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AND

WORLD METEOROLOGICAL ORGANIZATION

REPORT OF THE TYPHOON COMMITTEE

ON ITS EIGHTEENTH SESSION

**Beijing, China
8 - 14 October 1985**

FOR PARTICIPANTS ONLY

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

Typhoon Committee

Eighteenth session
8-14 October 1985
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I. ORGANIZATION OF THE SESSION

1. The eighteenth session of the Typhoon Committee was held at Beijing from 8 to 14 October 1985.

Attendance

2. The session was attended by representatives of China, Hong Kong, Japan, Malaysia, the Philippines, the Republic of Korea, Thailand, and Viet Nam. Observers from the Union of Soviet Socialist Republics and the United States of America attended the session. Observers were also present from the United Nations Development Programme (UNDP), the Office of the United Nations Disaster Relief Co-ordinator (UNDRO), and the League of Red Cross and Red Crescent Societies (LRCS).

Opening addresses

3. At the opening session, a welcome address was delivered by Mr. Zou Jingmeng, Administrator of the State Meteorological Administration of China. Mr. Huang Hua, Vice-Chairman of the Standing Committee of the

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National People's Congress of the People's Republic of China delivered the opening address. Messages from the Executive Secretary of ESCAP and the Secretary-General of WMO were read by the representatives of those organizations.

4. In extending a warm welcome to all participants, Mr. Zou Jingmeng noted that it was the first occasion that the Government of China had hosted a session of the Typhoon Committee. He said that through the concerted efforts of the individual members, and co-ordination with ESCAP and WMO, the regional project had yielded a wide range of benefits to members. China attached great importance to the prompt dissemination of accurate typhoon warnings and disaster prevention and preparedness activities. He expressed the hope that the international co-operation built during TOPEX (Typhoon Operational Experiment) would be continued and widened. He also paid tribute to the work of Dr. Kintanar as the Co-ordinator of the Typhoon Committee secretariat and the contributions made by Japan, and he wished the session every success.

5. In his opening address, Vice-Chairman Mr. Huang Hua extended a warm welcome to all representatives to the session. He pointed out that Typhoon Committee members occupied an area which was subject to frequent typhoons. Typhoons affected many countries in Asia, but members of the Typhoon Committee had made progress in overcoming the harmful effects of typhoons through improved warning systems. He stressed that the Typhoon Committee, supported by the World Meteorological Organization (WMO) and ESCAP, had undertaken outstanding work which brought benefits to the countries and their people in the area. He mentioned that China attached great importance to accurate typhoon forecasts and warnings and expressed the hope that through close collaboration between members and assistance from ESCAP and WMO further progress would be made.

6. In his message, the Executive Secretary of ESCAP expressed his thanks to the Chinese Government for its generosity in hosting the session and stressed its significance in view of the fact that it was the first one being held outside its usual meeting places of Bangkok, Manila and Tokyo. He pointed out that despite the efforts exerted and capital investments made by countries for flood loss prevention work over the past several years, much more was required to be done to minimize the

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deleterious effects of that type of natural disaster. In that regard, he mentioned that as part of its support to the Committee, ESCAP had organized many activities under the hydrological component, the latest one being the project on flood risk analysis. He hoped that the results of the pilot project started in Malaysia would be useful to the other members of the Committee.

7. The representative of WMO, on behalf of the Secretary-General of WMO, expressed his gratitude to the State Meteorological Administration and to the Government of China for hosting the session and for the excellent arrangements made. In his message, he stressed that close co-operation between the three main components, namely, meteorology, hydrology and disaster prevention and preparedness (DPP), were indispensable in order to mitigate the loss of life and economic damage caused by typhoons. Considerable progress had been made by the Typhoon Committee in that respect. He further pointed out that regional co-operation, which had been carried out through TOPEX among Typhoon Committee members, proved very successful and should therefore be continued as part of the Committee's work so as to improve typhoon forecasting and warning services and also flood forecasting activities. The importance of regional co-operation for the further development of the hydrological and disaster prevention and preparedness components which required full attention by the Committee was also stressed. He acknowledged the contribution of UNDP to the Committee activities and to the implementation of the Committee's programme. He finally assured participants that WMO would continue to give full support to the Committee and its programme.

Election of officers

8. The Committee elected Mr. Luo Jibin (China) as Chairman and Mr. Ho Tong Yuen (Malaysia) as Vice-Chairman. Mr. P. Sham was elected Chairman of the Drafting Committee.

Agenda

9. The Committee adopted the following agenda:

1. Opening of the session.

2. Election of officers.
3. Adoption of the agenda.
4. The Committee's activities during 1985:
 - (a) Meteorological component;
 - (b) Hydrological component;
 - (c) Disaster prevention and preparedness component;
 - (d) Training;
 - (e) Research.
5. Flood risk analysis and mapping.
6. Review of the 1984 and 1985 typhoon seasons/annual publication.
7. Co-ordination with other activities of the WMO Tropical Cyclone Programme.
8. Programme for 1986 and beyond.
9. Support for the Committee's programme.
10. Consideration of the agenda for the nineteenth session.
11. Date and place of the nineteenth session.
12. Scientific lectures.
13. Adoption of the report.

II. THE COMMITTEE'S ACTIVITIES DURING 1985
(WRD/TC.18/1)

10. The Committee reviewed and evaluated the overall progress made in implementing its programme during 1985, as set out in document WRD/TC.18/1. Five components were discussed in detail: (a) meteorological, (b) hydrological, (c) disaster prevention and preparedness, (d) training and (e) research.

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A. Meteorological component
(Agenda item 4 (a))

11. The Committee noted with satisfaction that considerable progress had been made by members in improving their observing facilities and capabilities for typhoon forecasting and warning services especially with the continuation of operation of the Geostationary Meteorological Satellite (GMS-3) by Japan. Such progress included the establishment of additional radars and upgrading of telecommunication facilities for data exchange between national meteorological centres and the appropriate regional telecommunication hubs.
12. Work on post-TOPEX operational and research activity was carried out effectively in accordance with the programme for 1985 and beyond as laid down by the seventeenth session of the Committee. During that period, China, Hong Kong, Japan and the Philippines carried out intensified surface and radar observations. Those data and typhoon forecasts had been exchanged over GTS (global telecommunication system) using the WMO format. The report on the sub-experiment was distributed to members in accordance with the recommendation of the TOPEX Evaluation Meeting. The 850 and 200 millibar upper-air streamline charts for the period of the second operational experiment (SOE) of the typhoon operational experiment (TOPEX) prepared with the assistance of China and Japan had been made available in microfilm and distributed to members by WMO.
13. The Expert Meeting on Planning Regional Operational Co-operation for the Typhoon Area was held on 20-23 August 1985 at Tokyo as a follow-up of the recommendations of the Evaluation Meeting of TOPEX and in response to a proposal of the Typhoon Committee at its seventeenth session that a regional centre for tropical disturbance advisories be considered for the typhoon area.
14. The Committee's review covered meteorological satellites, upper-air observation, radar stations and the exchange of radar fixes, ocean weather ships and buoys, reconnaissance flights and meteorological telecommunications.

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15. Japan maintained regular operation of GMS-3 which provided vital information for ensuring accurate typhoon positioning and improved forecasting and warning capabilities. The Committee expressed its gratitude to the Government of Japan for its effort in maintaining such important satellite operations.

