-General of WMO.
4. The Executive Secretary warmly welcomed the participants and in particular the representative of China and the observer from Viet Nam, who were participating in a session of the Committee for the first time. He stressed the importance of the session because of its two major tasks - to decide the future direction and long-term programme of the Committee, based on the recommendations of the Typhoon Committee review mission, and support for the Committee's programme, particularly after 1979. The second was a difficult task but had to be faced and discussed frankly. He concluded by pledging the full support of ESCAP to the Committee.
5. In his statement, the Secretary-General of WMO paid a tribute to the members of the review mission team for the work they had performed and pointed out that the results of the mission constituted the most important topic for discussion at the eleventh session. The question of future support for the Committee's programme was one of very real concern to WMO and he urged the Committee to take the essential decisions which would enable it to begin its second decade of activity from a position of strength. Reviewing briefly

/the preparations

the preparations in hand to draw up an enlarged WMO programme on tropical cyclones for the period 1980-1983, he invited members of the Typhoon Committee to make proposals for new activities.

6. The representative of China thanked the Executive Secretary of ESCAP and the representative of the Secretary-General of WMO for their kind words of welcome. He said that great progress had been achieved by his country in its meteorological services which gave first priority to serving agriculture. However, while adopting many measures to cope with floods and disasters associated with typhoons, the meteorological and hydrological services could not fully meet the increasing needs arising from development. Expressing the willingness of China to learn from and increase co-operation with members, he concluded with the hope that his country could promote mutual understanding and friendship through the session.

Election of officers

7. Mr. G.J. Bell (Hong Kong) was elected Chairman of the Committee for 1978/1979; Mr. P. Markandan (Malaysia) was elected Vice-Chairman; and Mr. R.L. Kintanar (Philippines) was elected Chairman of the Drafting Committee.

Agenda

8. The Committee adopted the following agenda:
 1. Opening of the session
 2. Election of Chairman and Vice-Chairman
 3. Adoption of the agenda
 4. The Committee's activities during 1978
 - (a) Meteorological component
 - (b) Hydrological component
 - (c) Disaster prevention and preparedness
 - (d) Training
 - (e) Research
 5. Consideration of the report of the Typhoon Committee review mission
 6. Long-term plan of action of the Committee

7. Support for the Committee's programme
8. Programme for 1979
9. Co-ordination with the WMO tropical cyclone project and regional programme
10. Consideration of the agenda for the next session of the Committee
11. Date and place of meeting of the twelfth session
12. Scientific lectures
13. Adoption of the report

II. THE COMMITTEE'S ACTIVITIES DURING 1978

(WRD/TC.11/1)

9. The Committee reviewed the progress made in implementing its programme during 1978. Specific mention was made of new observing and telecommunication facilities, services of a consultant on disaster prevention and preparedness, and of joint collaboration in research activities. The Committee was also informed of further progress made in the expansion of flood forecasting systems.
10. The observer from Viet Nam informed the Committee that typhoons and floods were yearly threats to the crops, economic activities and livelihood of the Vietnamese nation. Viet Nam desired to learn and apply the rich experience of the Committee members, and sought their co-operation and assistance.

A. IMPROVEMENT OF METEOROLOGICAL FACILITIES

11. The Committee noted with satisfaction that a wind-finding radar donated by the United States under WMO/Voluntary Assistance Programme (VAP) had been installed at Davao (Philippines) and commenced OoZ observations in March 1978. The Committee welcomed the information that, with the provision of hydrogen generators at all RS/RW stations, interruptions associated with shortage of that gas would soon be overcome.
12. In Malaysia, two additional 10-cm radars were expected to be installed at Penang by the end of 1978 and at Kluang in 1979. Ten-cm radars were also expected to be installed at Tanay (near Manila, Philippines) in 1979 and at Cheju (Republic of Korea) in 1980. A detailed survey of the

proposed site for Cheju radar on the top of a hill (1950 metres) was made by the telecommunication and electronics expert of the Committee secretariat.

13. Some members continued to experience difficulties in the proper calibration and maintenance of weather radars. The secretariat had made a review of the requirements for radar test equipment and spare parts, and the possibility of assistance from external sources was under consideration. Test equipment costing \$14,000 was being provided to Malaysia from the UNDP project fund.

14. The Committee noted with satisfaction that five Soviet research vessels had been operating in the western Pacific since June 1978. Surface and upper-air observations from those ships were received by Japan and retransmitted over the Global Telecommunication System (GTS). Two officers from the Philippines were invited to sail on board Soviet vessels for familiarization with the programme of observations and data analysis. The Committee recorded its appreciation to the Soviet authorities for that valuable assistance and expressed the hope that the USSR would make available the result of its studies on typhoons, if possible in English. The Committee was further informed that the USSR would continue a similar programme in future years and would welcome any form of participation in them by any member of the Committee.

15. The Committee was pleased to learn that the Tokyo-Peking point-to-point circuit (75 band) began regular operation in December 1977. The operation of the Bangkok-Hong Kong point-to-point satellite circuit had begun in April 1978 and had resulted in considerable improvement in the exchange of data between the two centres. A direct satellite link between Bangkok and Tokyo would be established in 1979.

16. The Committee was informed that, in connexion with the monitoring of national data collection, the secretariat continued to receive quarterly statistics from the Philippines, the Republic of Korea, Malaysia and Thailand. Updated results of analysis of those statistics had been circulated to the members concerned.

17. Consideration had been given to further steps to improve national data collection in the Philippines. Communication tests with new antenna systems installed at Daet and Legaspi in March 1978 and the use of low-frequency bands were found satisfactory by day and at night. Installation or modification of antennae at other stations was under consideration.

18. The Committee examined the priority list established at its tenth session and revised it as follows:

Observing facilities

(i) Upper-air stations

98223	Laoag (Philippines))	
)	12 GMT RS/RW-National projects
98645	Cebu (Philippines))	

(ii) Weather radar

Cheju (Republic of Korea))	
Tanay (near Manila, Philippines))	National projects
Penang (Malaysia))	
Kluang (Malaysia))	

(iii) Satellite receiving equipment
(GMS/TIROS-N satellite)

Seoul, Hong Kong, Manila)	
)	National projects
Bangkok, Kuala Lumpur)	

(iv) Ocean weather station

Ship at 16°N, 135°E (offered by the USSR)

Telecommunication facilities

(i) Improvement of national data collection facilities

Lao People's Democratic Republic)	
Philippines)	National/
Thailand (night-time reception))	bilateral projects

(ii) Regional telecommunication links

Bangkok-Phnom Penh)	
)	
Bangkok-Hanoi)	National projects
Bangkok-Tokyo (1979))	

(iii) Other telecommunication facilities

Thailand - Strengthening of Regional Telecommunication Hub (RTH)
Bangkok

- National/bilateral project

Typhoon forecasting techniques

19. The Committee noted with satisfaction that the preparation of a manual for the prediction of the intensity and movement of tropical cyclones, undertaken by the United States with the collaboration of Hong Kong, India, Japan and the secretariat under a sub-project of the WMO tropical cyclone project, was almost completed. The final text of the manual was expected to be ready for printing before the end of 1978.

Exchange of radar fixes

20. Radar fix messages continued to be exchanged between members as in previous years. The Committee urged members to ensure the regular and prompt exchange of radar messages.

Meteorological satellites

21. The Committee noted with appreciation that the Japanese Geostationary Meteorological Satellite (GMS) became fully operational in April 1978. Cloud pictures and nephanalysis charts were disseminated by Japan Meteorological Agency (JMA) facsimile broadcast, and wind vector data and sea-surface temperature are transmitted over GTS. The Committee recorded its appreciation to the Government of Japan for the valuable information being provided through GMS.

22. The Committee was informed of members' plans for procurement of satellite-receiving equipment for high-resolution cloud imagery and other data from GMS and TIROS-N satellites. It noted that Thailand had received new APT equipment (LR Fax) from the United States for reception from TIROS-N satellites and that Hong Kong had assembled a system to receive LR-Fax from TIROS-N satellites, mainly with locally-produced material. JMA had a plan to send an expert on satellite data collection systems and WEFAX reception for field service in Thailand, Singapore, Malaysia, the Philippines and Indonesia for six weeks after November 1978. The final decision on that matter would be reached after the conclusion of the WMO/United Nations seminar on the interpretation, analysis and use of meteorological satellite data (RA II/V) to be held at Tokyo from 23 October to 2 November 1978.

Aircraft reconnaissance

23. The Committee noted with appreciation that United States reconnaissance flights over the western Pacific continued to provide valuable data for typhoon warning services. The representative of the United States said that such reconnaissance flights were likely to be continued in the years ahead.

The First GARP (Global Atmospheric Research Programme) Global Experiment (FGGE)

24. Regarding additional observations requested for the Monsoon Experiment (MONEX) in Malaysia and the Philippines, the Committee was informed that an RS/RW station at Tawau in Malaysia and 12 GMT RS/RW observations at Laoag, Mactan and Zamboanga and 12 GMT observation at Davao and Puerto Princesa in the Philippines would be implemented before December 1978.

Establishment of ocean buoys at strategic locations

25. The Committee was informed that in pursuance of the recommendation made at the tenth session, the possibility had been explored of establishing ocean buoys at strategic locations, such as the data-sparse and typhoon-prone area to the east of the Philippines, as a project of the Typhoon Committee. While the Philippines had agreed to provide supporting facilities, the question was raised whether the operation of ocean buoys would be appropriate for a joint undertaking by the Committee. The representative of the Philippines stated that his country would consider the possibility of establishing ocean buoys as part of its national programme, and that any assistance from external sources would be welcome.

B. HYDROLOGICAL COMPONENT

26. The Committee noted that efforts were being made by the government officials concerned to improve the flood forecasting system for the Han River basin in the Republic of Korea, based on the recommendations contained in the comprehensive report prepared by the fifth survey team from Japan which visited the Republic of Korea in 1977. The Committee was informed that in the Nagdong River basin an automatic flood forecasting network was set up in September 1978 for the Andong Dam area and the basin-wide flood forecasting system was scheduled to be established during 1979 to 1981. In the Geum River basin, a telemetering network under construction upstream of Dae Chung Dam was scheduled to be completed in 1979 and was planned to be enlarged to cover the whole basin in 1981. In the Yeong San River basin a similar system was expected to be installed during 1982 to 1985.

27. The Committee noted with concern that, although the need for a second survey of the establishment of a pilot flood forecasting system in the Se Bang Hien River basin in the Lao People's Democratic Republic was evident, no progress had been made in that regard in the absence of any response from the Government.

28. The Committee was informed that the Government of Malaysia had requested technical assistance from Japan for the establishment of flood forecasting systems in the Kinabatangan River basin of Sabah and the Sadong River basin of Sarawak, and that the data relating to past major floods in those two river basins had been forwarded to Japan for preliminary study. The hope was expressed that the Government of Japan could organize a survey team during 1978.

29. The Committee was informed that the pilot flood forecasting system in the Pampanga River basin had continued to work satisfactorily during 1978. It noted with appreciation that a hydrological data book prepared by Mr. T. Takenouchi under the sponsorship of the Japan International Co-operation Agency had been forwarded to the Government of the Philippines in May 1978.

30. In connexion with the establishment of flood forecasting systems in the Agno, Bicol and Cagayan river basins, the Committee was informed that the Philippines had started implementation of those projects in September 1978 with the assistance of a loan from Japan. Large-scale expansion of flood forecasting activities in the Philippines required a strengthening of the flood forecasting organization. A hydrologist was therefore trained in Japan for five months (November 1977-April 1978); the Philippines Atmospheric, Geophysical and Astronomical Services Administration (PAGASA) had started recruiting additional staff to be assigned to the Flood Forecasting Office and its subcentres; a Japanese telecommunication expert was sent to PAGASA in August 1978 for a period of two years to train personnel.

31. The equipment required for the establishment of a hydrometeorological telemetry network in the Pasig-Marikina-Laguna de Bay basin in the Philippines had been purchased and it was expected that installation would be completed shortly.

32. The Committee noted with interest the progress in the establishment of the pilot flood forecasting system in the MaeKlong River basin in Thailand. The plan, including the design of the telecommunication network, had been finalized by the second survey team from Japan as a result of the field survey in November to December 1977. A Japanese mission visited Bangkok in June 1978 to discuss the report and follow-up action. The final report was expected to be formally submitted to the Government of Thailand soon. The Committee expressed the hope that the implementation of the MaeKlong project could be started as early as possible.

33. The Committee expressed its appreciation to the Government of Japan for the extensive assistance which it had provided to members under that component of its programme.

C. DISASTER PREVENTION AND PREPAREDNESS

34. The Committee was informed of developments during 1978 as summarized below.

Philippines

35. The PAGASA-OCD broadcast station, dedicated to weather and allied information, continued to function satisfactorily. The Emergency Broadcast System (EBS), which was tested in the Manila area in 1977, was being extended to four other regional cities. EBS was tested at Cebu City in April 1978, when nine radio stations and three television stations participated.

36. The Philippines' proposal to set up a centre for training and research in disaster prevention at Manila in co-operation with United Nations agencies, about which some information was given at the tenth session, was reported to be still under consideration.

Republic of Korea

37. The Ministry of Construction published a pamphlet on "Policies for disaster prevention" in May 1978. It gave the latest information on organization for disaster prevention, statistics of recent damage, current status and plans for flood forecasting and warning, communication facilities for disaster prevention etc. in the Republic of Korea.

Japan

38. In 1978 a radio telephone circuit had been established linking the ministries concerned with disaster prevention activities.

Guidelines for Disaster Prevention and Preparedness in Tropical Cyclone Areas

39. While the English version of the Guidelines had been distributed in 1977, French and Spanish versions became available during 1978. In accordance with the recommendation made at the tenth session, arrangements were made to supply the requisite number of additional copies of the Guidelines to members for distribution among the agencies concerned.

/Consultant

Consultant services in disaster prevention and preparedness

40. In pursuance of the offer made by LRCS at the tenth session, a consultant was made available to the secretariat for two months (February-April 1978) to review disaster plans in Malaysia and the Philippines. The consultant visited Manila and several places in Malaysia (Kuala Lumpur, Kelantan, Trengganu, Pahang, Sarawak and Sabah). A comprehensive report prepared by the consultant was furnished to the agencies concerned in both countries. The report contained some remarks and recommendations for consideration by those concerned.

41. The Committee considered that the comprehensive report provided information and recommendations of considerable value to Malaysia and the Philippines. The Committee wished to place on record its appreciation to LRCS for providing the services of the consultant.

D. TRAINING

42. The Committee noted with appreciation that, in pursuance of the offer made at the tenth session, the Government of Japan organized group training courses in river engineering for four months from 3 August to 4 December 1978 and another course in meteorology, with special emphasis on the use of satellite data, for four months from 28 September 1978 to 27 January 1979. The representative of Japan informed the Committee that his Government would organize training courses in river engineering and in meteorology (radar operation and maintenance) in 1979. For the course in meteorology, trainees should be electronic technicians.

43. With reference to the assistance offered by France at the tenth session, the Committee was informed that the Republic of Korea had nominated a fellow for training in satellite meteorology in France for six months commencing May 1978. Malaysia reported that one officer was attending a similar training course in France under a French Government fellowship. Malaysia also had sent two trainees to Hong Kong for training in computer programming. The Committee was further informed that the possibility of sending one or two technicians from Thailand to Hong Kong for training in the operation of the automatic switching system was under consideration.

44. The Committee noted with interest that a WMO/United Nations Regional Training Seminar on the Interpretation, Analysis and Use of Meteorological

/Satellite

Satellite Data would be held at Tokyo from 23 October to 2 November 1978 for the benefit of WMO members in Regions II (Asia) and V (South-west Pacific).

45. The representative of WMO informed the Committee that the WMO Executive Committee had allocated funds for a roving seminar on "Intense precipitation and floods" to visit six countries in WMO Regions II (Asia) and V (South-west Pacific), including two members of the Typhoon Committee, during the period October 1978-March 1979.