16. The Committee was informed that the Government of Japan was considering making further improvement in the operation of GMS-3. Beginning from March 1987, provided the necessary budget would be approved by the Government, three-hourly full earth-disk HR-FAX, three-hourly four sectorized LR-FAX pictures (instead of seven sectorized) and hourly polar stereographic projection pictures (north of 10°N) would be transmitted. Starting from 1988. HR-FAX transmissions would be discontinued and replaced by three-hourly full-disk and hourly half disk picture transmissions in a digital format and three-hourly LR-FAX with four sectorized forms and hourly polar stereographic projection picture (north of equator) forms. In view of the above changes, most members would find it necessary to modify their satellite ground receivers in the near future. The Committee requested the Japan Meteorological Agency (JMA) to provide, as soon as possible, detailed information for those modifications.

17. Some members received spare parts through the UNDP regional typhoon programme for urgent repairs. A recent survey revealed that the performance of satellite ground receivers of some members had started to deteriorate as a result of age, and therefore more replacement parts or replacement of APT/WEFAX (automatic picture transmission weather facsimile) receivers would be needed in the future.

18. In China, cloud data obtained through the newly installed satellite ground receiver were disseminated to all provincial stations by teletype using the FM-85 SAREP format and by facsimile.

19. As a co-operative project between China's Guangdong Meteorological Bureau and the Royal Observatory, Hong Kong, an automatic weather station was installed in July 1985 at Huang Mao Zhou, an island about 100 kilometres south of the Pearl River estuary. Observations from the station during the passage of the tropical cyclones in August and September 1985 had proven to be very useful and reliable. The encouraging performance of the system used in that station showed that it would be worth while for similar automatic weather stations to be introduced by other members, particularly in places where manned stations could not be

established or operated. A new 10-centimetre radar replaced the obsolete one at Shantou. The procurement by China of two additional radars with doppler capability was under way.

20. China planned to select one or more typhoons every year, starting from 1986, for special operational experiment and to improve forecast accuracy with radar, upper-air and surface intensified observations. The Typhoon Operational Manual had been modified. The "Typhoon year book for 1984" and "Typhoon data" would be compiled and published for domestic use in China. Evaluation procedures on typhoon forecast accuracy were established and used at all forecasting centres in China. Training of personnel on both objective and subjective typhoon forecasts, including those for precipitation and wind force, was carried out in 1985.

21. The Royal Observatory of Hong Kong provided useful information on surface, upper-air and radar observations through GTS to members in accordance with the procedures contained in the TOPEX Operational Manual. Newly installed automatic weather reporting facilities and radar had been operating satisfactorily, thereby improving data collection and providing better typhoon and flood warning services.

22. Japan replaced an old radar by a new model at Tanegashima and installed the radar echo digitizing and disseminating system (REDIS) at Osaka and Hiroshima stations. Six radars equipped with REDIS devices had coverage of approximately 130×10^4 kilometres over two thirds of Honshu Island of Japan and data acquired from those stations were used to make radar echo composition maps. Both the radar and AMEDAS (automated meteorological data acquisition system) data were used to make radar-AMEDAS composition maps and were disseminated over telephone lines and television networks to the weather stations and the public throughout the country. A new numerical model for typhoon forecasting with eight level parameters, 81×81 grid points and 50 kilometre Mercator projection grid mesh scale was under development. The ocean weather ship Keifu Maru continued its observation at 20°N 130°E during August and September and 30°N 140°E during October 1985 and provided data of three-hourly surface observations, 00 and 12 GMT (Greenwich mean time) rawinsonde reports, 06 and 18 GMT rawin reports, 00 and 06 GMT radar reports and once daily BT (Bathy thermograph) observation reports through GTS. Ocean data

buoys Nos. 21001, 21003, 21004, 22001 and 22002 (WMO identification numbers) also continued to operate at their usual locations.

23. In Malaysia, a new Enterprise Electronic Corporation type 10-centimetre radar at Butterworth in Peninsular Malaysia would be commissioned at the end of October 1985. The installation of a new radar at Kuching and the replacement of the existing radars at Subang, Kuantan and Kota Bharu were planned for upgrading the radar network in order to improve warning services. The meteorological telecommunication system had been improved and expanded to more stations by using new electronic teleprinters with computer memory devices. It was expected to ensure reliable and speedy data exchanges both for domestic and international use.

24. In the Philippines, a VAX-II-1730 computer system was installed through the bilateral assistance of the United States of America. The computer was used to produce products of objective typhoon forecasts, thunderstorm forecasts and a two-day forecast of minimum and maximum temperatures. Installation of a new WSR-77 type of radar at Busuanga, Palawan Island facing the South China Sea was completed. It was expected to be operational soon. Replacement of WSR-77 model radar at Guian station was under way and expected to be operational by early 1986. Installation of an additional TIROS-N satellite ground receiver to improve the satellite picture dissemination system for transmission of pictures between the satellite receiving station and the forecasting centre was planned to be implemented through external support. Installation of a wind-finding radar at Puerto Princesa through VCP (voluntary co-operation programme) assistance was also under way.

25. In the Republic of Korea, the procurement of a mobile radar with doppler effect was being undertaken with assistance under the UNDP national project. That radar was expected to be used to observe and study the structure of severe weather disturbances such as thunderstorms and heavy rainfall associated with typhoons. An existing 10 centimetre radar and a GMS satellite receiver were to be replaced by new ones in the near future. Three additional radars would be installed in the eastern and southern part of the Republic of Korea in the near future. Installation

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of the automatic data switching system at Seoul had been completed in the middle of 1985 and would become operational in the latter part of 1985.

26. In Thailand, installation of two 5.6-centimetre radars at Chumphon and Songkhla were under way. They were expected to be operational by the end of 1985. The existing 5.6-centimetre radar at Songkhla would be transferred to Phuket in early 1986. Installation of additional radars at Khon Kaen (north-eastern Thailand) and Chanthaburi (eastern Thailand), with external assistance, were being planned. The procurement of an additional antenna system for upgrading reception of NOAA (the United States National Oceanic and Atmospheric Administration) satellite picture was under way. The existing antenna system would be modified and used with the LANDSAT satellite receiver to improve picture reception.

Thirty-three sets of SSB (single side band) transceivers were procured in 1983 and 1984 and the installation of those transceivers was completed in June 1985. An additional 11 sets of SSB transceivers were under procurement and expected to be installed by the end of 1986.

27. The Committee noted the expansion of radar networks in the typhoon area. In addition to the existing 42 radars, 8 new radars were installed and put into operation by members of the Committee. Improvement of the telecommunication facilities was also made by five members in 1985. The reliability of data collection and warning dissemination had greatly improved in northern Thailand for the improvement of data collection at night.

28. In compliance with the request of members, the telecommunication and electronics expert assisted some members in undertaking repair and calibration of electronics equipment and availed himself for consultation on the selection of new electronic equipment and procurement of spare parts.

29. The Committee was informed that the United States would continue meteorological reconnaissance flights in the region. The Committee expressed its appreciation to the United States for providing valuable meteorological information through their aircraft reconnaissance operations and hoped that those operations would be continued in the years ahead.