46. The Committee noted with satisfaction that Japan was organizing a Training Seminar in Technology for Disaster Prevention at Tokyo from 26 October to 18 December 1978, for which most members of the Typhoon Committee had been invited to send nominations. The seminar was being organized by Japan as part of its technical co-operation programmes for developing countries. It was recalled that a similar seminar was held at Tokyo from 27 October to 12 December 1977.

47. The Committee was informed that China would provide host facilities for a second UNDP/WMO training seminar on flood forecasting at Nanking commencing on 27 October 1978. The representative of China indicated that applications could be considered for participation in a similar seminar likely to be organized in 1980 with UNDP/UNESCO assistance.

48. The Committee noted with satisfaction that the telecommunication and electronics expert of the secretariat had provided on-the-job training in radar calibration and maintenance to technicians at Kuala Lumpur, Bangkok and Seoul.

49. The representative of the Soviet Union expressed his country's readiness to expand assistance through VAP in long-term training in different branches of hydrometeorology, including post-graduate courses for a master's degree and training for technicians and observers. The representative of the Federal Republic of Germany informed the Committee that, during 1977 and 1978, three members from the Philippines and one member from the Thai Meteorological Service received training in his country. He assured the Committee of further support for its activities within the framework of international co-operation.

/E. RESEARCH

E. RESEARCH

50. The Committee noted with satisfaction that the Royal Observatory, Hong Kong, continued to produce objective forecasts of typhoon tracks by computer programming of selected techniques and that those forecasts were disseminated to members for operational use.

51. The Committee was informed that the Barotropic model for typhoon track forecasting developed in the Philippines had been modified since its initial application. The model covered a wider area (28° S - 44° N; 92° E - 180° E) and would be tested on a real time basis during the 1978 and 1979 typhoon seasons. A technical report would be made available after the tests.

52. Regarding the typhoon moderation programme in the Philippines, the Committee was informed that steps were being taken to conduct technical studies in co-operation with some experts from the United States. PAGASA was also negotiating the purchase of a fully instrumented aircraft for the study of cloud physics. In response to a query regarding the date when actual moderation experiments might be expected to be undertaken, the representative of the Philippines indicated that current study was of a preparatory nature which might later include trial reconnaissance flights into typhoons. However, he assured members that they would be informed prior to actual seeding experiments.

53. Mr. P.C. Chin (Hong Kong), acting as co-ordinator for the joint study on tropical cyclone prediction by objective techniques, presented a progress report. The scheme for the joint study was circulated to the research correspondents for implementation in 1978. The region of investigation was taken to be from 5° N to 45° N and from 100° E to 160° E. The Japan Meteorological Agency had commenced supplying typhoon tracks to the co-ordinator for finalizing the common best tracks. The verification results prepared by the Republic of Korea, the Philippines, Thailand and Japan had been summarized. Detailed statistical analysis would be undertaken when more objective forecasts became available.

54. Extracts were presented from a progress report prepared by Mr. Miyazaki (Japan), co-ordinator for the joint study on storm surges. In the Philippines, an attempt had been made to apply to selected coastal

basins Jelesniaski's dynamical storm surge model for the prediction of storm surge. A technical report had been prepared by PAGASA, which was expected to be printed in the near future. In Hong Kong, a combination of the Observatory Bay model and the "SPLASH" open coast model for investigation of storm surges had been applied to derive heights of sea flooding for various return periods for the design of several major coastal structures.

55. The Committee was informed that a pilot study of flood risk mapping for the Pampanga River Basin had been undertaken in the Philippines. In that connexion, relevant data for past floods in the Pampanga basin had been collected. The Committee noted that WMO had requested UNEP funding to implement pilot projects in selected river basins in all interested countries in the ESCAP region. The Committee urged UNEP to arrange for early approval of that request.

56. The representative of the Soviet Union informed the Committee that numerical modelling and numerical forecasting of typhoons was being developed in a number of research centres in the USSR. Special investigations in the western Pacific had been undertaken under the "Typhoon" programme, and in that connexion four or five research vessels operated during typhoon seasons. Such investigations would also be carried out in the future. The main objective of the investigations concerned the typhoon structure and its interaction with the ocean. The scientific results so far obtained were available in various journals. A list of those publications would be prepared in English so that interested members of the Committee could find appropriate references.

57. The attention of the Committee was invited to the report of an informal meeting of experts on the WMO programme of research in tropical meteorology, held at Geneva from 14 to 18 August 1978, which included a number of items of interest to members.

58. The Committee noted that China and Japan had expressed an interest in the possibility of providing host facilities for a symposium on typhoons in 1980 or 1981. It requested WMO, with the assistance of the Committee secretariat, to explore that possibility in consultation with the countries concerned.

/III.

III. CONSIDERATION OF THE REPORT OF THE TYPHOON COMMITTEE
REVIEW MISSION

(WRD/TC.11/2, WRD/TC.11/3, WRD/TC.11/4, WRD/TC.11/5)

59. The report of the Typhoon Committee review mission was introduced by the leader of the mission and its conclusions and recommendations explained. He expressed regret at the omission of any reference in the report to the excellent work rendered by the other members of the Typhoon Committee secretariat (WRD/TC.11/2, para. 25).

60. A member of the mission supplemented the introductory remarks of the leader by summarizing the hydrological component and explaining the rationale for the recommendations under that component. The comments on the report of ESCAP/WMO and those of UNDRO/LRCS were explained.

61. After noting the introductory remarks on the report and the comments of the organizations mentioned above, the Committee congratulated the mission for its excellent work. In general, the recommendations of the report were accepted and the following specific points were made.

62. The representative of China said that his Government was glad to have been able to hold talks with the mission members to whom the need for friendly co-operation among Committee members through exchange visits, seminars and study tours had been expressed. In addition, the possibility of carrying out joint experiments on typhoons was under study and further details would be supplied when facilities became available.

63. The departments concerned in Hong Kong were still studying the mission report and, though no official views had been reached, in general it shared the views of the mission and in particular the recommendation that the scope of the work and functions of the Committee secretariat should not be diminished. The problem of land slips referred to in the report was already being intensively studied. Hong Kong was also prepared to share its expertise in the field of disaster preparedness.

64. Similarly, the representative of Japan did not wish to see any diminution in the work of the secretariat. His Government fully supported the need to give high priority to the procurement and installation of the radar sets recommended in the mission report (WRD/TC.11/2, para. 30). It suggested the addition of training in the use of data from weather satellites or in weather forecasting techniques by visits of lecturers to each member. It was

/prepared

prepared to support the study and execution of works for the establishment of pilot areas for comprehensive flood loss prevention and management in basins of economic and social importance to the members.

65. The representative of Malaysia emphasized the need for training in meteorology.

66. The representative of the Philippines was pleased to note that in addition to the recommendations to the Committee, the mission had made specific recommendations concerning each country. He stated that PAGASA would implement the relevant recommendations pertaining to his organization, and the Ministry of Human Settlements was already carrying out some of the recommendations addressed to it. Referring to paragraphs 455 to 457 of the review mission's report, he reported that a few weeks previously the Minister of Public Works, Transportation and Communications of the Philippines had issued a directive to defer action on all flood control projects until a review of the flood control programme had been carried out.

67. The representative of the Republic of Korea joined the members expressing their satisfaction with the mission report but had no specific comments to offer.

68. The representative of Thailand said that in response to the recommendations of the mission, his Government was taking steps to remedy difficulties in the collection of meteorological observations at night.

69. The representative of UNDP expressed the view that the mission report was an excellent one as it provided comprehensive information on the current situation as well as on the various problems the members of the Committee were facing. He suggested, however, that the WMO note of caution about including flood control as part of the Committee's work be taken seriously as flood control was a very big problem requiring heavy capital investment for its solution and involving a large number of ministries in the process.

70. A few corrections to the material contained in the report were submitted.

71. The Committee expressed its thanks to the Governments of Japan and the United States and to ESCAP, WMO, UNDRO and LRCS for their valuable assistance which had made it possible to organize the mission.

72. The Chairman concluded the discussion on the mission report by congratulating and thanking the mission for its excellent work.

/IV.

IV. LONG-TERM PLAN OF ACTION OF THE COMMITTEE

(WRD/TC.11/2, WRD/TC.11/3, WRD/TC.11/4, WRD/TC.11/5)

73. The Committee endorsed the general lines of the long-term programme proposed by the review mission as a suitable framework for the Committee's future activities. It was agreed, however, that with the assistance of the secretariat, the Committee should progressively formulate a more detailed programme for both the short- and long-term programmes and that in so doing priorities might be indicated to the extent possible.

74. As suggested in document WRD/TC.11/3 by the WMO and ESCAP secretariats, the Committee added the following items under the meteorological component of the long-term programme:

(a) Review, monitoring and improvement, as required, of the system for the dissemination of typhoon and flood warnings;

(b) Studies directed towards development of improved storm surge prediction methods and consequent reduction of damage.

75. In regard to the suggestion put forward by China for typhoon experiments in the western Pacific on a scale equivalent to the current Monsoon Experiment, the representative of Japan expressed the view that such typhoon experiments were desirable provided they did not include modification experiments. Japan proposed that:

(a) WMO should be requested to prepare a plan for typhoon experiments in the western Pacific within the framework of the Committee's programme and as a sub-project of the WMO tropical cyclone project;

(b) The planning of the experiments should be funded by WMO;

(c) An informal planning meeting to prepare the plan should be held in 1979;

(d) A meeting of experts should be held to discuss the scientific and technical aspects of the experiments;

(e) An observation centre for the experiments should be established in Canton, Manila or Okinawa.

76. The Committee supported those proposals and requested WMO to take early action to investigate how they might be implemented in close consultation with the members concerned.

/77.

77. To increase co-operation and exchange of experience, the representative of China suggested that the following activities should be organized:

(a) A symposium in China on typhoon forecasting during 1979 or 1980;

(b) Visits of study groups.

A training seminar in China on hydrology for members of the Committee was under consideration.

78. The review mission's recommendation for a comprehensive approach to the subject of flood control led to a detailed consideration of the extent to which the Committee should become involved in the structural and non-structural aspects of flood loss prevention and management. While recognizing that the principal objective of the Typhoon Committee was to minimize typhoon damage, the major part of which was caused by floods, it was considered that it would be unrealistic for the Committee to assume responsibility for advising members on all measures necessary for nation-wide flood control programmes. However, the Committee agreed to undertake preparation of comprehensive plans for flood loss prevention and management in pilot areas vulnerable to heavy flood damage on the understanding that implementation of only selected aspects of the comprehensive plan by stages would be considered.

79. The Committee decided to give increased attention to nonstructural techniques for mitigation of flood damage (flood forecasting, flood plain management, vulnerability studies, watershed management etc.). The enormous financial implications involved in structural flood control measures and the limited resources of the Committee were also taken into account in arriving at that decision. In view of those considerations, the title "Flood control component" proposed for the long-term plan was changed to "Hydrological component (including flood loss prevention and management)".

80. In considering the scope of disaster preparedness activities, the representative of UNDRO pointed out that typhoons were only one cause of disasters, and as such the Committee's work in that field should be carefully co-ordinated with other work being done, nationally and regionally, on over-all disaster preparedness.

81. In regard to the title "Disaster preparedness and relief component" in the long-term and short-term programme, the Committee considered that relief aspects were beyond the scope of the Committee's activities and the title was changed to "Disaster preparedness component"; the disaster prevention aspects being already included under the hydrological component.

/82.

82. The long-term and short-term programmes were revised on the basis of the above considerations. The revised texts, as agreed by the Committee, are given in annexes I and II.

V. SUPPORT FOR THE COMMITTEE'S PROGRAMME
(WRD/TC.11/6)

83. The representative of UNDP stated that his organization recognized that the Committee's programme of activities was one of the more successful projects with which UNDP had been associated. It had elements of technical co-operation among developing countries (TCDC) as evidenced by the contribution of the Government of the Philippines, which was more than pure provision of host facilities, and by the training facilities provided by members. The active participation of the People's Republic of China would also bring a welcome new dimension to the programme. More than anything else, UNDP shared with members of the Committee their grave concern for the loss of human lives and the damage caused to their economies by typhoons. For those reasons he advised the Committee that, while the current project (which included support for the posts of chief technical adviser and telecommunication/electronics expert) would end in December 1979, UNDP would be prepared to consider support for selected activities for the biennium 1980-1981, which was the end of the current programming period for UNDP, provided the participating Governments progressively increased their inputs to the project.

84. Members stressed that they were allocating substantial resources to activities sponsored by or resulting from the Committee and its work, and that, while those activities were largely of a national nature, they were in a number of cases mutually supporting. In any case, the substantial investments being made in pursuit of objectives agreed by the Committee made it more difficult to obtain additional government funds for the international component. For that reason also it was unlikely that firm allocations could be made from indicative planning figures (IPFs).

85. The Committee agreed that there should be continuing endeavours to meet requirements from their own resources and, in spite of the difficulties involved, reaffirmed the view that there should be no diminution in the scope and volume of activities carried out. In that connexion, the Committee recalled with appreciation statements expressing support for its activities which had been

/made

made by representatives of the Soviet Union, the United States, the Federal Republic of Germany, UNEP, UNDRO and UNDP, as well as by its own members.

86. The Committee therefore agreed that planning for 1980-1981 should be based on the availability of:

- (a) A co-ordinator or manager who might also act as a technical adviser in his field of specialization;
- (b) A telecommunication/electronics expert;
- (c) A hydrologist;
- (d) A meteorologist;
- (e) A flood control expert;
- (f) A disaster preparedness expert, probably on short-term assignments.

87. With regard to sources of support, the Committee agreed that parallel with increased efforts by members to provide expert services for the technical secretariat, a project proposal should be prepared by WMO and ESCAP for submission to UNDP, on the following basis:

- (a) The members of the Committee would provide the personnel services under (a), (c), (d) and (e) above;
- (b) UNDP should be requested to provide requirements under (b) and (f), the latter in co-operation with UNDRO and LRCS;
- (c) UNDP should be requested to meet costs associated with the provision of personnel by members, other than salaries and related costs which would be continued by the respective countries within the framework of TCDC;
- (d) UNDP and UNDRO should be requested to meet the cost of selected activities in the training field;
- (e) UNDP should be requested to provide the cost of selected items of equipment such as those associated with inter-country transmission of data and information.

88. The Committee noted with appreciation the statement by the representative of the Philippines that his Government would consider providing the services of a co-ordinator/manager for an initial two-year period (1980-1981) and, if necessary, the services of a meteorologist, on the understanding that

/costs

costs associated with travel would in both cases be met from other sources. It also noted with appreciation the statement by the representative of Japan that his country would consider providing the services of a hydrologist, including travel costs, for the same period.

89. With regard to the expert in disaster preparedness, the Committee noted the view of the representative of UNDRO that work sponsored by the Committee in that area should as far as possible be carried out in the broader context of national planning to reduce damage associated with disasters of all types. Having regard to the fact that the organizations participating in the work of the Committee frequently had the principal responsibility for warnings associated with most types of natural disaster, and that in any case disasters associated with typhoons and floods caused the greatest over-all damage on a continuing basis in the Typhoon Committee area, it was agreed that consideration should be given to the assignment of a specialist in disaster preparedness in the broader sense, who would be expected to devote much of his time to matters of direct concern to the Committee. Furthermore, it was agreed that if, as seemed likely, such services were needed only on a part-time basis, it would be appropriate to seek the assignment of a full-time specialist whose services could be shared with the members of the WMO/ESCAP Panel on Tropical Cyclones.

90. Having regard to the importance of the work of the Committee for the WMO tropical cyclone project, WMO was requested to take appropriate action on the Committee's view that increased support for its expanded activities, including the proposed typhoon experiment, should form part of the plan for an enlarged WMO tropical cyclone programme in the period 1980-1983 to be submitted to the Eighth World Meteorological Congress. Such support should include the provision of a meteorological adviser for at least two years (1980-1981) as well as items of special importance to ensure that the typhoon warning system in its area operated at maximum efficiency, and the provision of training for staff involved in the operation of that system.