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30. The Committee revised the priority list as follows:

Priority list as revised by the Typhoon Committee
at its eighteenth session

Observing facilities

(a) Upper-air stations

98223 Laoag (Philippines)	12 GMT radiosonde/rawin/ national/external assistance needed
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98645 Cebu (Philippines)

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47187 Cheju (Republic of Korea)	National/external assistance needed
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(b) Weather radar

Xisha (China)	National/external assistance needed
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Cheju (Republic of Korea)	National/external assistance needed
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Tanay (near Manila, the Philippines)	National project
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Haiphong (Viet Nam)	External assistance needed
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Vientiane (Lao People's Democratic Republic)	External assistance needed
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Khon Kaen and Chanthaburi (Thailand)	National/external assistance needed
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(c) Satellite receiving equipment (GMS/TIROS-N Satellite)

Hanoi (Viet Nam)	External assistance needed
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Bangkok (Thailand)	National/external assistance needed
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Telecommunication

(a) Improvement of national data collection facilities

Lao People's Democratic Republic))) National/bilateral
Philippines) projects/external
) assistance needed
Viet Nam)

/(b)

(b) Regional telecommunication links

Bangkok-Hanoi (new circuit)	National project
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Beijing-Guanghou-Hong Kong	National/bilateral project
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(c) Other telecommunication facilities

Thailand - Strengthening of RTH, Bangkok	National/external assistance needed
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B. Hydrological component
(Agenda item 4 (b))

31. The Committee reviewed the activities implemented under the hydrological component during 1985 on the basis of the information provided in document WRD/TC.18/1 and reported at the session.

32. The Committee noted the continued efforts of members to improve their existing flood forecasting and warning systems and to install new systems. It welcomed the recognition of the importance of flood risk analysis and mapping as an essential element in any plan to reduce the loss of life and damage from flooding (see section III below).

33. The Committee noted the following additional developments reported by members.

34. In China, three flood forecasting and warning systems had been completed in Lushui, Huathe and Yongding River Basins in 1985. Two of them became operational in June 1985. Two booklets entitled Hydrological Information and Forecasting Standards and Standards for Hydrological Telemetry Systems had been published for the purpose of effective implementation of flood forecasting work. Two workshops on hydrological forecasting models, in which about 100 participants from all over the country took part, were held in 1985.

35. Hong Kong had improved the network of automatic telemetering rain-gauges and increased its number up to 56 covering most areas in Hong Kong. A storm water management model (SWMM) installed in late 1984 was calibrated using local data, and other models including the unit hydrograph, the tank and the storage function models would also be installed and would be calibrated in the latter part of 1985.

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36. In Japan, eight radar rain-gauge stations had been established by March 1985 and five stations were under construction to measure the distribution of rainfall and its movement. Flood risk maps based on actual inundation for 262 river basins had been made public and those based on flood estimation would be made public in the near future for multi-purpose use in flood damage reduction. In October 1985, a river information centre was established by the Ministry of Construction to offer data to the local government, private company and the public whenever necessary on river basins, such as rainfall, water level and water quality data obtained by telemetering systems and radar rain-gauge stations.

37. In Malaysia, a number of articles, which covered flood forecasting systems and procedures to be followed during the flood season, appeared in the quarterly magazine of the Ministry of Agriculture. The magazine had a wide target audience including farmers, fishermen and villages directly affected by seasonal floodings. The Flood Risk Mapping Project was progressing smoothly. A steering committee had been formed with members from relevant government agencies to outline long-term plans to extend the project to other cities in Malaysia.

38. The Philippines had started an 18-month training course for about 50 trainees under the project on flood forecasting and warning systems for the efficient operation of major dams in Luzon Island. The civic and telecommunication works of the project were expected to be completed by the middle of 1986. The continuing monitoring of the flood forecasting systems was an ongoing activity under the hydrological component using the methodology developed during TOPEX as amended by the Committee at its seventeenth session.

39. In the Republic of Korea, a master plan on the flood forecasting system in Nakdong River basin was prepared in 1985 and the development of its computer programme and the purchase of equipment had been completed.

40. In Thailand, in connection with the project of flood risk analysis and mapping, the contour map over 500 square kilometres of area in the city of Bangkok was under implementation. That work would be completed by the end of 1985.

41. Viet Nam was considering the establishment of a pilot flood forecasting and warning system in the Ka River basin. The Government desired external assistance.

42. The Committee was pleased to note that a number of members were continuing to monitor their flood forecasting systems as an ongoing activity under the hydrological component using the methodology developed during TOPEX and amended as agreed at the seventeenth session of the Committee. That activity was seen as having a central role to play in the Committee's programme of work in flood forecasting, including the need for increased meteorological input to the preparation of flood forecasts. The Committee therefore called on all members who had monitored their systems under TOPEX to continue to do so and invited members to designate and monitor additional flood forecasting systems.

43. The Committee noted the efforts being made by the WMO secretariat to organize exchange visits between the experts responsible for operating the designated flood forecasting systems. Their visits between China, Hong Kong, Malaysia and the Philippines would take place between 16 November and 3 December 1985. The Committee expressed the hope that additional visits might be arranged in the future.

C. Disaster prevention and preparedness (DPP) component
(Agenda item 4 (c))

44. The Committee reviewed the activities under that component of its programme as described in document WRD/TC.18/1 and noted the following additional information.

45. In connection with the request of the Committee at its seventeenth session, LRCS provided the Typhoon Committee secretariat with information on case studies involving disaster prevention and preparedness programmes which had resulted in mitigation of damage. Those case studies could be used as evidence based on which further government support might be obtained.

46. In China work on DPP was undertaken. An example of its work on that programme was the production of a film on tropical cyclones as part of a public education and information campaign.

47. In addition, China, to meet requirements of specialized users, installed automatic super-short-wave warning systems for disseminating typhoon and disastrous weather forecasts and warnings at coastal cities such as Guangzhou, Shanghai, Tianjin, Dalian and Shenzhen.

48. Since 1984, the Shanghai Meteorological Bureau had been issuing marine weather forecasts and typhoon warnings by facsimile and its contents and frequency of transmission would be increased gradually. Also, two VHF (very high frequency) telephone meteorological telecommunication networks were set up along the coastal areas, one in the province of Jiangsu, Shanghai, Zhejiang and Anhui and the other in the mouth of the Pearl River and Shantou region. Such VHF meteorological telephone networks would ensure continued transmission of meteorological information when typhoons threatened those areas.

49. In Hong Kong continued efforts were made by the government departments and agencies concerned to improve the public weather and warning services. Up-to-the-minute tropical cyclone information was provided to the public by the Royal Observatory forecasters doing live interviews and briefings on radio and television broadcasts.

50. During the year, the Japanese Government carried out countermeasures against disasters. These included promotion of science and technology concerning disaster prevention, reinforcement of disaster preparedness, promotion of national land conservation and promotion of restoration work.

51. In order to secure rapid and proper exchange of information among organizations and bodies concerned, the National Land Agency (NLA) disaster prevention radio communications (DPRC) system, introduced in 1978, connecting NLA with all designated administrative and public organizations and bodies in Tokyo, was completed in March 1985. The system acted as a hot line and played an important role not only during the occurrence of disaster but also for prevention purposes.