91. The Committee also requested the ESCAP secretariat to use its best endeavours to obtain additional support in order to meet the Committee's objective of enlarging its activities, as set out in its short- and long-term programmes. For instance, reference was made to the possible value of a revolving fund through which countries could obtain urgently needed items of equipment. That could supplement the fund operating within WMO/VAP.

92. It was noted with appreciation that UNEP was prepared to give careful consideration to any request from the Committee for support, including the provision of short-term consultants in disaster prevention and mitigation, preparedness planning, training and research, information and, in particular, environmental effects of typhoon experiments. The Committee also welcomed the information that UNEP would consider providing travel support for attendance at meetings of short duration that related the environment to typhoons.

93. The representative of UNDP welcomed the decision of the Committee regarding planning of activities for 1980-1981 as it represented a genuine and commendable example of TCDC, support for which UNDP would be happy to consider.

94. The Committee expressed its warm appreciation to the representative of UNDP for his valuable advice and guidance which had greatly assisted the Committee in resolving that important issue.

VI. PROGRAMME FOR 1979

(WRD/TC.11/8)

95. In considering its programme for 1979, the Committee took into account the latest developments under each component of its activities and expected assistance from external sources. The main conclusions and recommendations of the review mission (May-June 1978) were also taken into account. Recognizing that a number of national activities of particular interest to the Committee would be carried out by its members the Committee directed that special attention be given, with the assistance of the secretariat to the following items of work during 1979:

Meteorological component

- (a) Operation and maintenance of electronic equipment (RS/RW, radar, APT, radar picture transmission and telecommunication equipment);
- (b) Establishment of new radar stations in Malaysia (Penang and Kluang) and in the Philippines (Tanay);
- (c) Provision of test equipment, spare parts and trained technicians for proper calibration and maintenance of weather radar;
- (d) Provision or improvement of meteorological and telecommunication facilities included in the priority list established by the Committee;

(e) Establishment of suitable receiving equipment for reception of cloud imagery and other data from GMS and TIROS-N satellites;

(f) Review of national data collection facilities and data exchanges needed for typhoon warning services, including periodical monitoring, with a view to 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) Study of the possibility of establishing ocean buoys at strategic locations, such as the data-sparse and typhoon-prone area to the east of the Philippines;

(i) Review of techniques used for operational typhoon forecasting and introduction of improvements, where appropriate.

Hydrological component

(a) Establishment of pilot flood forecasting systems in the Lao People's Democratic Republic and Thailand, with possible assistance from the Government of Japan;

(b) Establishment of flood forecasting systems in the Agno, Cagayan and Bicol river basins in the Philippines, with further assistance from the Government of Japan;

(c) Further improvements in the operation of flood forecasting systems in the Pampanga River basin (Philippines) and in the Han River basin (Republic of Korea);

(d) Organization of survey missions and follow-up action for the establishment of flood forecasting systems in selected river basins in Sabah and Sarawak (Malaysia) with possible assistance from Japan, Organization of a survey mission for the establishment of a flood forecasting system in the Johore River basin in Malaysia;

✓ (e) Determination of flood-prone areas subject to heavy damage for application of flood plain management;

(f) Selection of pilot areas for comprehensive flood loss prevention and management;

/(g)

(g) Organization of regional training seminars in:

(i) Principles of flood loss prevention and management;

(ii) Repair and maintenance of electronic equipment used in flood forecasting and warning systems.

Disaster prevention and preparedness

(a) Follow-up action on the joint LRCS/WMO/ESCAP missions (1973-1976), taking into account the recommendations of the Regional Seminar held at Tokyo in 1976 and the Guidelines on Disaster Prevention and Preparedness in Tropical Cyclone Areas, with the assistance of consultants, where necessary;

(b) Follow-up action on the consultant's survey report on Malaysia and the Philippines;

(c) Testing of the effectiveness of disaster preparedness at local levels;

(d) Increased attention to making warnings understandable to ensure appropriate response.

Training

(a) Training of personnel through group training courses in Japan and other fellowships through bilateral and VAP assistance. Short-term training courses on maintenance of radar, APT and telemetering equipment might be given special consideration;

(b) Post-graduate training to promote meteorological research efforts;

(c) Participation in seminars and study tours relevant to the Committee's programme;

(d) On-the-job training by Committee secretariat experts, particularly in the operation and maintenance of radar, APT and telecommunication equipment.

Research

(a) Stimulation of research activities through advisory services, exchange of information, joint collaboration among members and exchange visits by research personnel. Special attention would be given to ensuring further progress in the studies of objective typhoon forecasting and of storm surges;

/(b)

(b) Contributions to the sub-projects under the WMO tropical cyclone project, in which members of the Typhoon Committee and its secretariat were participating;

(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;

(e) Sending of progress reports on research activities relating to typhoons by August to enable the secretariat to prepare a consolidated progress report for presentation at the next session of the Committee.

VII. CO-ORDINATION WITH THE WMO TROPICAL CYCLONE PROJECT AND REGIONAL PROGRAMMES

(WRD/TC.11/8)

96. The Committee noted the information contained in the fourth status report on the implementation of the WMO tropical cyclone project. The measures taken by the United Nations General Assembly in December 1977 in adopting a further resolution (A/RES/32/196) calling upon WMO to intensify its efforts in that field was welcomed by the Committee. It was further noted that the WMO Executive Committee at its thirtieth session had stressed the need to allocate larger resources to the project and had requested the Secretary-General of WMO to submit a detailed plan to the Eighth Congress in May 1979 for the expansion of the current activities.

97. The action that had been taken by the WMO secretariat to follow up that request by consulting members affected by tropical cyclones was supported by the Committee. It recalled that at its tenth session it had requested its members to forward their views and proposals to the WMO secretariat. The Committee was informed of the response so far received and again emphasized the importance of the countries affected by typhoons making their views known so that they could be incorporated into the plan being prepared for the Eighth Congress. It was pointed out that it was only through the full participation of countries in planning future activities that their particular needs could be taken into account.

98. The Committee noted that under the global component of the project, reports had been issued on 5 of the 11 sub-projects and that several others were close to completion. In addition, French and Spanish versions of the Guidelines for Disaster Prevention and Preparedness in Tropical Cyclone Areas had been completed in the first half of 1978. The continuing demand for that publication was an indication of its usefulness in many countries and the Committee therefore hoped that its members would ensure that the availability of the Guidelines was made known to all concerned in the national systems for protection from tropical cyclones.

99. Progress made under the regional component of the tropical cyclone project was also brought to the Committee's attention. Reference was made in particular to new activities in the Caribbean and Central America under the WMO RA IV Hurricane Committee and to the views expressed at the seventh session of Regional Association V (South-west Pacific) on the problems brought by tropical cyclones in that area. The Committee was of the opinion that its own experience had demonstrated clearly that the major function of the regional cyclone bodies was the improvement of the operational warning system. It considered that that fact should be given first attention in the planned expansion of the tropical cyclone project over the subsequent few years.

100. The discussion revealed that some members experienced difficulty in obtaining information on papers of concern to them published in countries outside the typhoon area. To improve that situation, the chief technical advisers of the Committee secretariat and the Technical Support Unit were requested to keep each other fully informed of any papers published in their respective areas and, when desired, to arrange for the exchange and distribution of such papers. It was further proposed that at future sessions of the Committee members should bring with them lists of papers published since the previous session for distribution to the other members of the Committee.

/VIII.

VIII. CONSIDERATION OF THE AGENDA FOR THE NEXT SESSION
OF THE COMMITTEE

101. The Committee requested the ESCAP and WMO secretariats, in consultation with the Committee secretariat, to prepare the detailed agenda for the twelfth session which could include scientific lectures on the progress of the First GARP Global Experiment (FGGE) and the implications to the activities of the Committee. It was agreed that members would inform ESCAP, WMO and the secretariat of any subjects they might wish to propose for the next session.

IX. DATE AND PLACE OF MEETING OF THE TWELFTH SESSION

102. The Committee suggested that the twelfth session should be held, if possible, in November 1979. The venue would be decided by ESCAP and WMO in consultation with the Chairman of the Committee and any member that might offer host facilities.

X. SCIENTIFIC LECTURES

103. As requested by the Committee at its tenth session, arrangements were made for the inclusion in the programme of the eleventh session of the following scientific lectures:

(a) "Examples of tropical cyclone-induced storm surge damage and their implications", by Mr. John Hope (United States);

(b) "Flood risk mapping", by Mr. Akihiko Tsuchiya (Japan).

104. The Committee recorded its thanks to the lecturers for their interesting presentations and its appreciation to the Governments of the United States and Japan for making them available for the occasion.

XI. ADOPTION OF THE REPORT

105. The Committee adopted its report on 9 October 1978.

/Annex I

Annex I

PROPOSED LONG-TERM PROGRAMME

A. METEOROLOGICAL COMPONENT

1. Improvement of telecommunications and observation facilities, where deficiencies exist, to assure adequacy of all national data collection and retransmission to the associated RTH
2. Assistance to members in acquiring full utilization of existing observational facilities through
 - (i) Acquisition of spare parts
 - (ii) Acquisition of radar calibrating equipment
 - (iii) Training of maintenance personnel
3. Continuation of surveys by the Committee secretariat to provide guidance in preparation for new instrumentation or facilities
4. Promotion of exchange of pertinent data - radar, aerial reconnaissance fixes, objective forecasts, etc.
5. Review, monitoring and improvement, as required, of the systems for the dissemination of typhoon and flood warnings
6. Assistance to members in providing appropriate meteorological training for staff
7. Encouragement and assistance in typhoon-related research on specific topics, joint collaboration in research programmes and distribution of results among the members through exchange of scientific papers and promotion of regional seminars
8. Studies directed towards the development of improved storm surge prediction methods
9. Authorization of frequent visits of secretariat experts to members to keep them advised of pertinent scientific and technological developments and to assist in regional co-ordination of typhoon damage mitigation efforts

B.

B. HYDROLOGICAL COMPONENT
(including flood loss prevention and management)

10. Operation, maintenance and improvement of existing flood forecasting and warning systems

11. Establishment of flood forecasting and warning systems in other river basins

12. Establishment of pilot areas for comprehensive flood loss prevention and management

(i) Selection in each country of a pilot area which is highly vulnerable to heavy flood damage

(ii) Investigation, survey and study of the pilot areas

(iii) Preparation of comprehensive plans for flood loss prevention and management within the context of over-all water resources development of the pilot areas

(iv) Implementation of selected aspects of the comprehensive plans by stages, if necessary

13. Within the framework of item 12, application of flood plain management for a pilot area or basin

(i) Selection in each country of a flood-prone area subject to heavy damage

(ii) Determination of magnitudes and corresponding frequency of heavy floods in each flood-prone area

[illegible]

(iii) Assessment of potential flood damage in each area for various flood magnitudes

(iv) Preparation of flood vulnerability maps

(v) Implementation of flood plain management measures

14. Regional training seminars in:

*(i). Principles of flood loss prevention and management

(ii) Flood vulnerability analysis

(iii) Principles of flood plain management for flood loss prevention and management

* (iv) Principles of watershed management for flood loss prevention and management

* (v) Repair and maintenance of electronic equipment used in flood forecasting and warning systems

(vi) Hydrological forecasting

*(vii) Urban hydrology

(viii) The application of flood loss simulation techniques for the assessment of potential flood damage in a socio-economic context

(ix) The application of remote sensing techniques for flood hazard assessment and flood loss prevention and management

[illegible]

* Requirements for these seminars were considered to be of higher priority.

C. DISASTER PREPAREDNESS COMPONENT

15. Assistance in establishment of appropriate national organizations at all levels, and in formulation of plans
16. Improvement of facilities and services for emergency communications
17. Improvement of effectiveness of warnings and community reaction
18. Assistance with training in disaster preparedness
19. Improvement of techniques for assessment and reporting of damage and consequent needs
20. Pilot projects for predisaster planning, including analysis of hazards and resources at all levels, and case studies on such plans and their effectiveness in practice
21. Development of measures to reduce damage associated with storm surge

/Annex II

Annex II

PROPOSED SHORT-TERM PROGRAMME

A. METEOROLOGICAL COMPONENT

1. Improvement of national data collections and retransmission, where deficient, giving primary emphasis to measures to ensure full utilization of existing observational facilities and formulation of specific measures to correct shortcomings
 - (i) Procurement of calibration equipment for all radar sets
 - (ii) Improvement of telecommunication networks
 - (iii) Procurement of electronic spare parts
 - (iv) Recruitment and training of maintenance personnel for telecommunication and electronic equipment
2. Assistance to members in procuring equipment for reception of imagery from Japanese GMS and United States TIROS-N satellites
3. Taking of necessary action to ensure that all members have access to processed data from GMS satellite, such as wind vectors computed from satellite film loops
4. Review, monitoring and improvement, as required, of the system for the dissemination of typhoon and flood warnings
5. Assistance to members in obtaining basic meteorological training for appropriate staff and also higher level of training for staff holding university degrees
6. Assistance to members in arranging group and bilateral conferences, seminars, visits, etc., in order that they might exchange ideas and expertise in the fields of typhoon forecasting and damage mitigation
7. Encourage members to undertake research on typhoons, especially on topics relating to their particular area, and promotion of joint collaboration among members in research projects, where applicable

8. Studies directed towards the development of improved storm surge prediction methods
9. Increasing the frequency of Committee secretariat experts' visits to members to ensure that each member is kept abreast of technological developments and that close collaboration is maintained in joint efforts to mitigate typhoon damage
10. Surveying of areas of proposed new instrumentation, such as new radar sites, and making appropriate recommendations
11. Assistance to members in obtaining new radar sets and other instrumentation in areas where the need has been established

/B. HYDROLOGICAL

HYDROLOGICAL COMPONENT
(including flood loss prevention and management)

ITEM	YEAR			
	1979	1980	1981	1982
2. Establishment of pilot flood forecasting systems				
(i) Maeklong River in Thailand				
(ii) Sg. Kinabatangan in Sabah, Malaysia				
(iii) Sg. Sadong in Sarawak, Malaysia				
(iv) Se Bang Hieng River in Lao People's Democratic Republic				
3. Operation, maintenance and improvement of existing flood forecasting systems				
(i) Sg. Kelantan, Sg. Trengganu, Sg. Pahang and Sg. Perak in Malaysia				
(ii) Pampanga River in the Philippines				
(iii) Han River in the Republic of Korea				
4. Establishment of flood forecasting systems in other river basins				
(i) Agno River in the Philippines				
(ii) Bicol River in the Philippines				
(iii) Cagayan River in the Philippines				
(iv) Chao Phraya River in Thailand				
(v) Nagdong River in the Republic of Korea				
(vi) Geum River in the Republic of Korea				
(vii) Johore River in Malaysia				
5. Establishment of pilot area for comprehensive flood loss prevention and management by each member				
(i) Selection of pilot area				
(ii) Investigation and survey				
(iii) Preparation of comprehensive plans				
(iv) Implementation of selected aspects of comprehensive plans				
16. Within the framework of item 15, application of flood plain management for a pilot area or basin				
(i) Determination of flood-prone areas subject to heavy damage				
(ii) Determination of magnitudes and corresponding frequency of floods in each flood-prone area				
(iii) Assessment of potential flood damage in each area for various flood magnitudes				
(iv) Preparation of flood vulnerability maps				
17. Regional training seminars in				
(i) Principles of flood loss prevention and management				
(ii) Urban hydrology				
(iii) Principles of watershed management for flood loss prevention and management				
(iv) Repair and maintenance of electronic equipment used in flood forecasting and warning systems				

C. DISASTER PREPAREDNESS COMPONENT

18. Promotion of studies and exchange of experience to develop more efficient methods of assessment and reporting of damage and consequent needs
19. Provision of expert advice and assistance with resources for the improvement of emergency communications
20. Promotion of studies and exchange of experience to improve the efficiency of warning techniques and the reaction to warnings at community level
21. Advice and assistance with training in the techniques of community preparedness
22. Selection of areas suitable for case studies and pilot projects for predisaster planning
23. Development of measures to reduce damage associated with storm surge

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UNITED NATIONS
ECONOMIC AND SOCIAL COMMISSION FOR ASIA AND THE PACIFIC
and
WORLD METEOROLOGICAL ORGANIZATION

TYPHOON COMMITTEE
Twelfth session, Bangkok, 13-19 November 1979

NOTES FOR THE INFORMATION OF PARTICIPANTS

1. The twelfth session of the Typhoon Committee will be held at Bangkok from 13 to 19 November 1979.

Immigration requirements

2. Participants attending ESCAP meetings in Thailand are required to obtain one of the following visas from Thai Embassies or Consulates abroad prior to travel to Thailand:

- (A) Transit Visa if they will stay in Thailand for less than 30 days
- (B) Tourist Visa or Non Immigrant Visa if they will stay in Thailand for more than 30 days.

Participants from countries where there is no Thai Embassy or Consulate may enter Thailand without a visa only if prior notification is forwarded to ESCAP giving full details of participant namely: name, address, position, nationality, passport number, flight number and flight date and arrival time in Thailand. Upon receipt of this information ESCAP will notify the Ministry of Foreign Affairs who in turn will advise the Immigration Division to issue the appropriate stay permit upon arrival at the Bangkok Airport.

Health requirements

3. Participants are required to obtain a certificate of vaccination against smallpox and inoculation against cholera at least 10 days before

/their

their departure from their respective countries. They are, however, advised to consult travel agents in their own countries at least two weeks in advance of their departure, in order to obtain up-to-date information on these requirements.

Foreign exchange

4. Participants may bring with them pounds sterling or United States dollar travellers' cheques or bank drafts, which can be exchanged for Thai currency at the prevailing bank rates. The exchange rates, which fluctuate from time to time, are approximately as follows:

\$US	1.00	=	Baht	20.50
£	1.00	=	Baht	43.00

Exchange facilities are available at the hotels as well as the United Nations Branch of the Siam Commercial Bank Ltd., which is open from 0900 to 1130 hours and 1230 to 1500 hours from Monday through Friday, except on official holidays, and is located on the fourth floor of the Service Building.

Weather

5. The climate of Bangkok during November is humid and warm. The daily mean maximum temperature is 31.7°C (89°F) while the daily mean minimum temperature is 21.7°C (71°F). The mean monthly rainfall is 66 mm (2.6 in). Light tropical clothing will be appropriate. The conference hall where the meetings are to be held is air-conditioned.

Communications

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

c/o Mr. A. S. Manalac
Chief, Water Resources Section
Natural Resources Division
Economic and Social Commission for Asia
and the Pacific (ESCAP)
United Nations Building
Rajadamnern Avenue
Bangkok 2, Thailand

Cable address: ESCAP BANGKOK

/RECEPTION

Reception on arrival

7. Provided that advance notice is given, participants will be met on arrival at Don Muang Airport, Bangkok, by a staff member of ESCAP, who will assist them with customs and immigration formalities. Arrangements will also be made for transportation to their respective hotels.

8. To facilitate reservation of hotel accommodation and arrange for reception on arrival, participants are requested to complete and submit the attached attendance information form at an early date, or otherwise to furnish the following particulars by cable at least seven days in advance to Mr. C. Roy Smith, Chief, Division of Administration, ESCAP, United Nations Building, Bangkok 2, Thailand.

Cable address: ESCAP BANGKOK

- (a) Date and time of arrival
- (b) Airline and flight number
- (c) Hotel accommodation requirements
- (d) Whether an entry visa is required on arrival

Hotel accommodation

9. Accommodation will be reserved at the request of participants at the Thai, R.S. and Majestic Hotels, which are located close to ESCAP.

Special room rates are available to participants as follows:

HOTEL	ROOM	RATES PER DAY		
Thai	Single	Baht	180.00	(net)
	Double	Baht	220.00	(net)
R. S.	Single	Baht	198.00	(net)
	Double	Baht	286.00	(net)
Majestic	Single	Baht	180.00	(net)
	Double	Baht	240.00	(net)

All rooms have air-conditioning. Charges for all meals, including breakfast, will be extra. Meals are subject to a 10 per cent service charge. Hotel room rates are subject to alteration without prior notice.

/Local transportation

Local transportation

10. Owing to budgetary limitations, it will not be possible to provide transportation for participants who stay at hotels other than those mentioned above. They will therefore have to make their own arrangements for attending meetings and social functions. Some hotels are within walking distance of the ESCAP building, and taxis are generally readily available. As meters are not used by taxis, it is necessary to agree on the fare beforehand.

Schedule of meetings

11. The opening meeting will be held at 1000 hours on Tuesday, 13 November 1979 (0900-0945: Registration), in one of the conference rooms in the Secretariat or the Service Building, where all subsequent sessions will also be held.

12. Subject to confirmation by the participants, the daily schedule, except for the opening meeting, will be as follows:

Monday to Friday	0900 to 1200 hours 1330 to 1600 hours
Saturday	0900 to 1230 hours

Registration

13. A registration desk will be located outside the conference room. Participants are requested to be in the lobby outside the conference room between 0900 and 0945 hours on the opening day, in order to allow time for registration. Participants who have failed to register on the opening day of the conference should please request a registration form to ensure that their names will appear on the list of participants.

Badges

14. Participants are requested to wear the identification badges they receive upon registration at all meetings and official functions.

/Officers concerned

Officers concerned with the meeting

15. The substantive division concerned with the meeting is the Division of Natural Resources. The office of the Chief of the Division is on the fifth floor of the United Nations Building.

16. The Division of Administration, of which Mr. C. Roy Smith is the Chief, is responsible for the physical arrangements for the meeting.

Working hours of the ESCAP secretariat

17. The working hours of the ESCAP secretariat are from 0730 to 1545 hours with a break of 45 minutes for lunch, Monday through Friday. Staff servicing the meeting will, however, be available during meeting hours.

Documents

18. It is planned that documents for the meeting will be supplied to the Governments in advance, and to participants upon receipt of nominations if sufficient time is left. However, others may be distributed as they are issued during the meeting. In view of the limited number of copies available, it will be appreciated if participants bring with them the sets supplied in advance.

Working language

19. The working languages of the meeting will be English and French if Democratic Kampuchea and/or the Lao People's Democratic Republic are represented at the session; otherwise, only English will be used.

/ATTENDANCE INFORMATION

UNITED NATIONS
ECONOMIC AND SOCIAL COMMISSION FOR ASIA AND THE PACIFIC
and
WORLD METEOROLOGICAL ORGANIZATION

TYPHOON COMMITTEE
Twelfth session, Bangkok, 13-19 November 1979

ATTENDANCE INFORMATION
(Please type or print)

1. NAME
(As it should appear in
official listing): _____
2. TITLE OF PRESENT OFFICIAL
POSITION
(In home country or
official duty station): _____

3. MAILING ADDRESS (Office): _____

4. COUNTRY/ORGANIZATION REPRESENTED: _____

5. WILL ATTEND THE SESSION AS:
☐ REPRESENTATIVE ☐ ALTERNATE ☐ ADVISER _____ OTHER

/.....

6. ACCOMPANIED BY FOLLOWING MEMBERS OF FAMILY:

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

7. ARRIVAL IN BANGKOK: DATE _____
FLIGHT NUMBER _____
TIME _____

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

NAME OF HOTEL _____

ROOMS Single _____
 Double _____
 Suite _____

CHECK-IN DATE _____

CHECK-OUT DATE _____

Note: All rooms and suites will be assigned according to information furnished above and on a first-come first-served basis. It is essential that any change in plans, i.e., arrival date, accommodation required etc., be communicated to Mr. C. Roy Smith, Chief, Division of Administration, ESCAP, at the address shown below. Any room not occupied in accordance with latest advice to him will be held 24 hours at the participant's expense and then released.

9. IF MAKING OWN LIVING ARRANGEMENTS IN BANGKOK, PLEASE INDICATE:

Address in Bangkok

_____ Date of arrival _____

_____ Flight number _____

_____ Time _____

_____ Date of departure _____

/.....

Please address this attendance information to:

Mr. C. Roy Smith	<u>with a copy to:</u>
Chief, Division of Administration	
Economic and Social Commission for	Mr. A.S. Manalac
Asia and the Pacific (ESCAP)	Chief, Water Resources Section
United Nations Building	Natural Resources Division
Rajadamnern Avenue	Economic and Social Commission for
Bangkok 2, Thailand	Asia and the Pacific (ESCAP)
	United Nations Building
	Rajadamnern Avenue
	Bangkok 2, Thailand

Cable address: ESCAP BANGKOK

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

Typhoon Committee
Twelfth session
13-19 November 1979
Bangkok

PROVISIONAL AGENDA

1. Opening of the session
 2. Election of the Chairman and Vice-Chairman
 3. Adoption of the agenda
 4. The Committee's activities during 1979:
 - (a) Meteorological component
 - (b) Hydrological component
 - (c) Disaster prevention and preparedness
 - (d) Training
 - (e) Research
 5. Typhoon Operational Experiment (TOPEX)
 6. Support for the Committee's programme
 7. Programme for 1980
 8. Co-ordination with the WMO tropical cyclone project and regional programmes
 9. Consideration of the agenda for the thirteenth session of the Committee
 10. Date and place of the thirteenth session
 11. Scientific lectures
 12. Adoption of the report
-

27 July 1979

ORIGINAL: ENGLISH

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

Typhoon Committee
Twelfth session
13-19 November 1979
Bangkok

ANNOTATED PROVISIONAL AGENDA

1. Opening of the session

The twelfth session of the Typhoon Committee will begin at Bangkok on 13 November 1979.

2. Election of the Chairman and Vice-Chairman

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 1979

A review of the activities of the Committee since the eleventh session will be made under this item (WRD/TC.12/1). The review will cover each of the five components of the programme, namely, (a) meteorological component, (b) hydrological component, (c) disaster prevention and preparedness, (d) training and (e) research. The Committee is invited to assess the progress made since its eleventh session, comment on the activities undertaken in 1979 and offer suggestions for accelerating those not completed.

/The members

The members may also wish to report on the establishment in their countries in 1979 of any relevant facilities not covered by the report.

5. Typhoon Operational Experiment (TOPEX)

At its eleventh session the Committee proposed that a typhoon experiment should be undertaken as part of its programme. In response to the request of that session, WMO in consultation with ESCAP made arrangements for a Preparatory Meeting on the Typhoon Operational Experiment to be held at Tokyo in early July 1979. The Meeting was attended by representatives of seven members of the Typhoon Committee and ESCAP, WMO and TCS. The outcome of this preliminary planning exercise will be submitted to the twelfth session (WRD/TC.12/2).

The Preparatory Meeting considered that there was a need for further action to be taken on TOPEX in the interval between that meeting and the twelfth session. A second document on this item (WRD/TC.12/3) will therefore report on the developments since the Preparatory Meeting.

The session is invited to review the steps taken to initiate the Experiment and the plans for its further planning and execution, and to express its views on the future conduct of this important part of the Committee's programme.

6. Support for the Committee's programme

At the eleventh session of the Committee careful consideration was given to the resources needed to carry out the Committee's short- and long-term programmes formulated following the Typhoon Committee Review Mission to members in 1978. At that session members indicated their readiness to assume responsibility for a large part of the institutional support previously borne by UNDP. However, UNDP had indicated its willingness to consider further support for items in the programme of the Committee and had requested that a project document be formulated and submitted covering further assistance for the years 1980 and 1981.

This request was submitted to UNDP in June 1979 and it is expected that by the time the Committee holds its twelfth session a decision will have been made on the extent of UNDP support for this period.

/Other sources

Other sources of support, such as the WMO Voluntary Co-operation Programme (VCP), bilateral aid, UNDR0, UNEP and LRCS, and the possible establishment of an ESCAP revolving fund may also be considered under this item. Support to TCS for the execution of the Committee's programme, including TOPEX, will no doubt also be discussed under this item. Information will be provided on the steps so far taken and on the outlook for support from these various sources (WRD/TC.12/4). Requirements of members for assistance for TOPEX should be given special attention by the twelfth session under agenda item 5.

7. Programme for 1980

The Committee will make a selection of specific items of work on which it wishes to concentrate, with the assistance of TCS, during the following year. For this purpose, it will consider the short-term programme of work recommended by the Typhoon Committee Review Mission and endorsed by the eleventh session. The activities relating to the Typhoon Operational Experiment (TOPEX), including the proposed First Planning Meeting for TOPEX, will no doubt feature in the consideration of the programme for 1980.

8. Co-ordination with the WMO tropical cyclone project and regional programmes

The developments in the WMO tropical cyclone project and its associated regional programmes will be reported to the Committee under this item. A status report on the implementation of the WMO tropical cyclone project is issued each year and the report up to 30 June 1979 will form the basis of a document submitted to the twelfth session (WRD/TC.12/6) giving further information on the global and regional activities under the project. Reference is also made to the plans and activities of the WMO/ESCAP Panel on Tropical Cyclones and to similar activities in other tropical cyclone areas. 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. A separate document (WRD/TC.12/7) will be submitted on WMO research activities related to tropical cyclones.

9. Consideration of the agenda for the thirteenth session of the Committee

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

10. Date and place of the thirteenth 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."

11. Scientific lectures

As suggested at previous sessions of the Committee, a programme of scientific lectures will be arranged during the twelfth session. Details will be announced later.

12. Adoption of the report

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

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FOR PARTICIPANTS ONLY

WRD/TC.12/1
2 October 1979

ORIGINAL: ENGLISH

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

Typhoon Committee
Twelfth session
13-19 November 1979
Bangkok

THE COMMITTEE'S ACTIVITIES DURING 1979

(Item 4 of the provisional agenda)

Note by the Typhoon Committee secretariat

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GENERAL

1. At its thirty-fifth session, held at Manila in March 1979, ESCAP was pleased to note the progress in the activities of the Typhoon Committee. The Commission commended UNDP on its support, which had contributed significantly to the accomplishments of the Typhoon Committee. It also supported the request of the Committee that ESCAP and WMO seek additional support for its programme. The Eighth WMO Congress, held at Geneva in May 1979, considered that the programmes being conducted by regional bodies like the Typhoon Committee had resulted in important achievements.

2. The members of the Committee jointly submitted a document to the Eighth WMO Congress requesting greater support under the WMO tropical cyclone project to meet the requirements of the expanded programme undertaken by the Committee, including the Typhoon operational experiment (TOPEX). Japan submitted an additional document on tentative plans for TOPEX. The Congress expressed its deep interest in the experiment and commended the members of the Committee on their initiative in undertaking that work.

3. A preparatory meeting on TOPEX was held at Tokyo in early July 1979. The meeting was attended by the representatives of seven members of the Typhoon Committee and ESCAP, WMO and TCS. The report of that meeting (WRD/TC.12/2) and another document (WRD/TC.12/3) on further action taken on TOPEX will be considered under agenda item 5.

4. On the basis of the recommendations made by the Committee at its eleventh session on future support for the Committee's activities, a project document was submitted to UNDP for further assistance during 1980-1981. UNDP's response to this request and other sources of support will be discussed under agenda item 6 (WRD/TC.12/4).

5. Official missions undertaken or planned by TCS experts in the period between the eleventh and twelfth sessions are indicated below:

Chief Technical Adviser	:	Bangkok (April); Beijing, Shanghai, Guangzhou and Hong Kong (May); Seoul and Tokyo (June-July); Bangkok (November)
Telecommunication and electronics expert	:	Kuala Lumpur, Kuantan, Kota Baru, Bangkok and Chumphon (November-December 1978); Tokyo, Seoul (July); Tokyo (October); Bangkok (November)

/Hydrologist and

Hydrologist and flood forecasting expert : Kuala Lumpur, Kuching, Kota Kinabalu (November-December 1978); Beijing, Shanghai and Guangzhou (May); Bangkok, Kuala Lumpur, Seoul (September) Bangkok (November)

A. METEOROLOGICAL COMPONENT

RS/RW and radar stations

6. RS/RW stations at Laoag, Mactan, Puerto Princesa and Zamboanga (Philippines) were provided with hydrogen generators to relieve the difficulty arising from shortage of hydrogen gas. PAGASA (Philippines) placed orders for five additional 10-cm radars, Model WSR-77 with colour display and digital video integrator units. These new radars are expected to be installed in 1980 for strengthening typhoon warning services in the Philippines. *expected to play a significant role in TOPEX*

already undertaken
7. A survey of the radar stations in the Philippines will soon be undertaken jointly by the TCS expert and PAGASA officials with a view to examining the current performance of the radars and assessing the requirements for additional spare parts.