52. As a countermeasure against disasters caused by landslides, debris flow, slope failure, etc., Japan had established a "Joint Meeting for Promotion of Land Surface Hazards Countermeasures" and an "Advisory

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Committee for Land Surface Hazards Countermeasures" composed of government officials of relevant ministries and agencies and other experts in those fields.

53. In the Philippines, training on disaster preparedness of local disaster co-ordinating councils and disaster control group members, in co-ordination with other government agencies, was a continuing activity and a total of 4,339 local council and control group members and volunteers had been trained since January 1985. A total of 782 local disaster co-ordinating councils had been organized/reorganized in addition to the 2,168 in 1984 and 22 disaster control groups had also been organized since the beginning of the year.

54. The Action Group of the National Disaster Co-ordinating Council in the Philippines had drafted two measures for consideration of the Government on providing the criteria and procedures for the declaration of a state of calamity in certain disaster areas and to prioritize allocation of funds for relief and rehabilitation programmes aimed at hastening normalization and recovery of disaster-stricken areas. Periodic meetings were also held among government agencies to enable dam operations to come up with emergency plans for warning downstream communities should water be released from dams.

55. In Thailand, plans for the establishment of the civil defense school project under the Ministry of the Interior had been drafted for consideration by the Government. The project had not yet been completed owing to lack of funds and external assistance would be required. However, seminar courses for a wide range of civil defense authorities and volunteers for civil defense projects were carried out during the year.

56. The representative of UNDR0 briefed the Committee on a recent initiative taken by the Asian Institute of Technology (AIT) in Bangkok to establish a regional disaster management centre, complementing other similar institutions such as the prospective research and training centre in the Philippines. AIT had approached UNDR0 for technical advice in developing a training programme for upper-level disaster managers. Following a feasibility study supported by UNDR0 in association with UNDP and WMO, it was expected that the training centre would be established in 1986. Members of the Committee were invited to consider availing themselves of the training facilities at AIT.

57. The Committee noted that ASEAN was organizing a meeting of experts on natural disasters to be held at Bangkok in early 1986.

58. In line with its public education and information campaign, the Committee was pleased to note that public appearance of forecasters on media broadcasts in real time proved to be very effective, as had also been experienced in Hong Kong and the Philippines.

59. The Committee was pleased to take note of the information provided by LRCS that the objectives, including public education and information campaign, training, prevention and preparedness, relief, etc., of the Guide-lines on Disaster Prevention and Preparedness published under the auspices of WMO, ESCAP and LRCS were still valid. It was also noted that for disaster preparedness it would be useful for warnings not only to be disseminated early but also to reach the threatened areas in understandable language. LRCS observed that in some Typhoon Committee members, while disaster preparedness plans were constantly updated, the results of activities such as flood risk mapping, etc., should be readily available for public use with a view to enhancing their security. Test exercises were carried out; training courses were also undertaken on DPP. Close co-operation between national societies and agencies contributed to safety enhancement and mitigation of damage.

60. With a view to contributing to further improvement in the mitigation of damage caused by typhoons and related floods, storm surges, etc., the Committee, on the advice of LRCS, recommended to its members that:

- (a) Case studies should continue to be carried out;
- (b) Forecasts and warnings should be prepared in a manner easily understood by users;
- (c) Information should be exchanged between the agencies concerned before, during and after disasters;
- (d) Countermeasures against land surface hazards should be further developed;
- (e) Efforts should be continued on training and research in DPP, including the setting up of a regional centre using the available expertise and facilities in the region.

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D. Training component

(Agenda item 4 (d))

61. The Committee reviewed the activities under that component of its programme, as described in document WRD/TC.18/1.

62. The Committee was pleased to note that a number of training events in which many members participated had been organized during the year. In addition to those listed in the document, the following were also organized:

(a) Expert Group Meeting on the Improvement of Disaster Prevention Systems based on Risk Analysis of Natural Disasters related to Typhoons and Heavy Rainfall, Bangkok, 8 to 13 July 1985;

(b) Group training course on the operation, calibration and maintenance of weather radars, including Doppler radars, Quezon City, the Philippines, 2 to 14 September 1985;

(c) HOMS Workshop on Flood Routing and River Forecasting, Bandung, Indonesia 25 to 30 November 1985 (for which the following members of the Committee have been invited to nominate two participants each - China, Malaysia, Thailand and Viet Nam); and

(d) Seminar on Flood Inundation Forecasting, Rangoon, 9 to 21 December 1985 (for which the following members have been invited to nominate participants - China, Malaysia, the Philippines, Thailand and Viet Nam); ESCAP has also been invited to send a representative.

63. The National Research Center for Disaster Prevention of Japan continued, each year, to organize a seminar on "Technology for Disaster Prevention" with the support of the Japan International Co-operation Agency. The seminar material was compiled each time into a publication which served as a very useful guide in developing the disaster mitigation capability of Typhoon Committee members.

64. The Typhoon Committee at its seventeenth session noted the dearth of training opportunities in DPP and expressed its desire that with the assistance of WMO, ESCAP, UNDRO, and LRCS, efforts would be made to create more opportunities for such training. A list, provided by UNDRO, of training facilities on disaster management, hazard, risk and prevention and preparedness, was circulated to members.

65. The Committee noted that the following seminar and meeting on DPP were held during the year:

(a) Seminar on Technology for Disaster Prevention, Tsukuba, Japan, 22 August to 9 November 1985;

(b) Expert Group Meeting on the Improvement of Disaster Prevention Systems based on Risk Analysis of Natural Disasters related to Typhoons and Heavy Rainfall, ESCAP, Bangkok 8 to 13 July 1985.

66. At the seventeenth session of the Typhoon Committee members requested the possibility of using TCDC (technical co-operation among developing countries) arrangements for exchange visits of scientists/experts between members, attachment of staff to advanced centres and study tours. A consolidated list of requirements and offer of facilities by members was compiled and forwarded to WMO for possible funding. UNDP had also expressed its support for expansion of TCDC activities among Typhoon Committee members.

67. A senior forecaster from the Royal Observatory, Hong Kong visited the Typhoon Research Institute at Shanghai, China under TCDC arrangements. Forecasters from China would be shortly attached to the Philippines and Thailand under the TCDC scheme with their travel and per diems provided by WMO.

68. In China, training of personnel on objective and subjective typhoon forecasting was carried out in 1985. An 18-month on-the-job training on flood forecasting and warning systems for dam operation was held in the Philippines in October 1985 and attended by concerned national agencies.

69. The Committee expressed its gratitude to the Government of Japan for organizing group training courses for members of the Committee, and hoped that such training opportunities would be made available in the future.

E. Research component

(Agenda item 4 (e))

70. The Committee reviewed the activities under that agenda item described in documents WRD/TC.18/1 and WRD/TC.18/8, and noted the following additional information.

71. In Japan, a new numerical forecast model of tropical cyclone had been developed by the Japan Meteorological Agency (JMA). The new model was capable of providing better forecasts of cyclone movements and heavy rainfall.

72. Further, in order to understand the mechanism of tropical cyclone movement, numerical studies were carried out using both a sophisticated baroclinic numerical model and a simplified barotropic model.

73. Flood risk mapping studies were also undertaken in Japan based on the following: (a) geomorphology of the area; (b) historical data; (c) hydrological-hydraulic models; and (d) damage statistics.