8. The radar at Seoul (Republic of Korea), which has been in use for more than 10 years, is expected to be overhauled by the end of 1979. Radars at Osaka and Marsue (Japan), which were established in 1968 and 1969 respectively, are to be replaced by new ones by March 1980.

9. The 10-cm radar transferred from Khon Kaen to Chumphon (Thailand) became operational in December 1978. The TCS telecommunication/electronics expert assisted in its calibration and adjustment. He also assisted in repairing the defective 10-cm radar at Bangkok. *(expected by end 1980)*

Radar at Penang is already functioning
10. Two 10-cm radars for Penang and Kluang in Malaysia were expected to be operational before the end of 1979. Malaysia received radar test equipment worth \$US 14,000 purchased with UNDP funds under the regional typhoon project. *TCS expert assisted in calibration of radars at Kuala Lumpur, Kuantan and Kota Bharu*
Telecommunication system

11. The Tokyo-Melbourne point-to-point circuit was expected to be upgraded from 75 to 200 baud by the end of 1979. The Tokyo-Bangkok direct satellite link was expected to be established in 1980. (The Hong Kong-Bangkok link was

/expected to

expected to improve with the automation of the Bangkok RTH by the end of 1979. The Hong Kong-Beijing link was functioning satisfactorily.

12. The establishment of the automatic meteorological data acquisition system (AMEDAS) at more than 1,300 stations throughout Japan was completed in June 1979. The system ensures prompt collection at JMA of selected meteorological data, including wind and rainfall.

13. With a view to improving the national data collection and dissemination of typhoon warnings in the Philippines, the possibility of obtaining assistance from Japan was under consideration. Meanwhile, 12 provincial stations were provided with low frequency band crystals and modified antenna to improve night-time data collection. *PAGASA with TCS help recently agreed for maintenance from runway*

14. A computer automatic switching system which would cost about \$US100,000 was expected to be installed at the Bangkok RTH by the end of 1979. Procurement of software from the Royal Observatory, Hong Kong, and training of two Thai technicians in the operation of the automatic switching system at Hong Kong were under consideration. *has been procured*

15. To review the efficiency of national data collection and retransmission to the associated RTH, TCS continues to receive quarterly statistics from the Philippines, the Republic of Korea, Malaysia and Thailand. The statistics are being analysed and summarized results will be circulated to the members concerned. *Statistics has been circulated on 4 Oct '79*

16. With effect from 1 April 1979, the Hong Kong coastal radio station accepted weather reports from ships equipped with ship-shore telex facilities. This arrangement was introduced on trial basis for one year.

Other meteorological activities

(a) Ocean weather ships in the western Pacific

17. The eleventh session recorded its appreciation to the Soviet authorities for the valuable assistance provided by operating research vessels in the western Pacific in 1978. Two officers from the Philippines participated in the programme of observations and data analysis on board the Soviet ships. The Committee was informed that the USSR would continue similar programmes in future years. Details of the 1979 programme were awaited.

/18.

(b) Priorities for the implementation of observing and telecommunication facilities

TCS maintained contact with members to expedite implementation of the recommended facilities. The possibility of bilateral assistance was explored where necessary.

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- ✓(c) Urge members to take all possible steps to secure radar test equipment, adequate spare parts and trained technicians to ensure effective maintenance of weather radars;
- ✓(d) Review the arrangements for reception of information from GMS and TIROS-N satellites and make recommendations for early procurement of suitable receiving equipment.

B. HYDROLOGICAL COMPONENT

General activities

30. Continued efforts were made for the improvement of the pilot flood forecasting systems established in the Pampanga River basin of the Philippines and in Han River basin in the Republic of Korea. Establishment of a pilot flood forecasting system in the MaeKlong River basin of Thailand with assistance from Japan has been under consideration. Further progress has been made towards the establishment of flood forecasting systems in other major river basins in the Philippines. Preparations were also being made for the expansion of similar systems in the Republics of Korea and in Malaysia. Developments during 1979 are summarized below:

(a) China

31. The TCS experts during their visit to China in May 1979 had a useful exchange of information with the officials concerned. Floods constitute a major natural hazard in China. However, as a result of flood control works extensively undertaken since 1949, the disastrous floods have been controlled to a large extent.

32. The flood forecasting method used at present is called the "Xinanjian" model, which is primarily based on the unit hydrograph and the Muskingum flood routing method with suitable adjustments. Telephone and telegrams are used for data collection and flood forecast disseminations for operational purposes. China has plans to install a telemetering network initially in small river basins.

(b) Hong Kong

33. A remote-recording rain gauge network for monitoring heavy rain over some potentially dangerous slopes was installed. Real-time rainfall information from the network is used for warning the probable occurrence of moderate to severe landslips.

/(c) Lao People's

(c) Lao People's Democratic Republic

34. No progress has been reported since the eleventh session of the Committee.

(d) Malaysia

5. A preliminary survey for the establishment of flood forecasting systems in the Kinabatangan River basin in Sabah and Sadong River basin in Sarawak was carried out during November-December 1978 by a team of three Japanese experts. The TCS hydrologist participated in the survey for part of the period. A second survey to finalize the plan is expected to be organized with further assistance from Japan towards the end of 1979.

36. Flood forecasting systems with telemetering equipment are already in operation in four river basins in Peninsular Malaysia. The Government has also initiated action to install a hydrometeorological network for a flood forecasting system in the Johore River basin.

(e) Philippines

37. In connexion with the improvement of the Pampanga flood forecasting system, Dr. Takenouchi (Japan) visited the Philippines in March 1979 and explained his data book on the Pampanga flood forecasting system. He made several recommendations after a review of the records of observations and comparison of computed and observed water levels of the past floods.

38. Satisfactory progress has been made in the project for the expansion of flood forecasting systems in the Agno, Bicol and Cagayan River basins. The required equipment was being shipped by Japan to the Philippines and the related facilities were being constructed by local firms. The system was expected to be partially operational during the rainy season of 1979.

39. In view of the serious damage caused by Typhoon "Kading" in October 1978, the Government of the Philippines made an over-all review of the existing disaster mitigation schemes and worked out a plan which included, among other things, establishment of flood forecasting and warning systems for efficient operation of all major dams. The plan is proposed to be integrated into the nation-wide flood forecasting system. The Government of Japan sent a team of experts to the Philippines for three weeks during July-August 1979 to assist the agencies concerned in developing the plan. The proposed plan was expected to be finalized by the end of 1979.

/(f) Republic of

(f) Republic of Korea

40. Continued efforts were made to improve the accuracy of flood forecasting in the Han River basin, with special attention on the section between Paldang Dam and Indogyo downstream. The Japanese experts are expected to visit Seoul before the end of 1979 and assist the government officials in these activities.

41. A telemetric network for the Dae-chung Dam area in the Geum River basin is proposed to be implemented in the near future in addition to a similar system in the Andong Dam area of the Nagdong River basin, which was set up in September 1978. Expansion of the flood forecasting system to cover the entire basins of the Nagdong and the Geum has been planned to be completed during 1980-1981.

(g) Thailand

42. Based on the report of the second survey team sent by Japan for the improvement of the Maeklong flood forecasting system, Thailand submitted a request to the Government of Japan for further assistance. The TCS expert had several consultations on the subject with ESCAP and the officials concerned in Thailand and in Japan.

Flood loss prevention and management

43. In accordance with the decision of the eleventh session to include flood loss prevention and management within the Committee's activities, TCS issued a circular letter to member countries in March 1979 giving relevant background information and indicating possible assistance from Japan. A list of reference materials prepared by ESCAP and copies of some publications obtained from Japan were also distributed. The subject has since been under consideration by the representatives of Japan, ESCAP, WMO and TCS.

44. Japan decided to organize a group training course on flood loss prevention during September-November 1979. A roving mission was also being organized by ESCAP in co-operation with the Government of Japan and a schedule for five weeks was under consideration in consultation with the member countries proposed to be visited.

/45.

45. Flood risk mapping. A flood risk map of the Pampanga River basin (Philippines) was prepared based on historical records of inundated areas during past floods. Risk evaluation by means of hydrological analysis was under study.

Action proposed

46. It is suggested that the Typhoon Committee may wish:

(a) To record its appreciation of the valuable assistance provided by the Government of Japan in:

(i) Sending a preliminary survey team to Malaysia in connexion with the establishment of flood forecasting systems in Sabah and in Sarawak;

(ii) Sending Dr. Takenouchi to the Philippines to explain the hydrological data book on the Pampanga River basin and to make useful recommendations for further improvement of the flood forecasting system;

(iii) Sending a survey team to the Philippines in connexion with the flood forecasting and warning systems for dam operation.

(b) To consider further steps for the establishment of pilot flood forecasting systems in Thailand and the Lao People's Democratic Republic and for the proposed extension of flood forecasting systems to Sabah and Sarawak in Malaysia;

(c) To consider the steps taken in the Philippines for flood forecasting and warning systems for dam operation and the desirability of similar measures for major dams in other countries;

(d) To note the action initiated for the development of comprehensive flood loss prevention and management and to suggest follow-up action.

C. DISASTER PREVENTION AND PREPAREDNESS

46. In the Philippines, PAGASA and OCD expanded and improved the broadcast station dedicated to the dissemination of weather warnings and allied information through the acquisition of studio equipment and accessories, erection

/of transmitter

of transmitter tower and installation of radio linkage from studio to transmitter. The emergency broadcast system has been further extended to several regions in the country.

48. In connexion with the proposed establishment of a training and research centre for disaster prevention and preparedness, an UNDR0 consultant (Mr. Wilfred Carter) made a survey mission in the Philippines during June-July 1979. His report ^{which included recommendations for the centre} was submitted to the Government for consideration.

49. At the request of the Government of Thailand, WMO arranged for a consultant Mr. Roger T. Jones, Natural Disaster Organisation, Australia for a period of one month during February-March 1979. Mr. Jones assisted the Department of Local Administration in Thailand in organizational and training questions relating to disaster prevention and preparedness.

50. In connexion with the survey conducted by the LRCS consultant on disaster prevention and preparedness (Mr. M. Konoye) in 1978, Malaysia and the Philippines were requested to report on the follow-up action taken on the consultant's recommendations.

51. The Proceedings of the Regional Seminar on Community Preparedness and Disaster Prevention (Water Resources Series No. 49) were printed by ESCAP and arrangements made for distribution to all concerned.

52. Additional copies of Guidelines for Disaster Prevention and Preparedness in Tropical Cyclone Areas were supplied to the directors of the meteorological services in Hong Kong, Japan, the Philippines and Thailand for distribution to the agencies concerned.

Action proposed

53. It is suggested that the Committee may wish to:

- (a) Note the above information;
- (b) Express appreciation to WMO and UNDR0 for having provided consultants to advise Thailand and the Philippines respectively on matters relating to disaster prevention and preparedness.

In Korea, a pamphlet on "Work status" published by the Ministry of Construction in May 1979 shows the later organisation of disaster Prev. centre. The work assigned includes implementation and supervision of flood control projects, disaster rehabilitation, communication

D. TRAINING

August 1978 to discuss success and failure in relief work
At the suggestion of WTR, Priority given
Seminar were distributed to members
Thru TCS. Several expressed their views on
the usefulness of the Rep. D. TRAINING

54. In 1979 the Government of Japan is organizing the following Group training courses: (a) river engineering, from 2 August to 3 December 1979, (b) flood loss prevention and management, from 27 September to 2 November 1979, (c) meteorology (radar operation and maintenance), from 4 October 1979 to 3 February 1980 and (d) technology for disaster prevention, from 3 October to 17 December 1979. Invited members have been requested to send timely nominations for the training courses as prescribed in the respective brochures. ^{selection / electronic report given lectures in Mut. course for the work}

55. A WMO/United Nations Regional Training Seminar on the Interpretation, Analysis and Use of Meteorological Satellite Data was held at Tokyo from 23 October to 2 November 1978. Participants from most of the member countries attended the Seminar. A UNDP/WMO regional training seminar on flood forecasting will be organized at Nanjing (China) in October 1979. (8 Oct - 8 Nov)

56. Regarding China's offer to receive visits of study groups, specific subjects for organizing such study groups were under consideration in consultation with China and other member. [Suggested from UNDP requested - approval not yet rec.]

57. At the eleventh session, China suggested that a symposium on typhoon forecasting should be organized in China during 1980. The proposed arrangements for the symposium were discussed by the representatives of WMO, TCS and China at the time of the TOPEX meeting at Tokyo in July. Provision for this symposium has been requested as part of the UNDP support to the regional typhoon programme for 1980-1981. (Advance authorization recd)

58. In accordance with the short-term programme approved by the eleventh session, proposals for regional training seminars in the field of hydrology during 1980-1981 were included in the project document submitted by WMO and ESCAP to UNDP for support. (Advance authorization recd.)

59. The telecommunication and electronics expert of TCS provided on-the-job training in radar calibration and maintenance at Kuala Lumpur, Kuantan and Kota Bharu (Malaysia), at Chumphon (Thailand) and at Seoul (Republic of Korea). He also was scheduled to give some lectures at the group training course on radar operation and maintenance to be organized by Japan commencing in October 1979.

/Action

Action proposed

60. The Committee may wish to:
- Record its appreciation of the valuable assistance provided by the Government of Japan in organizing group training courses during 1979 for the benefit of the members;
 - Advise members to avail themselves of the training facilities offered by the developed countries and those obtainable under WMO VCP, including short-term fellowships;
 - Consider the further action necessary in arranging for study groups to visit China.

E. RESEARCH

General activities

61. The Royal Observatory, Hong Kong, continued to produce objective forecasts of typhoon tracks by computer. These were disseminated to members for operational use. Multiple regression equations based on space mean charts were being developed for forecasting typhoon movement.
62. The barotropic model for typhoon track forecasting developed in the Philippines has been further improved, and statistics are being compiled for performance verification. A two-layer primitive equation Baroclinic model is also being programmed for forecasting and typhoon tracking.
63. Regarding the typhoon moderation programme in the Philippines, an intensive feasibility study was completed with the help of a group of experts from the United States. The scientific basis for such a programme, including the technology and instrument systems, was studied and a detailed experiment design formulated. Initially, the emphasis will be on monitoring of relevant parameters before undertaking an actual experiment.
64. A technical paper by Mr. Patipat Patvivatsiri (Thailand) on heavy rainfall over Thailand related to tropical cyclones in 1975 was published. A study of the precipitation patterns in the Philippines associated with different types of typhoon tracks was completed by the TCS meteorologist seconded by the Philippines.

Technical
note on the
recent
update in
new paper

/Joint collaboration

Joint collaboration in typhoon research

65. The joint study on "Tropical cyclone prediction by objective techniques" was continued for 1978 typhoons. A progress report was expected to be prepared by Mr. P. Sham (Hong Kong), who replaced Dr. P.C. Chin as the project's co-ordinator. After consultation between the co-ordinator, research correspondents and TCS, it was agreed that that joint study might be suspended from 1979, as similar studies could be resumed later with more extensive data coverage derived from TOPEX.

66. The Final Technical Report on Storm Surges prepared by Arafiles and Alcances (Philippines) was printed and distributed. A report entitled Progress in Storm Surge Studies in Hong Kong prepared by Robert Lau was also circulated. Forecasting of storm surges in Victoria Harbour (Hong Kong) based on improved numerical models was computerized for operational use. A progress report is expected to be submitted to the twelfth session by Dr. Miyazaki (Japan), co-ordinator for the joint study on storm surge.

Action proposed

67. The Committee may wish to:
- Note the above information;
 - Consider the further action necessary to ensure effective collaboration in typhoon research.

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FOR PARTICIPANTS ONLY

WRD/TC.12/2
13 September 1979

ORIGINAL: ENGLISH

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

Typhoon Committee
Twelfth session
13-19 November 1979
Bangkok

TYPHOON OPERATIONAL EXPERIMENT (TOPEX)

(Item 5 of the provisional agenda)

REPORT OF THE PREPARATORY MEETING
ON THE TYPHOON OPERATIONAL EXPERIMENT (TOPEX)*

* The attached report of the Preparatory Meeting is submitted to the twelfth session of the Typhoon Committee for endorsement, in accordance with the request of the Meeting (see paragraph 54). A second document (WRD/TC.12/3), to be distributed later, will review TOPEX activities in the period between the Preparatory Meeting and the twelfth session and make proposals for further action.

WRD/TC.12/3
19 October 1979

ORIGINAL: ENGLISH

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

Typhoon Committee
Twelfth session
13-19 November 1979
Bangkok

TYPHOON OPERATIONAL EXPERIMENT (TOPEX)

(Item 5 of the provisional agenda)

RECENT ACTIVITIES

Note by the WMO secretariat

Introduction

1. Document WRD/TC.12/2, submitted to the twelfth session of the Committee, contains the report of the Preparatory Meeting on the Typhoon Operational Experiment (TOPEX) which took place in Tokyo, Japan, from 3 to 6 July 1979. In a footnote to that document it was stated that a second document would be submitted to the session reviewing TOPEX activities in the period since the Preparatory Meeting, and that it would also contain some proposals for further action. The present document reviews the latest developments in the planning of TOPEX.

Follow-up on decisions of Preparatory Meeting

2. During its consideration of the organizational and management aspects of the Experiment, the Preparatory Meeting decided to establish, as an interim measure, a Preparatory Committee for TOPEX (Meteorological Component). It was further agreed that the Preparatory Committee should consist of a Co-ordinator designated by Japan and focal points designated by individual participating members. One of the first tasks undertaken in following up the Preparatory Meeting's decisions was therefore to invite members to make

/these

these designations and a circular letter was dispatched for that purpose on 3 August 1979. At the time of preparing this document seven members had designated focal points to the Committee, including the Co-ordinator (Dr. T. Nitta, Japan). Thus all members present at the Preparatory Meeting will participate in the further planning of this component.

3. The Meeting had similarly decided that members would be invited to designate focal points for the other two components of TOPEX - the hydrological component and the warning dissemination and information exchange component. Six nominations to the first of these and five to the second had been received by the end of September 1979. The appendix to this document shows the latest position in more detail.

4. It may be recalled that the function of the Preparatory Committee for TOPEX (Meteorological Component) was foreseen as the continuous study of the scientific and technical aspects of the planning and execution of the Core Experiment in the period up to the First Planning Meeting. At that time it is expected that a more permanent arrangement of higher status covering the entire Experiment will be set up.

5. The Co-ordinator of the Preparatory Committee visited the WMO Secretariat early in October, thereby providing an opportunity for discussions on the initiation of the Committee's work. Given that little more than one month remained before the opening of the twelfth session, it was decided that the best course of action would be to inform members of the formal constitution of the Preparatory Committee and to seek their advice on a number of questions which could be discussed in further depth at the session.

6. The Co-ordinator therefore addressed a letter to each of the focal points for the Meteorological Component soliciting views on the conduct of the Preparatory Committee's work over the next 6-8 months. Views were sought on the organization and conduct of the Core Experiment itself, covering in particular the national position with respect to the implementation of WWW facilities, and plans for augmented observing programmes. It was suggested that the situation be surveyed to reveal any likely problems and probable needs for assistance in extending these facilities to meet the TOPEX requirements. As TOPEX also calls for the establishment of Experiment Sub-Centres (ESCs) by each participating member, information on the arrangements being made for this purpose were also requested. Finally it was suggested that focal points should ensure that their national delegations to the Twelfth Session are fully briefed on these matters.

7. In providing for the hydrological component, the Preparatory Meeting requested the WMO Secretariat to liaise with the focal points in the further planning. It was suggested that proposals for the more detailed specification of the activities foreseen under the component should be sought, together with indications of the manner and extent of the future participation of members, so that more detailed plans for the component could be drawn up. This information has been requested from the focal points designated to date, again with the proposal that there should be further discussion of the component at the Typhoon Committee session.

8. As requested at the Preparatory Meeting, members have been invited to designate focal points for the warning dissemination and information exchange component. So far, five members have done so. Preliminary contacts have also been made with other interested international organizations as agreed at the Meeting. No definite proposals have yet emerged for the conduct of this component and it will be necessary for TC.12 to consider it in greater detail.

TOPEX Newsletter

9. In view of the considerable interest in TOPEX shown by many WMO Members, and their request for regular information on the progress achieved, the Tokyo Meeting decided that a periodic newsletter should be issued. WMO was asked to make the necessary arrangements.

10. One of the steps taken for this purpose was to invite Typhoon Committee members to provide short contributions on national activities undertaken with a view to participation in TOPEX. At the time of preparing this document, notes had been received from several members. In parallel, the WMO Secretariat initiated action for the production of the first newsletter which it was hoped could be available in time for the Typhoon Committee session. Although it may now be difficult to respect this target date, arrangements for the newsletter are sufficiently well advanced to ensure the appearance of the first issue within a relatively short period.

Action proposed

11. The Committee is invited to note the information given in this document on the action taken subsequent to the Preparatory Meeting and to consider the measures necessary to support the further planning and execution of TOPEX. In particular, it may wish to:

(a)

- (a) examine closely the information provided by members on national aspects of their participation in TOPEX, covering each of the three components concerned;
- (b) draw up a programme for the activities of the Preparatory Committee for TOPEX (Meteorological Component) in the period prior to the First Planning Meeting;
- (c) consider the measures necessary to develop in more detail the work to be pursued under the hydrological and warning dissemination and information exchange components;
- (d) propose appropriate dates for the First Planning Meeting on TOPEX; *[June or July 1980] 5-14 Incl '80*
- (e) indicate any other ways in which it feels the planning process for TOPEX could be strengthened, including possible direct or indirect assistance from sources outside the Typhoon Committee membership.

/Typhocn

Typhoon Operational Experiment (TOPEX) -
Designation of focal points

<u>Typhoon Committee member</u>	<u>Preparatory Committee (Meteorological component)</u>	<u>Hydrological component</u>	<u>Warning Dissemination and Info. Exchange component</u>
CHINA	WANG SHIHPING	ZHAO KEJING	ZHANG XUNLIANG
DEM. KAMPUCHEA			
HONG KONG	P. SHAM	P. SHAM	P. SHAM
	<u>Co-ordinator</u>		
JAPAN	T. NITTA	T. NAKAO	-
LAO P.D.R.			
MALAYSIA	CHEANG BOON KHEAN	L. H. PANG	
PHILIPPINES	C.P. ARAFILES	C.P. ARAFILES	C.P. ARAFILES
REP. OF KOREA	HAK JOONG SEANG	CHAN SIK CHOI	DAL YOUNG OH
THAILAND	P. PATVIVATSIRI	A. CHANTANAVIVATE	P. PATVIVATSIRI

WRD/TC.12/4
8 October 1979

ORIGINAL: ENGLISH

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

Typhoon Committee
Twelfth session
13-19 November 1979
Bangkok

SUPPORT FOR THE COMMITTEE'S PROGRAMME

(Item 6 of the provisional agenda)

Note by the ESCAP secretariat

Introduction

In discussing support for the Committee's programme at the eleventh session, certain views were expressed which could be taken as guidelines for the provision of future support for the Committee's programme. These guidelines include elements of technical co-operation among developing countries (TCDC), continuing endeavours of members to meet requirements from their own resources, the utilization of support from the WMO Voluntary Contribution Programme (VCP), the utilization of expert services from other United Nations bodies like UNDR0 and UNEP, the solicitation of aid from bilateral sources, and provision of programme support for selected activities by UNDP. The support to the Typhoon Committee secretariat (TCS) will have to be increased in view of the expanded activities associated with the typhoon operational experiment (TOPEX).

Sources of support

(i) Committee members

At its eleventh session, the Committee was informed that for 1980-1981 the Philippine Government would consider providing the services of a co-ordinator/manager who might also act as the technical adviser in

/his field

his field of specialization and who would also take over the duties of the Chief Technical Adviser of TCS and, if necessary, the services of a meteorologist, on the understanding that costs associated with travel would in both cases would be met from other sources.

Japan also stated that it would consider providing for the same period the services of a hydrologist including travel costs. Representations were also made by ESCAP with the Japanese Government for the provision of the services of a flood control expert. No advice had been received from the Government of Japan concerning these matters at the time this document was under preparation.

The new programme adopted at the eleventh session and TOPEX will call for additional national contributions.

(ii) UNDP

UNDP has played an important role in the history of the Committee. It has been a major source of financial support in the past and, it is hoped, will continue to provide such support in the future. At the eleventh session of the Committee, the representative of UNDP stated that because of the TCDC elements of the Committee and of its grave concern for the loss of human lives and the damage to the economies of its members, UNDP would be prepared to consider support for selected activities for the biennium 1980-1981.

In response to the Committee's request, a project proposal based on guidelines laid down by the Committee was submitted by ESCAP and WMO in June 1979 to UNDP which would provide for:

- (a) An extension of the project for a further two years;
- (b) The continuation of the WMO expert in meteorological telecommunication and electronic equipment;
- (c) Increased travel costs;
- (d) A limited number of short-term fellowships for each participating country;
- (e) Support for a symposium on typhoon forecasting and warning to be held in China;
- (f) Support for the participation of certain countries in TOPEX;

/(g)

- (g) Priority equipment requirements;
- ✓(h) Support for regional training seminars;
- ✓(i) Study group visits to China on (i) flood control in 1980 and (ii) watershed management for flood loss prevention and management in 1981;
- ✓(j) Additional consultant services in connexion with the TOPEX programme.

In August, UNDP gave advance authorization for part of the programme. The items under (i) and (j), however, have not been approved yet.

(iii) WMO/ESCAP

At its eleventh session, the Committee called upon WMO to provide increased support to its expanded activities through the WMO tropical cyclone programme (TCP) during the period 1980-1983. This request was submitted to the Eighth World Meteorological Congress (May 1979) in documents prepared by Typhoon Committee members and by the Secretary-General. The Congress decided that an intensified TCP should be conducted during 1980-1983 and further commended the Committee for its initiative in planning TOPEX. It urged WMO members to support TCP and TOPEX to the maximum extent possible. Because of severe budgetary limitations it was possible for the Congress to provide only minor financial support to the Committee through the WMO regular budget.

However, the Congress recognized the need to strengthen the secretariat support to TCP as a whole. The provision of additional staff in 1980 will undoubtedly make it possible to give improved assistance to the Committee, particularly in the planning and execution of TOPEX.

The WMO VCP, formerly VAP, will continue to be available in the years 1980-1983 as another source of support for Committee members.

Establishment of a revolving fund

At its eleventh session, the Committee requested the ESCAP secretariat to use its best endeavours to obtain additional support in order to meet the Committee's objectives of enlarging its activities as set out in its short- and long-term programmes. Reference was made to the possible value of a revolving fund through which countries could obtain urgently needed items of equipment.

/This view

This view was brought to the attention of the Commission at its thirty-fifth session, which was held in March 1979. In listing the extra-budgetary resource requirements for the work programme of ESCAP, the secretariat included an amount of \$100,000 to start a revolving fund for urgently needed items of equipment for the Typhoon Committee. Unfortunately there was no response to this proposal and no prospective donor offered to provide the necessary funds.

(iv) Other UNDRO, UNEP, LRCS

UNEP was prepared to give consideration to providing support by making available short-term consultants in disaster prevention and mitigation, preparedness planning, training and research, information and environmental effects of typhoons. It was expected that UNDRO and LRCS would be able to provide a specialist in disaster preparedness whose services could be shared with the members of the WMO/ESCAP Panel on Tropical Cyclones.

Future needs

The new programmes, and TOPEX, will undoubtedly give rise to a need for additional support for some activities. At present it is not clear to what extent members can meet these needs nationally and how much support will be needed from outside. A very careful appraisal is necessary and it is suggested that discussions should be channelled in this direction. Where details cannot be provided, a mechanism permitting their early definition will be essential.

Action proposed

- (a) Review of present sources of support and determination of the extent to which they meet present requirements;
 - (b) Definition of additional requirements, including time-table for their introduction;
 - (c) Proposals for likely sources of new support;
 - (d) Arrangements for continued review of programme requirements.
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FOR PARTICIPANTS ONLY

WRD/TC.12/5
27 September 1979

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

Typhoon Committee
Twelfth session
13-19 November 1979
Bangkok

PROGRAMME FOR 1980

(Item 7 of the provisional agenda)

Note by the Typhoon Committee secretariat

*or mutual collaboration
is needed*

Introduction

It is recognized that many activities of interest to the Typhoon Committee will be carried out by the individual members. However, under this agenda item, the Committee may wish to consider only those items of work on which it will concentrate during 1980, with the assistance of the Typhoon Committee secretariat (TCS). For this purpose, the short-term programme of the Committee (1979-1982) approved at the eleventh session should provide the necessary guidelines.

Under item 6 of the provisional agenda, the requirements for further assistance from UNDP during 1980-1981, for which a request has already been submitted to UNDP, will be considered. The planned work programme as included in the request to UNDP for further assistance should therefore be considered in formulating the programme for 1980. The latest developments in the execution of the Committee's programme and expected assistance from other sources of support, such as WMO VCP, bilateral aid, UNDRO, UNEP and LRCS, must also be taken into account.

*Expects a
support from
UNDP*

Further, the decision of the Committee to undertake the typhoon operational experiment (TOPEX) will introduce special activities in the Committee's programme in the year ahead. Preparations for TOPEX, including

/the

the organization of a planning meeting, should therefore constitute a major item in the programme for 1980.

On the basis of the above considerations, the following tentative programme of work for special attention during 1980 has been drawn up:

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 test equipment and spare parts and training of technicians for calibration and maintenance of weather radars;
- (d) Improvement of meteorological and telecommunication facilities included in the priority list established by the Committee;
- (e) Establishment of suitable receiving equipment for reception of cloud imagery and other data from GMS and TIROS-N satellites;
- (f) Review of national data collection facilities and data exchanges needed for typhoon warning services, including periodical monitoring, and taking of remedial measures, where necessary;
- ^{TOPEX (3)} (g) Review of the present arrangements for dissemination of typhoon and flood warnings with a view to introducing improvements, where necessary;
- ^w (h) Preparations for TOPEX, including those for the First Planning Meeting, on the basis of the tentative programme recommended by the Preparatory Meeting in July 1979.

Hydrological component

- (a) Establishment of a pilot flood forecasting system in Thailand, with possible assistance from the Government of Japan;
- (b) Establishment of flood forecasting systems in the Agno, Bicol and Cagayan River basins in the Philippines and in ~~selected river basins in Sabah~~ and Sarawak (Malaysia), with further assistance from the Government of Japan;

The Kinabatangan river basin (c) in Sabah and the Sadang river basin in Sarawak

(c) Further improvement in the operation of flood forecasting systems in the Pampanga River basin (Philippines) and in the Han River basin (Republic of Korea) and expansion of flood forecasting in the Nagdong and Geum River basins (Republic of Korea);

^{organization of a study group visit to China}
(d) Selection, investigation and survey of the pilot areas ~~yet to be chosen by member countries~~ for comprehensive flood loss prevention and management;

(e) Continuation of determination of magnitudes and frequency of floods in flood-prone zones subject to heavy damage, and preparation of flood-risk maps;

[✓] (f) Preparations for activities under hydrological component of TOPEX. (2)
^{(K) organization of a study group visit to China}
Disaster prevention and preparedness

- (a) Promotion of studies and exchange of experience to develop more efficient methods of assessment and reporting of damage and consequent needs;
- (b) Advice and assistance with training in techniques of community preparedness, through consultancy services where appropriate;

(c) Promotion of studies and exchange of experiences on human response to warnings;

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

Training (e) Improvements in the dissemination of typhoon and flood warnings, exchange of information on disaster situations between concerned agencies and related measures to minimise damage caused by typhoons. (This refers to warning dissemination and information exchange between TOPEX)

(a) Training of personnel through group training courses in Japan and other fellowships through bilateral and VCP assistance. Short-term training courses on maintenance of radar, satellite receiving equipment and telemetering equipment might be given special considerations;

(b) Participation in seminars relevant to the Committee's programme;

(c) On-the-job training by TCS experts, particularly in the operation and maintenance of radar, ^{satellite receiving} and telecommunication equipment.