74. On the improvement of flood forecasting techniques, studies were undertaken on the short-term rainfall forecast method based on the radar rain-gauge. Studies had also been undertaken concerning flood damage mitigation especially in urban areas. In 14 urban rivers of Japan, studies on comprehensive flood loss prevention measures, including the application of non-structural measures and land use regulation, were carried out in situ.

75. In the Republic of Korea, studies for improving a tracking technique for typhoons were being undertaken. In Thailand research had been under way using analysed data from the region since 1951, and attempts had been made to develop a numerical weather prediction model for tropical cyclones and their associated rainfall.

76. The Committee at its seventeenth session noted with satisfaction that most of its members had already designated research correspondents, updated as of June 1985. It was the view of the Committee that there should be a co-ordinator of the research activities for each of the three main components of the programme, namely the meteorological, hydrological and disaster prevention and preparedness components. Dr. T. Kitade (Japan) had been designated co-ordinator for the meteorological component. However, at that session the Committee considered that the activities under the other two main components pertained mainly to national undertakings and therefore such designation of co-ordinators for the hydrological and DPP components for research activities were viewed not to be of immediate necessity.

77. The Committee expressed its deep appreciation of and gratitude to Dr. T. Kitade, Co-ordinator of research activities under the meteorological component, and research correspondents for the excellent job they had done during the year.

III. FLOOD RISK ANALYSIS AND MAPPING

(Agenda item 5)

78. The Committee considered document WRD/TC.18/2 which contained a brief report on the project on improvement of disaster prevention systems based on risk analysis of natural disasters related to typhoons and heavy rainfall. The overall objective of the project was to prepare recommendations for each member and formulate a concrete implementation programme on flood risk analysis in one or two specific areas in the Typhoon Committee region.

79. It was noted that on the basis of the findings of the first mission, the second mission, comprised of an expert in flood risk analysis and the Typhoon Committee hydrologist, visited Malaysia from February to April 1985 and prepared a detailed implementation programme of flood risk analysis in the Upper Klang River basin which had been selected as a demonstration area by the first mission. It also noted that an expert group meeting was organized at Bangkok from 8 to 13 July 1985 to review the results of the first and second missions and to discuss the detailed implementation programme of flood risk analysis in members and in the selected pilot demonstration basin.

80. The Committee examined and endorsed the recommendations made by the expert group meeting. In particular, it decided to include in the Committee's work programme a project on the preparation of a manual and guide-lines on flood risk analysis as well as the preparation of information material on comprehensive flood loss prevention and management.

81. It also endorsed the recommendation that a seminar to demonstrate the methodology and techniques should be organized after completion of the pilot demonstration project on flood risk analysis of the Upper Klang River basin. In addition, the manual and guide-lines for flood risk analysis and mapping should be discussed at that seminar. It was noted that a roving mission to members of the Typhoon Committee on flood risk analysis and mapping would be necessary to finalize the manual and guide-lines.

82. The representative of the Government of Malaysia stressed that assistance of an expert would be necessary for the implementation of flood risk analysis and mapping in the demonstration area and expressed his desire that the Government of Japan would provide the expert support.

83. The representative of the Government of Thailand informed the Committee that a seminar on non-structural measures of flood damage mitigation including flood risk analysis and mapping would be held at Bangkok in December 1985 and expressed its desire that ESCAP, WMO and the Typhoon Committee secretariat would provide as much assistance and support to the seminar as possible.

IV. REVIEW OF THE 1984 AND 1985 TYPHOON SEASONS/ANNUAL PUBLICATION

(Agenda item 6)
(WRD/TC.18/5)

84. The Committee at its fourteenth session had decided to include in its subsequent sessions a review of the previous typhoon seasons. At the eighteenth session the review covered the period from 1 September 1984 to 31 August 1985. Country papers prepared by members contained information on typhoons and associated floods and their corresponding damage, in accordance with the format in the "Report on damage caused by cyclones, floods and drought" adopted by the Committee.

85. A summary report of the country papers was presented and distributed to all participants during the session.

86. The Committee decided at its seventeenth session to proceed with the production of an annual publication, tentatively titled "ESCAP/WMO Typhoon Committee annual review". A plan on the preparation of the annual review was drafted by the Chief Editor, provided by Hong Kong, and communicated to national editors, ESCAP, WMO and the Typhoon Committee secretariat in July 1985. It was intended that the first issue of the annual review would cover the calendar year 1985. The editorial board and the proposed editorial work schedule and table of contents were given in annex I. However, it was the view of some members that some of the target dates should be readjusted to give ample time for national editors to gather and compile the materials required. It was planned that the finalized script would be sent to the Typhoon Committee secretariat by 31 March 1985.

87. The Committee was of the view that the publication was expected to be circulated to a wide spectrum of readers and that care should be taken by the editorial board not to duplicate existing publications such as the Water Resources Journal of ESCAP. The Committee expressed the view that greater emphasis should be given to the proposed chapter two of

the plan, particularly to those tropical cyclones which affected the members. News from the other cyclone bodies of the tropical cyclone programme could also be included and LRCS and UNDR0 would be welcome to contribute to the publication.

88. The Committee further expressed its view that the first publication should contain background information of the Committee and that a decision on subsequent issues of the publication should await the outcome of the first publication.

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

(Agenda item 7)

(WRD/TC.18/6)

89. The Committee's discussion of that item was based mainly upon the information given in the "Eleventh status report on the implementation of the WMO tropical cyclone programme". Additional information available since the issue of the status report was given and was supplemented by a verbal presentation of later developments, especially the views contained in the Second WMO long-term plan on the tropical cyclone programme.

90. That status report described various activities and developments under the tropical cyclone programme. The Committee noted that information, which was presented by the WMO secretariat in the eleventh status report as well as in the report on later developments.

91. The second long-term plan was being circulated to all WMO members for comments. The Committee felt that careful consideration should be given by members to the proposed tropical cyclone programme activities for the period from 1988 to 1997.

92. The Committee specifically urged members to pay particular attention to the programme allocations in the WMO programme budget for the tenth financial period of 1988 to 1991.

93. It recorded its hope that it would be possible to enhance activities of the tropical cyclone programme through increased support for the programme.

94. The view was expressed that to meet the overall objectives of mitigating cyclone disasters, regional cyclone bodies should take steps towards closer co-operation with other regional cyclone bodies, in particular through exchange of experience on forecasting and warning methodologies and proven new technologies and systems.

VI. PROGRAMME FOR 1986 AND BEYOND

95. The Committee considered the medium- to long-term plan approved by the Typhoon Committee, as amended by the seventeenth session. The Committee reiterated that that plan should continue as a basis for the further development of the Typhoon Committee's programme. Taking into account the decisions for follow-up of TOPEX and the general outline given in the medium- to long-term plan, the Committee endorsed the proposals made by the Typhoon Committee secretariat for specific activities to be undertaken by members in 1986 and beyond. Those activities were listed under the headings of the five components for the Typhoon Committee programme and were set out in annex III to the report. The Committee agreed to identify specifically those items which should receive high priority consideration by members. In that connection, it was mentioned that it might not be possible to implement all items in 1986. Therefore members might wish to consider the implementation of items in the years thereafter.

96. The Committee agreed that the medium- to long-term plan was an important guide-line to members for planning the programme activity for all Typhoon Committee components. However, the Committee felt that there should be a more detailed co-operation in the various components, particularly in implementation of the meteorological component, the hydrological component and the interface with the DPP component.