Research

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

/(b)

Review Seminar 3 April 1979

(b) Encouragement to members to undertake research on typhoons, especially on topics relating to their particular area, and 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 1980;

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

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FOR PARTICIPANTS ONLY

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

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CO-ORDINATION WITH THE WMO TROPICAL CYCLONE PROJECT
AND REGIONAL PROGRAMMES

(Item 8 of the provisional agenda)

Note by the WMO secretariat

Purpose of document

1. The annex to this document (fifth status report on the implementation of the WMO tropical cyclone project) provides the twelfth session of the Typhoon Committee with information on the activities under the project up to 30 June 1979. It thus contains the principal decisions taken by Eighth Congress on the future activities to be carried out from 1980 on, under what will then be known as the WMO tropical cyclone programme (TCP). Any later information available by the time of the session will be presented to the Committee by the representative of the WMO secretariat.

Action proposed

2. The Committee is invited:

(a) To note and comment upon the information provided in the annex to this document;

(b) To consider what further measures, if any, are required to ensure effective co-ordination between its own activities and those conducted under other parts of TCP.

/Annex

Annex

FIFTH STATUS REPORT ON THE IMPLEMENTATION OF THE WMO TROPICAL CYCLONE PROJECT

(30 June 1979)

Introduction

1. The WMO Tropical Cyclone Project was initiated by Sixth Congress in 1971 in response to Resolution 2733 (XXV) of the United Nations General Assembly. A Plan of Action proposed by the former Executive Committee Panel of Experts on Tropical Cyclones forms the basis of the activities.
2. In May 1979 Eighth Congress reviewed the progress made and decided that the activities should be intensified in the years 1980-1983. In calling for an intensification of these activities, Eighth Congress stated that the ultimate objective of the WMO Tropical Cyclone Programme, as it will be named from 1980 onwards, is to establish national and regionally co-ordinated systems to ensure that the loss of life and damage caused by tropical cyclones are reduced to a minimum. This goal can only be attained if each Member affected by tropical cyclones is able to:
 - (a) Detect, track and forecast the approach of tropical cyclones;
 - (b) Apply the most appropriate techniques of quantitative storm surge prediction;
 - (c) Forecast the flooding arising from a tropical cyclone strike;
 - (d) Issue timely and accurate early warnings;
 - (e) Organize and execute the essential disaster prevention and preparedness measures;
 - (f) Provide the basic data on risk of loss by winds, storm surges and floods to meet the needs of development planners and others.
3. To attain its purposes the TCP will have three main elements:
 - (a) Meteorological, based on the World Weather Watch (WWW), which will be 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 (OHP), which will be 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 will be 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.

4. The further implementation and development of the TCP will enable Members to provide improved services to offset the present dramatic impact of tropical cyclones upon their populations and national economies. In particular, it may be expected that the following advantages will accrue:

- (a) Improved capability to issue accurate and timely warnings of tropical cyclones and their expected effects in terms of 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 present impact upon national economies, thereby permitting increased economic growth in developing countries.

5. The Implementation Programme (IP) for 1980-1983 continues the division of the activities in two separate parts, under a general component and a regional component.

6. The general component will cover those aspects of the TCP of general interest to Members affected by tropical cyclones. It will seek to convey information on developing sources of data from, for example, satellites and drifting buoys. It will provide guidance to Members to permit the introduction of new prediction and warning techniques through the spreading of scientific knowledge and will ensure the wide availability of this information through the publication of manuals and reports. It will encompass the broader training requirements for the TCP.

7. Under the regional component the TCP/IP will concern itself mainly with the development of co-ordinated regional systems to combat loss of life and damage

* WMO's role in assisting Members in co-ordination measures to protect life and property will be performed in close co-operation with UNDRO, LRCS and other bodies with special expertise in these fields.

resulting from tropical cyclones. This task will be carried out through inter-governmental groups such as the ESCAP/WMO Typhoon Committee and the WMO/ESCAP Panel on Tropical Cyclones, or similar regional mechanisms set up by the WMO regional associations such as the RA I Tropical Cyclone Committee for the South-West Indian Ocean and the RA IV Hurricane Committee. Close liaison has been and should be maintained between these various regional cyclone bodies. In relation to the regional component of the TCP, reference is made to the responsibilities of Regional Meteorological Centres (RMCs) for the preparation of analyses and prognoses and for the issue of advisories on tropical cyclones. Where these products are not already available to the NMCs from the RMCs concerned, the TCP should assist in measures to ensure their early availability, as well as in arrangements for their timely distribution to all Members affected by tropical cyclones in the area of the RMC. The main decisions taken by Eighth Congress are contained in Resolution 8 (Cg-VIII) and its annex.

Current activities

8. Details of the work being carried out have been given in annual status reports issued by the WMO Secretariat since 1975; the present (fifth) report aims to give information on the latest developments rather than to attempt to summarize all the activities carried out so far. As in the past years the information is presented under two main headings, the general component and the regional component. Information on the action taken jointly with other international organizations and on the programme envisaged for 1979-1980 is also given. An appendix contains a summary of the progress in executing a number of sub-projects under the global component.

General* component

9. Under the existing plan of action the principal steps taken on the global level have been the continuation of 12 sub-projects. A summary of the status of implementation of these sub-projects is given in the appendix. It shows that reports on the following sub-projects have been completed and distributed:

- No. 2 - Observations from mobile ships;
- No. 5 - Geostationary satellites;
- No. 6 - Forecasting tropical cyclone intensity and movement;
- No. 7 - Storm surge prediction;
- No. 8 - Risk evaluation techniques;
- No. 10 - Community preparedness and disaster prevention.

* Previously termed 'global' component but renamed by Eighth Congress

In addition, reports on three other sub-projects have been completed and are in the stage of final review prior to publication. They are:

- No. 1 - Special wind and pressure observation network;
- No. 3 - Automatic weather stations;
- No. 9 - Tropical cyclone warning systems.

Two new sub-projects on the regional aspects of storm surges in the hurricane area and on public information and education have been requested by the Hurricane Committee and will be initiated in the near future.

Regional component

10. The regional programmes are aimed primarily at the efficient operation of tropical cyclone early warning systems, including warnings of associated phenomena such as storm surge and floods, and of the relevant disaster prevention and preparedness organization. In all these aspects, progress is heavily dependent upon the World Weather Watch and the Operational Hydrology Programmes of WMO and upon the support of the regional associations concerned. The disaster prevention and preparedness activities are carried out in collaboration with other international organizations such as ESCAP, the Office of the United Nations Disaster Relief Co-ordinator (UNDRO) and LRCS.

Africa (RA I)

11. At its seventh session (Nairobi, February 1978) the Regional Association for Africa decided to re-establish the RA I Tropical Cyclone Committee for the South-West Indian Ocean. The member countries participating in the Committee's work are: Comoros, France, Madagascar, Malawi, Mauritius, Mozambique, Seychelles and the United Republic of Tanzania. The fourth session of the Committee is to be held at Maputo, Mozambique, from 15 to 22 October 1979.

Asia (RA II)

12. The eleventh session of the Typhoon Committee took place in October 1978. One of the principal topics of discussion was the report of the review mission which had visited, in order, Thailand, Malaysia, Philippines, Japan, the Republic of Korea, Hong Kong and China earlier in the year. In general, the report was warmly received by the Committee and the proposed long-term programme was endorsed as a suitable framework for future activities. Careful consideration was given to the question of

the Committee's involvement in flood control and it was agreed that comprehensive plans for flood loss prevention and management in pilot areas vulnerable to heavy damage should be prepared on the understanding that implementation of only selected aspects of the plan by stages would be considered. Increased attention will be given to non-structural techniques for damage mitigation.

13. The other main topic at the session was the question of future support for the Committee's programme. UNDP announced its readiness to consider continued support for selected activities in 1980-1981, provided the participating Governments progressively increased their inputs to the project. The members responded positively to this offer, agreeing to provide four of the six professional staff foreseen for the Typhoon Committee Secretariat after 1979.

14. A major development was a proposal for the conduct of a Typhoon Operational Experiment (TOPEX) in the Western Pacific. The objective of the Experiment would be to carry out, through international co-operation in the prompt and reliable collection and exchange of observational data, an operational test of the functioning of the various systems used for typhoon analysis, forecasting and warning. The Experiment would be carried out on actual typhoons through all stages of detection and tracking and would be effected on three levels:

- (i) The Core Experiment, based on an intensified network of observations around the typhoon with real-time integrated analysis, forecasting and warning;
- (ii) The Sub-Experiment, aimed at obtaining details of the three-dimensional structure of the typhoon, the mechanism of generation and its development and decay; and
- (iii) National activities, carried out by participating Members, such as those relating in particular to the hydrological aspects of the Experiment.

15. A Preparatory Meeting is to be held at Tokyo from 3 to 6 July 1979 to plan the further organization and conduct of the Experiment. TOPEX is to be carried out as part of the Typhoon Committee's programme and as a sub-project of the Tropical Cyclone Programme.

16. The sixth session of the WMO/ESCAP Panel on Tropical Cyclones was held in Rangoon, Burma, from 27 February to 5 March 1979. The Panel made a thorough review of its Technical Plan in the light of developments since the fifth session and drew attention to a number of shortcomings in the meteorological observing and telecommunication systems.

17. The major issue at the sixth session was again the problem of securing adequate support for the execution of the Panel's programme and particularly for the staffing of the Technical Support Unit (TSU). The Panel recognized that UNDP could not provide institutional support on a long-term basis but felt that the TSU had only recently begun to operate effectively. A limited period with staffing at the desired level was essential. It therefore called for UNDP support for 4-5 years, at the end of which the Panel members would assume the management and co-ordination functions at present performed by the TSU. A project document for this support, and for the provision of equipment and fellowships, has been prepared and submitted to UNDP. The project seeks support totalling US \$2 million over a 3-year period beginning in 1980.

18. In the meanwhile the TSU will have the services of its Chief Technical Adviser and the Telecommunications/Electronics Expert until the end of 1979. Consultant services in hydrology are also available. The appointment of the Telecommunications/Electronics Expert late in 1978 has resulted in a marked improvement in the telecommunication links in the Panel area. The implementation of the links Dacca - New Delhi and Karachi - New Delhi in the first half of 1979 was the most important feature of this improvement and represents a major step forward in completing the telecommunication system in that area.

North and Central America (RA IV)

19. The establishment of the RA IV Hurricane Committee by the seventh session of RA-IV to cover areas of the Caribbean, Central America and the Eastern Pacific was reported in the third status report. The first session of the Committee (San Juan, May 1978) formulated a Hurricane Operational Plan for its region and also its Technical Plan and Implementation Programme. As requested, the Secretary-General arranged for the early publication in loose-leaf form of the RA IV Hurricane Operational Plan which is now available as WMO Publication No. 524. It defines the responsibilities of all the Members concerned to ensure the most effective co-operation between their countries in the provision of meteorological information, forecasts and warnings of all tropical cyclones affecting the area.

20. The Committee's second session took place in San José, Costa Rica, from 2 to 10 April 1979. Amongst the changes made to the Hurricane Operational Plan was one to provide for rotating lists of names for hurricanes in the Caribbean Sea, the Gulf of Mexico and the North Atlantic Ocean, and in the eastern North Pacific respectively. A thorough review was made of Committee's Technical Plan and Implementation Programme and appropriate adjustments were made. It was recommended that the new hydrological component prepared by the RA IV Working Group on Hydrology should be adopted as a

matter of urgency for inclusion in the Technical Plan.

21. It was also proposed that a seminar/workshop on the use of satellite data for hurricane detection and prediction should, if possible, be held immediately prior to the third session of the Committee. Confirmation has been received that Mexico is prepared to act as host country to both the seminar/workshop and the third session in April 1980.

22. During the second session reference was made to a recent study that shows there has been a deterioration in hurricane forecast accuracy over the past five years. A similar trend has been observed in the Pacific. It is thought that this fact is related to a gradual reduction in the number of conventional observing platforms and means that any improvement in the effectiveness of warnings will depend upon better awareness and public response.

23. Action on the Technical Plan and Implementation Programme of the RA IV Hurricane Committee will be promoted by a one-year preparatory assistance project, addressed to six Central American countries to be initiated in October 1979. The purpose of the preparatory assistance is to prepare a detailed project document and to identify possible donors for a project which would cater for installation of one operational flood forecasting system in each one of the six countries, for improvement in flood warning and water management.

South-West Pacific (RA V)

24. The main activities of WMO Members in RA V in the Tropical Cyclone Projects have been through membership of the Typhoon Committee or through participation in various sub-projects under the general component. The seventh session of the Association was held in Jakarta in July 1978 and considered whether measures at the regional level were needed to improve the protective system. It recalled that its area of concern had been very seriously affected by tropical cyclones on a number of occasions since its sixth session and expressed the opinion that there was a need for concerted action in raising the level of the protective system as a whole in the area. The Association decided to appoint a rapporteur with the task of assessing the tropical cyclone protective system in the region in order to determine needs and define what must be done to improve it.

Co-operation with other organizations

25. In accordance with the wishes of the Seventh Congress, close co-operation with other international organizations active in disaster mitigation has continued. Thus there has been close consultation with ESCAP, UNDP, UNEP and UNDRO on a variety of matters of common concern. As in the past, WMO has maintained close relations with LRCS; recently, the League has assisted in the provision of a consultant for a one-month mission to advise Bangladesh in drawing up its national disaster preparedness plan. A WMO/UNEP project entitled "Tropical Cyclone monitoring and early warning systems in countries in the areas of the Bay of Bengal and the Arabian Sea" ended on 31 December 1978. UNEP approved the use of some remaining funds for the purchase of tide gauges to improve storm surge prediction in the Bay of Bengal and the equipment has been delivered. Another WMO/UNEP project entitled 'Selection of hurricane and early warning, including flood forecasting, systems in Central America' was also completed in 1978 and the relevant report will be published shortly.

Programme for 1979-1980

26. The activities of the WMO Tropical Cyclone Project are of a continuing and long-term nature. The project covers a very wide range of activities which, on the technical and operational side are of close concern to the World Weather Watch and Operational Hydrology Programme. There are also research aspects of the project to which CAS is giving attention in response to the directives of the Congress and the Executive Committee. In the 1979-1980 programme, therefore, sections A, B and C relate to activities which are taken care of within the WWV programme but the total context is much wider and includes many aspects of operational hydrology, a number of matters involving training and, to a lesser extent, research as well as the work on disaster prevention and preparedness carried out in collaboration with other international organizations. Section D relates to specific activities in hydrology.

A. 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) Meetings of experts required for the implementation of the TCP sub-projects listed in the appendix.

B. Regional component

Under the regional component the programme will be chiefly concerned with the activities undertaken by the regional cyclone bodies and the implementation of the decisions they make. The planning of the Typhoon Operational Experiment (TOPEX) will be an important new activity. Meetings of regional cyclone bodies and those related to TOPEX in the period 1 July 1979 - 31 December 1980 are listed below:

- (a) Preparatory Meeting on the Typhoon Operational Experiment (TOPEX), (Tokyo, Japan, 3 - 6 July 1979);
- (b) RA I Tropical Cyclone Committee for the South-West Indian Ocean - fourth session (Maputo, Mozambique, 15 - 22 October 1979);
- (c) ESCAP/WMO Typhoon Committee - twelfth session (Bangkok, Thailand, 13 - 19 November 1979);
- (d) WMO/ESCAP Panel on Tropical Cyclones - seventh session (tentatively Bangkok, Thailand, March 1980);
- (e) RA IV Hurricane Committee - third session (Mexico City, Mexico, April 1980) - The session will follow immediately after the seminar/workshop on the use of satellite data for hurricane detection and prediction;
- (f) First Planning Meeting of Experts for TOPEX (place and date to be decided);
- (g) ESCAP/WMO Typhoon Committee - thirteenth session (place and dates to be decided).