97. The Committee considered the report of the Expert Meeting on Planning Regional Co-operation for the Typhoon Area which was held from 20 to 23 August 1985 in Tokyo. It also noted the additional explanatory information provided by the WMO secretariat on the possible updating and modernization of the typhoon forecasting and warning services. The Committee welcomed that initiative and agreed that the concept developed by the expert meeting should be used for the development of a regionally co-ordinated implementation programme.

98. The Committee decided that the concept of regional co-operation among members of the Typhoon Committee as reproduced in annex II to the report should form the basis for the regional implementation programme for the typhoon forecast and warning services. Based on the medium- to long-term plan adopted by the Typhoon Committee at its seventeenth session, the Committee decided that it should be prepared and approved by the Typhoon Committee by the end of March 1986. That programme should

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identify specific commitments to be made by members and also the requirements for external assistance, particularly from UNDP and the voluntary co-operation programme.

99. The Committee agreed that the regional co-operation programme should aim at improving the meteorological component through:

(a) up-grading of the NMC; (b) designation of a regional specialized meteorological centre for preparation and issuance of advisories and other processed information for the typhoon region; and (c) introduction of modern data processing and telecommunications techniques.

100. In that connection, the Committee invited Japan to consider the establishment of a regional specialized centre at Tokyo. The Committee noted with appreciation that Japan would consider favourably the establishment of the centre at Tokyo.

101. The Committee was informed that Japan would provide DCP (data-collecting platform) channels of GMS-3 to each member of the Typhoon Committee for the collection of meteorological and hydrological data. That additional facility should also be incorporated in the regional co-operation programme.

102. The data collected through DCP would be transmitted by the RTH Tokyo on GTS to the members concerned. The Committee encouraged members to make use of the DCP system for data collection from data-sparse areas so as to ensure more accurate typhoon and flood warning services. The Committee requested ESCAP to consider providing assistance through extrabudgetary funds for the implementation of such a new and vital regional system.

103. The Committee recommended that a planning meeting should be organized early in 1986 to consider the draft regional co-operation programme. It should be followed by an extraordinary session of the Typhoon Committee. The Committee invited WMO in consultation with ESCAP and the Typhoon Committee secretariat to organize the planning meeting and invited ESCAP to arrange for the extraordinary session of the Typhoon Committee. The extraordinary session might also consider the ways and means to obtain external support particularly from UNDP and the WMO voluntary co-operation programme.

The Committee also endorsed the need for issuing a Typhoon Committee operational manual. That operational manual should be prepared on the basis of the TOPEX operational manual.

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The Committee requested the Typhoon Committee secretariat, in co-operation with WMO to prepare the operational manual taking into account proposals made by the experts from Hong Kong and Japan.

VII. SUPPORT FOR THE COMMITTEE'S PROGRAMME

(Agenda item 9)

(WRD/TC.18/3)

104. The Committee considered document WRD/TC.18/3 which reviewed the support required for institutional arrangements and to carry out its programme of activities.

Institutional support

105. The Committee, when considering the staffing of the Typhoon Committee secretariat, was informed that the Philippines would continue to provide a co-ordinator for another year. The Philippines also agreed to provide a meteorologist. The Committee expressed its gratitude to the Philippines for the offer. It further recorded its appreciation of Dr. Roman L. Kintanar for his contributions and the effective role he had played as Co-ordinator.

106. With regard to the hydrologist attached to the secretariat and provided by Japan, the Committee was informed that Japan was examining the possibility of continuing the services of the hydrologist for another year. The Committee requested Japan to consider favourably the provision of the hydrologist. ESCAP had also made representations to Japan to provide a hydrologist when the term of assignment of the incumbent expired at the beginning of March 1986.

107. The Committee noted that UNDP funding for the telecommunication and electronics expert would cease in June 1986. It recorded its appreciation of Mr. C. H. Tang for his contributions in the past years. Considering that the expert had performed a very vital role in the maintenance and operation of telecommunication and electronic equipment as well as in the training of personnel the Committee made a strong request that the services of the expert be continued for a further year. It expressed the hope that UNDP would consider the request sympathetically.

108. The Committee reiterated the need for an expert in disaster prevention and preparedness at the Typhoon Committee secretariat to work with members in developing and evaluating DPP measures and especially in

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defining the socio-economic impact of disasters caused by typhoons and floods. The Committee invited the attention of UNDRO and LRCS to that need and also suggested that members themselves consider providing such an expert from within the region, possibly under TCDC arrangements. The Committee was informed that LRCS had plans to mount expert missions to selected members to advise them on those matters. It welcomed the announcement and expressed its gratitude to LRCS.

109. Progress on members making cash contributions for institutional support, raised at the seventeenth session, was reported. The Committee was informed that at the forty-first session of ESCAP (March 1985) China had pledged a sum of \$12,000 per year. Thailand would be prepared to make a similar contribution for a maximum period of four years, provided all members of the Committee would contribute the same amount. The Philippines at the session pledged a sum of \$12,000 in the peso equivalent per year for four years commencing in 1986. The Republic of Korea informed the Committee that it would consider a contribution after 1986. Those voluntary contributions were welcomed by the Committee. They were indicative of the willingness on the part of members to implement the concept of self help in carrying out their activities. It expressed the hope that it would be possible for other members, that had not done so, to make similar contributions in the future. The Committee decided that the voluntary contributions should be paid to a Typhoon Committee trust fund. It requested the Secretary-General of WMO to establish that trust fund, the purpose of which should be to support Typhoon Committee activities. Guide-lines for the use of the Typhoon Committee trust fund would be considered by the forthcoming extraordinary session of the Typhoon Committee.

Programme support

110. The Committee was informed that WMO had submitted a request to UNDP for an extension of support to Project RAS/81/054, "Programme support to the Typhoon Committee" to the next programme cycle (1987-1991) with a requirement of approximately \$1 million. Considering that there would be a new thrust to the Committee's activities when the regional co-operation programme (Agenda item 8) was adopted, the Committee expressed the strong hope that UNDP support for its programme would continue in the next programme cycle. It recorded its appreciation to UNDP for the considerable support it had provided in the past. Members were urged to impress on aid co-ordinators in their respective countries

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the importance of its programme so that it would be accorded a higher status and priority by UNDP.

111. The extension of TCDC arrangements to support the Committee's work was endorsed. The Typhoon Committee secretariat had compiled a list of training requirements of members under TCDC, and member facilities where those requirements could be met. It requested the Typhoon Committee secretariat to update the list. Members concerned were also requested to follow up their request for training and expert attachments with the WMO secretariat.

112. Not much progress had been made in soliciting support from the private sector since the seventeenth session. The Committee recognized that that was a lengthy process, and new approaches would have to be made before results could be seen. The Committee requested WMO and the Typhoon Committee secretariat to pursue that source of support.

113. The voluntary co-operation programme (VCP) of WMO offered considerable potential for support to its programme; and the Committee decided that a co-ordinated voluntary co-operation programme project in support of the regional co-operation programme (Agenda item 8) should be prepared. It therefore requested the Typhoon Committee secretariat and WMO, upon adoption of the programme by members in early 1986, to prepare a co-ordinated voluntary co-operation project for consideration in mid-1986 by the WMO Executive Council Panel on the Voluntary Co-operation Programme.