C. Disaster prevention and preparedness

- (a) Follow-up action on recommendations from co-operating organizations;
- (b) Follow-up of LRCS/WMO/ESCAP missions to developing countries in tropical cyclone areas;
- (c) Case studies of severe tropical cyclone events with a view to improving protective measures.

D. Specific hydrological aspects

- (a) Catchment models; trials of various models leading to adoption of standard model(s) for tropical cyclone areas;
- (b) Flood frequencies; disaster risk studies in selected countries using, when appropriate, techniques described in WMO/UNEP report on risk evaluation; applications to data-sparse areas;
- (c) Expansion, improvement and automation of hydrological networks; establishment of flood forecasting systems.

WMO TROPICAL CYCLONE PROJECT - PLAN OF ACTION

Implementation programme and its status on 30 June 1979

<u>Sub-project number, title and objectives</u>	<u>Mode of implementation</u>	<u>Status</u>
<p>1. <u>Special tropical cyclone observing network</u> (anemometer and barometer networks)</p> <p>Objectives: To produce a report on the desirability and feasibility of establishing a relatively dense network of wind and pressure observing stations</p>	<p>Australia, with the collaboration of Japan, India and the Typhoon Committee Secretariat (TCS)</p> <p>Leader: Australia Experts nominated: Dr. M. Komabayashi (Japan) Shri V. Balasubramaniam (India) Dr. S.N. Sen (TCS)</p>	<p>Draft report completed and received for publication in the WMO Secretariat.</p>
<p>2. <u>Observations from mobile ships</u></p> <p>Objectives: To assess the present status of the availability, collection, dissemination and density of ships' reports for tropical cyclone detection and warning, and to make recommendations for improvements</p>	<p>Hong Kong, with the collaboration of India, Japan, Kenya, Mauritius, Pakistan and Thailand</p> <p>Leader: Mr. P.P. Sham (Hong Kong) Experts nominated: Shri V. Balasubramaniam (India) Mr. Hajime Mitsuno (Japan) Mr. E.G. Njoroge (Kenya) Mr. I. Dunpath (Mauritius) Mr. S. Akhlague Husain (Pakistan)</p>	<p>A report entitled "Observations from mobile ships" distributed on 16 March 1977.</p>
<p>3. <u>Automatic weather stations</u></p> <p>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</p>	<p>Japan, with the collaboration of Australia, France, India, Thailand, USA and CIMO</p> <p>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.)</p>	<p>Draft report entitled "The role of automatic weather stations in tropical cyclone monitoring" has been completed and received for publication in the WMO Secretariat.</p>

<u>Sub-project number, title and objectives</u>	<u>Mode of implementation</u>	<u>Status</u>
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 (U.S.A.) Dr. P. Barclay (Australia) Mr. M. Malick (France) Mr. J. Aoyagi (Japan) Dr. N. Kodaira (CIMO)	All collaborating countries have designated experts for this sub-project. A first draft is expected to be circulated to the experts shortly.
5. <u>Geostationary satellites</u>		
(i) Objectives: To develop a technique for the analysis and forecasting of tropical cyclone intensities, using satellite data;	Experts from the U.S.A., in collaboration with experts designated by Japan, U.S.S.R. and ESA, have prepared a manuscript on the "Use of Satellite Imagery in Tropical Cyclone Analysis"	Information on satellite data for cyclone forecasting is now available in WMO Publication No. 411 - "Information on Meteorological Satellite Programmes operated by Members and Organizations".
(ii) To develop a technique for the analysis and forecasting of tropical cyclone intensities, using satellite data;		WMO Technical Note No. 153 - "The Use of Satellite Imagery in Tropical Cyclone Analysis" was published in November 1977(WMO-473)
(iii) To advise the cyclone warning centres on the installation and operation of ground equipment		Advice being provided to Members concerned through the regional cyclone bodies.
6. <u>Forecasting tropical cyclone intensity and movement</u>		
Objectives: To prepare a manual on available techniques at cyclone warning centres for the prediction of intensity and direction of motion of the tropical disturbances. Evaluation of the above methods and on the applicability of the semi-objective techniques used in some regions for other regions affected by tropical cyclones	U.S.A., in collaboration with Hong Kong, India, Japan, U.S.S.R. and TCS Experts nominated: Dr. J.M. Pelissier, leader (U.S.A.) Dr. P.C.Chin (Hong Kong) Shri V. Balasubramaniam (India) Mr. Y. Okamura (Japan) Dr. S.N.Sen (TCS)	Publication sent for printing and copies expected to be available in July 1979.

<u>Sub-project number, title and objectives</u>	<u>Mode of implementation</u>	<u>Status</u>
7. <u>Storm surge prediction</u>		
Objectives: Preparation and publication of a Guide on Storm Surge Prediction	Japan, in collaboration with India and U.S.A. A text for the "Guidelines on Storm Surge Prediction" has been prepared by Drs. M. Miyazaki, P.K. Das and C.P. Jelesnianski	The publication "Present techniques of tropical storm surge prediction" was issued in March 1978(WMO-500)
8. <u>Risk evaluation techniques</u>		
Objectives: Providing basic data on risk of loss by cyclone wind, storm surge, flood and river flood to those countries affected by tropical cyclones who need them for development planning and other purposes	WMO Secretariat, with assistance of consultants. Implemented in conjunction with UNEP/WMO project on "Quantitative evaluation of disaster risks (tropical cyclones)"	"The quantitative evaluation of the risk of disaster from tropical cyclones, report of a WMO/UNEP project on the meteorological and hydrological aspects" was published at the end of 1976 (WMO-455). Pilot studies are being undertaken in a number of countries to test the techniques described in the hydrological component of the above report.
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.

<u>Sub-project number, title and objectives</u>	<u>Mode of implementation</u>	<u>Status</u>
10. <u>Community preparedness and disaster prevention</u> Objectives: Preparation and publication of a guide on community preparedness and disaster prevention to assist developing countries in the protection of human lives and property against the harmful effect of tropical cyclones	Joint project ESCAP/LRCS/WMO with the collaboration of UNDRO and TCS Publication by WMO	The "Guidelines for Disaster Prevention and Preparedness in Tropical Cyclone Areas" was published in English in June 1977 and French and Spanish versions in the first half of 1978. Copies may be obtained from the WMO, LRCS and ESCAP Secretariats.
11. <u>Flood forecasting and warning</u> Objectives: To establish and/or strengthen river and flood forecasting capability in countries affected by tropical cyclones	WMO and ESCAP Secretariats, with assistance of consultants	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.

<u>Sub-project number, title and objectives</u>	<u>Mode of implementation</u>	<u>Status</u>
12. <u>Human response to tropical cyclone warnings and their content</u> 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, Madagascar, India, Philippines and UNDRO Leader: Mr. Richard I. Coleman (U.S.A.) Mr. R.L. Southern (Australia) (Madagascar) Mr. B. Rajagopal (India) Mr. A.K. Sen Sarma (India) Mr. L.A. Amadore (Philippines) (UNDRO)	U.S.A. has accepted the invitation to execute the Sub-project and appointed the leader. Collaboration of other Members and UNDRO has been sought.

WRD/TC.12/7
27 September 1979

ORIGINAL: ENGLISH

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

Typhoon Committee
Twelfth session
13-19 November 1979
Bangkok

CO-ORDINATION WITH THE WMO TROPICAL CYCLONE PROJECT
AND REGIONAL PROGRAMMES

(Item 8 of the provisional agenda)

WMO PROGRAMME ON RESEARCH IN TROPICAL METEOROLOGY

Note by the WMO secretariat

Introduction

1. The Eighth Congress (April/May 1979) approved in resolution 23 (Cg-VIII) the WMO programme on research in tropical meteorology (PRTM). One of the programme components relates to tropical cyclones, for which a number of possible high-priority specific research projects have been developed by the WMO Commission for Atmospheric Sciences (CAS). (For details see the report of the informal meeting of experts on PRTM (Geneva, August 1978) which was distributed under the cover of letter R/TPM/1 of 20 November 1978.) Cg-VIII stressed that in the implementation of these projects, which are closely related to the WMO tropical cyclone project (TCP), a closer interaction needs to be maintained between the regional bodies of TCP and the CAS Working Group on Tropical Meteorology. EC-XXXI, while noting new developments in activities of the WMO/TCP, such as the typhoon operational experiment (TOPEX), specifically emphasized such a requirement.

Discussion

2. In response to the request of EC-XXXI, arrangements were made to hold an expert meeting at Fort Collins, Colorado, United States of America, from 16 to 19 July 1979 to further elaborate and develop the long-term implementation

plan for relevant specific Priority I research projects of the PRTM. Under the tropical cyclone component, the meeting came up with proposals for the practical implementation of the following research projects:

Project TC1 - Global tropical cyclone data for research, which envisages the setting-up of a uniform collection system of global conventional data relevant to tropical cyclones for research purposes. The project consists of two components, namely (1) the preparation and archiving of historical data sets and (2) the selection and archiving of relevant current data on a routine basis: this will include (a) tropical cyclone tracks and intensity, (b) routine surface and upper-air observational data transmitted over the CTS, (c) analysed weather maps on microfilm, (d) satellite imagery on microfilm and (e) forecasts and warnings.

Project TC3 - Small-scale cycloidal motion of tropical cyclones, which proposes to prepare a survey report on the current state of knowledge concerning the use of radar in tracking tropical cyclones. (It has been proposed to approach the United States to volunteer the services of an expert to undertake this work).

Project TC4 - Association of tropical cyclogenesis with large-scale circulation changes, which is aimed at better understanding the relationships between seasonal and interannual variations of tropical cyclogenesis and large-scale circulation features. The project will help to encourage members concerned to intensify their research efforts in the climatology of tropical cyclones.

3. As stated in resolution 23 (Cg-VIII), the implementation of the above-mentioned tropical cyclone research projects requires collaboration and the contribution of members in every way possible to the over-all effort. To help the Committee's discussion on possible collaboration and/or participation by members in its implementation, a summary of the main recommendations on the initiatives to be taken on these projects as well as related topics is given in the annex to this document. (The report of the Fort Collins expert meeting will be made available by the time of the twelfth session.)

4. It should be mentioned that the expert meeting, in developing the long-term implementation plan of these tropical cyclone research projects, took due account of the findings and recommendations contained in Prof. W.M. Gray's survey report on the state of research activities at existing

tropical cyclone centres and research institutions. A copy of his survey report has been distributed to all members concerned under the cover of letter R/TPM/1 of 10 July 1979. Prof. Gray is also currently engaged in the preparation of a WMO Technical Note on "Advances in tropical cyclone research", which is expected to be available in the near future (probably in early 1980).

ACTION PROPOSED

5. The Committee is invited to take note of the information contained in this document and to discuss and decide on any measures that it should take to maintain close collaboration with the CAS Working Group on Tropical Meteorology in the implementation of those high priority tropical cyclone research projects as referred to in paragraph 2 and the annex to this document.

/Annex

Annex

SUMMARY OF THE MAIN RECOMMENDATIONS CONTAINED IN
THE REPORT OF AN EXPERT MEETING ON WMO/PRIM
(Ft. Collins, 16-19 July 1979)

I. TROPICAL CYCLONE (TC) COMPONENT

Ref. para.

5.3 Project TC1 - Global tropical cyclone data for research

(1) Preparation and archiving of historical data sets

- SG to ask P.R. of the United States to arrange for archiving facilities at NCAR and/or National Climate Center (NCC)/NOAA at Ashville.
- SG to consult President of CBS about appropriate arrangements for making historical data available on request through WDCs.

(2) Selection and archiving of relevant current data on a routine basis

- (a) Tropical cyclone tracks and intensity - Collection of six-hour information for all stages of tropical cyclones concerning (i) storm name and number, (ii) latitude and longitude, (iii) maximum wind and (iv) minimum sea-level pressure. Data need to be compiled by ocean basin and be ready for research purposes not longer than one year after the cyclone season.

- SG to approach P.R. of the United States to request NOAA Environmental Data Service to compile a yearly global summary of all such cyclones.

(b) Routine surface and upper-air observational data transmitted over the GTS

- Ask President of CBS to make arrangements for the routine extraction and archiving at WDCs of the following categories of data within a radius of 20° of each designated tropical storm: (i) upper-air observations of wind, temperature and dew-point at the mandatory levels, (ii) ship reports, (iii) surface land station reports, (iv) satellite winds and (v) aircraft reports. Period covered from three days before

/the tropical

the tropical storm designation (max. wind 234 kts) to the day on which it declines in strength below this value. The establishment of uniform storm designation procedure is also needed.

- (c) Analyzed weather maps on microfilm - Once a day at the time of best coverage at either 0000 or 1200 GMT during tropical cyclone season at three levels (surface, 500 and 200 mb).

- SG to ask PRs of countries concerned with tropical centres (e.g., Nadi, French Polynesia, La Réunion or Mauritius, New Delhi, Miami, Guam, Hong Kong and Darwin) to arrange for the microfilms to be prepared annually, after investigating the possibility of providing microfilm equipment (on loan). (As an alternative, contact the United States and the USSR about provision of sets of microfilmed global weather charts).

- Ask President of CBS to arrange for one copy of the microfilmed maps from these centres to be archived at NCC/NOAA (Ashville) and WDC-B (Moscow).

(d) Satellite imagery on microfilm

- SG to ask P.R. of the United States to make available a microfilmed Mercator composite of Polar orbiting satellites to research workers on request.

- (e) Forecasts and warnings - to be compiled at regional centres and to make the information available through WDCs.

- SG to consult President of CBS on this matter.

Ref. para.

5.4 Project TC3 - Small-scale cycloidal motion of tropical cyclones

- SG through P.R. of the United States to invite experts from either NHEML or NMC to prepare a technical note on the current state of knowledge on the subject matter.
- Advise individual countries or areas (e.g., the United States, Japan, Hong Kong, India, Australia and others) of the need for compiling information on radar-tracked eye positions available

/in map

in map form and sending it to tropical research centres at Miami or Tokyo. (Also request members concerned to document tropical cyclone locations at intervals of one hour or less.)

- SG to ensure wider dissemination of information on the availability of these data and to consider the possibility of preparing a second T.N. when more detailed information becomes available.

Ref. para.

5.5 Project TC4 - Association of tropical cyclogenesis with large-scale circulation changes

- SG to invite an expert (Professor W.M. Gray from Colorado State University is proposed as a possible expert) to prepare a global climatological survey of tropical cyclones for one recent year. The survey should summarize the main features of (i) global circulation with indication of anomalous features in low latitudes, (ii) tropical cyclone occurrence, structure and tracks with any departures from the average pattern and (iii) relationships between (i) and (ii).
- The secretariat to consider a long-term programme of publication of annual summaries of global tropical cyclogenesis and climatology.

Ref. para.

5.6 Organization of a WMO symposium on tropical cyclones

- The secretariat, in consultation with the President of CAS, to take the necessary action to have the proposed WMO symposium organized in 1981 or 1982, subject to approval of EC-XXXII. (Venue: China, Hong Kong or Japan.)
- Participation of one to three representatives from each of the regional bodies involved in WMO/TCP to be ensured.

Ref. para

5.7 Typhoon operational experiment (TOPEX)

- The secretariat to arrange for a summary of any research needs arising from this experiment to be made known to the CAS Working Group on Tropical Meteorology.

Ref. para

5.8 Collaboration between regional bodies of WMO/TCP and CAS Working Group on Tropical Meteorology

- Bring to the attention of each of the regional bodies a requirement for designating an expert (a young scientist) to serve as the communication channel through the CAS Working Group in the