114. The Committee was pleased to note the offer of China to arrange a study tour for scientists from members on tropical cyclone forecasting facilities and techniques. The USSR offered to assist members in the field of training, provision of equipment and expert services under the voluntary co-operation programme. It was also willing to expand co-operation in research and exchange of scientists.

VIII. CONSIDERATION OF THE AGENDA FOR THE NINETEENTH SESSION

(Agenda item 10)

115. The Committee requested the ESCAP and WMO secretariats, in close consultation with the Typhoon Committee secretariat, to prepare the detailed agenda for the nineteenth session. It was agreed that members might propose to ESCAP, WMO and the Typhoon Committee secretariat, at an early date, specific items which should be included in the agenda of the next session.

IX. DATE AND PLACE OF THE NINETEENTH SESSION

(Agenda item 11)

116. The Committee requested the ESCAP and WMO secretariats in consultation with the Chairman of the Committee to decide on the date and venue of the nineteenth session. In regard to the provision of linguistic services, the Committee agreed that sessions of the Typhoon Committee held outside the ESCAP headquarters would in the future be conducted in English only. Pre-session documentation would also be in English only. However, the final report of the session would continue to be issued in English and French.

X. SCIENTIFIC LECTURES

117. A scientific lecture on "Review of the activities on tropical cyclones over the western North Pacific Ocean in 1985" was presented by Fan Yongxiang, Senior Engineer, National Meteorological Center, State Meteorological Administration, China.

The following video and films were shown.

(a) "National Meteorological Center in advance" (a video produced by State Meteorological Administration, China)

(b) "Typhoon" (a film produced by State Meteorological Administration, China)

(c) "Flood control in urban rivers" (a film produced by the Ministry of Construction, Japan)

118. The Committee expressed its appreciation to the lecturer for his interesting presentation.

IX. ADOPTION OF THE REPORT

(Agenda item 13)

119. The Committee adopted its report on 14 October 1985.

/Annex I

Annex I

ESCAP/WMO Typhoon Committee Annual Review Editorial Board

Chief Editor: Mr. C.Y. Lam (Hong Kong)

Editors: Mr. Mariano T. Asuncion (Phippines)

Mr. Chen Lianshou (China)

Mr. Hee-Seung Choi (Republic of Korea)

Dr. Lim Joo Tick (Malaysia)

Dr. Patipat Patvivatsiri (Thailand)

Mr. M. Saito (Japan)

ESCAP/WMO Typhoon Committee Annual Review 1985

Editorial Work Schedule

24 July 1985	- Circular letters to Editors - Letter to Typhoon Committee secretariat
29 July	- Start clearing backlog of narrative accounts of tropical cyclones - Start preparing narrative accounts of tropical cyclones as they occur
30 September	- Editors to send information on activities related to Typhoon Committee to Chief Editor
8-14 October	- Typhoon Committee session in Beijing: decisions on 1985 and future issues
1 November	- Request to Typhoon Committee Chairman to contribute "Foreword"
13 November	- Circular reminder to Editors
15 December	- Updated information on national activities from National Editors to reach Chief Editor - "Foreword" from Chairman to arrive
2 January 1986	- Start compilation of statistics and drafting of figures
31 January	- Draft on Typhoon Committee secretariat activities to reach Chief Editor - Draft on overall review of typhoons to Editors for comments
28 February	- Sections, "foreword", "Typhoon Committee Secretariat activities", "members' activities", "review of typhoons" sent to Editors for editorial review
31 March	- Submit finalized script to typhoon Committee secretariat

ESCAP/WMO Typhoon Committee Annual Review 1985

Proposed Table of Contents

<u>Chapter</u>	<u>Title</u>	<u>Remarks</u>
	Foreword	By Chairman of Typhoon Committee
1	Typhoon Committee Activities in 1985	
	(a) Meteorological Component	(a) - (e): Chief Editor to compile inputs from Editors
	(b) Hydrological Component	
	(c) DPP Component	
	(d) Training Component	
	(e) Research Component	
	(f) Typhoon Committee Secretariat	Input from Co-ordinator
2	Tropical Cyclones in 1985	Chief Editor to draft and circulate for comments from Editors
	(a) Overview	
	(b) Reports on individual tropical cyclones which affected members	(b): to include life history, damage done and tracks
3	TCP News	Chief Editor to draft, to include brief notes on eighteenth session
Appendix		A small selection of satellite or radar pictures

Annex IICONCEPT FOR A REGIONAL CO-OPERATION PROGRAMME AMONG MEMBERS
OF THE TYPHOON COMMITTEEObjectives

1. The broad objective of the regional co-operation programme in the typhoon area is to reduce the loss of life, disruption of economic activity and damage from strong winds, heavy rain and storm surge caused by typhoons, through:

(a) Improving the typhoon forecast and warning capabilities of members;

(b) Improving dissemination of warnings and exchange of information to ensure timely and appropriate community response at the national levels.

Benefits

2. The potential economic benefits and the impact of an enhanced regional co-operation programme to members in the area are:

(a) Timely and accurate forecasts and warnings to various sectors of the economy, e.g., agriculture, fishing, tourism, shipping;

(b) Earlier availability of the forecast of the movement and intensity of typhoons based on various techniques (numerical/dynamical models, statistical and synoptic methods);

(c) Improved human response to warnings from higher confidence in forecasts and better warning dissemination;

(d) Availability of reliable data from existing and new observing systems for analysis and forecasting of typhoons;

(e) Potential for archiving typhoon data sets in a suitable form for exchange between members for research and training;

(f) Better understanding of the three-dimensional structure of typhoons and the physical mechanism of their generation and decay;

(g) Improvement of present methods of typhoon forecasting by comparison of the results of the different forecast techniques.

/Essential

Essential activities within the programme

3. The implementation strategy should be to promote co-ordinated exchange of knowledge and proven methodology between members with the particular goal of improving the level of national meteorological services in the region. The responsibility for the issue of local warning will lie with the respective members. Therefore emphasis will be placed on improving the ability of members to obtain and use regional and global data bases for typhoon warnings. In order to achieve these goals it is necessary to:

(a) Strengthen the observational network, meteorological telecommunications and data-processing activities in the region;

(b) Identify additional resources and needs for upgrading existing facilities and centres;

(c) Prepare and issue regional operational tropical disturbance advisories for the area;

(i) Forecasts and advisories on tropical systems would whenever possible be based on advanced techniques;

(ii) Seasonal assessment of expected occurrence of tropical cyclones and their associated precipitation patterns.

(d) Distribute, rapidly, advisories and other relevant information to members concerned;

(e) Develop a strong training component.

Facilities

4. The regional operational co-operation programme for the typhoon area ensuring close co-operation between regional/specialized meteorological centres and national meteorological centres should include the following facilities:

(a) Observing systems including satellites, ASDARs (aircraft to satellite data relay), DCPs, drifting buoys and automatic weather stations and installation of equipment for reception of satellite information;

/(b)

(b) Additional observing systems and facilities specifically required for typhoon forecasting and warning including reconnaissance aircraft, storm warning radar, networks of special stations, dense local networks and special national data collection systems;

(c) Enhanced telecommunication system;

(d) Computer-based data processing (forecasting and various products preparation) facilities.

Functions

5. The regional operational co-operation programme should indicate the following essential functions:

(a) Exchange of forecasts and advisory messages on typhoons and tropical disturbances;

(b) Dissemination of special products produced in real-time (e.g. the enhanced supply of satellite information, results of typhoon-track forecasting obtained by statistical methods, numerical weather prediction models and combination of both methods);

(c) Real-time monitoring and storage of regional data and processed products by computer;

(d) Automatic monitoring of the regional data in order to determine in real-time the availability of the data and products;

(e) Education and training of personnel to upgrade the ability to issue typhoon forecasts and warnings;

(f) Intensified observations during a specific stage of a typhoon for the specified area.

The above functions should take into consideration the requirements of the hydrological and disaster prevention and preparedness (DPP) components.

Implementation action

6. In order to proceed with the implementation of the regional co-operation programme of the meteorological component the following steps have to be taken:

(a) Preparation and approval by the Typhoon Committee of a "regional co-operation programme for the typhoon area (meteorological component)";

(b) Formulation of a detailed training programme for personnel engaged in the implementation and operation of the meteorological component;

(c) Publication of an operational manual based on the TOPEX Operational Manual.

A general planning of the regional co-operation programme (meteorological component), should describe in full detail the requirements for inputs to the hydrological component and the information required by the DPP component.

Implementation schedule

7. The plan should allow for the phased implementation of the various systems, facilities and services to be provided under the programme. Reference should be made in the programme to the short-, medium- and long-term goals to be achieved by specific target dates. This information should allow members of the Typhoon Committee to acquire the required resources. The implementation schedule will be periodically updated by the Typhoon Committee.

Annex III

PROGRAMME FOR 1986 AND BEYOND

A. Meteorological component

- (a) Operation and maintenance of electronic equipment (radar, radiosonde/radiowind, satellite receiving and telecommunication equipment);
- (b) Establishment of new radar stations at key locations in Malaysia, the Philippines, the Republic of Korea, Thailand, and Viet Nam;
- (c) Replacement and/or upgrading of old radar sets in Malaysia, the Philippines, the Republic of Korea and Thailand;
- (d) Provision of equipment and spare parts for weather radar, radiosonde/radiowind and satellite data receiving stations;
- (e) Establishment and improvement of satellite data receiving stations for reception of cloud imagery and other data from GMS and TIROS-N satellites;
- (f) Installation of a computer processing system at selected locations with a view to integrating satellite, radar and rainfall data, so as to provide a spatial distribution of rainfall amounts over a large region;
- (g) Review of national data collection facilities and data exchanges needed for typhoon warning services, taking remedial measures when necessary;
- (h) Review of existing arrangements for dissemination of typhoon warnings with a view to introducing improvements where necessary;
- (i) National collection of tide gauge and water level data for use in storm-surge prediction;
- *(j) Promotion of interdisciplinary co-operation and research at the interface between the meteorological and disaster prevention and preparedness components;

/(k)

* To be implemented with priority.

- *(k) Conducting studies on human response to warnings;
- *(l) Improvement of the operation of those centres with responsibility for the provision of processed information needed by Committee members for their forecasting and warning systems;
- *(m) Enhancement of co-operation in typhoon monitoring, forecasting and warning;
- (n) Planning of measures to be taken within the Committee's programme to identify and conduct studies which would assist in defining a cost-effective best mix of observing systems in support of typhoon forecasting and warning;
- (o) Provision or improvement of meteorological and telecommunication facilities included in the priority list established by the Committee;
- (p) Monitoring of data exchange on existing point-to-point telecommunication circuits with a view to their improvement where necessary;
- (q) Enhancement of Typhoon Committee members' facilities for reception/dissemination of meteorological information with automation and upgrading of GTS (Global telecommunication system) centres to accommodate higher-speed data transmissions;
- (r) Improvement of data completeness and quality, including real-time and non-real-time monitoring;
- (s) Procurement and installation of equipment and spare parts for telecommunication, radar, satellite data receivers, etc., under the UNDP fund for 1986;
- (t) Development of instruments to meet specific needs in tropical cyclone areas;
- (u) Undertaking and exchange of intensified observations (surface, upper-air and radar), and typhoon forecasts, to the extent possible, including products of different objective methods in accordance with the TOPEX Operational Manual;

/(v)

* To be implemented with priority.

(v) Commissioning of a comprehensive study on ways to provide adequate data over tropical-cyclone-prone ocean areas;

(w) Continued execution of the Sub-Experiment items of TOPEX incorporated into the research component of the Committee's programme.

B. Hydrological component

(a) Establishment of flood forecasting and warning systems in the Nam Ngum and Se Bang Hieng River basins in the Lao People's Democratic Republic, the Pasak River basin in Thailand and one river basin to be selected in Viet Nam;

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

(c) Monitoring of the performance and forecast accuracy of existing flood forecasting systems;

(d) Exchange visits by experts to flood forecasting systems being monitored, possibly in the form of study tours;

(e) Organizing missions by experts to provide technical guidance on item (a) and (b) at the request of members, with bilateral or multilateral support if available, making use, where appropriate, of technology available through HOMS (Hydrological operational multi-purpose subprogramme);

(f) Establishment and operation of flood forecasting and warning systems for dam operations in the Philippines;

(g) Development of guidance on hydrological technology, including hydrological models, in consultation with members on the basis of OHP (Operational hydrology programme);

(h) Development and use of improved techniques for QPF (Quantitative precipitation forecast), taking advantage of data provided by satellite and radar;

(i) Investigation, survey and study of the pilot area selected for comprehensive flood loss prevention and management;

/(j)

(j) Formulation of an implementation programme for flood risk analysis and mapping in the pilot area;

(k) Establishment of simulation models for flood risk analysis and mapping in the demonstration area;

(l) Review of the existing arrangements for dissemination of flood warnings with a view to introducing improvements, where necessary.

C. Disaster prevention and preparedness component

(a) Taking follow-up action to foster disaster prevention and preparedness with reference to the recommendations made by the relevant mission;

(b) Taking follow-up action on the Philippine project to establish a Philippine training and research centre for disaster prevention and preparedness, through consultancy services where appropriate;

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

(d) Compilation of information on loss of human life and damage caused by typhoons, including damage to houses, public facilities, agricultural products, and so on;

(e) Promotion of interdisciplinary co-operation and research programmes among the meteorological, hydrological and disaster prevention and preparedness components;

(f) Improvement of public awareness on storm warnings, coupled with studies of human response to warnings;

(g) Establishment/upgrading of disaster prevention and preparedness plans at different levels;

(h) Strengthening national co-ordination and co-operation between departments/agencies involved in disaster prevention and preparedness activities;

(i) Improvement of communication systems for warning dissemination and relief operations;

/(j)

- (j) Improvement of damage assessment and reporting;
- (k) Development and exchange of information and guidance materials on structural and non-structural measures for mitigating disasters;
- (l) Conducting case studies on major disasters;
- (m) Organizing joint missions to evaluate disaster prevention and preparedness procedures and to provide advice on local problems;
- (n) Promoting enhanced co-operation among members on disaster prevention and preparedness matters;
- (o) Provision of advice and assistance in the field of training in disaster prevention and community preparedness, through consultancy services where appropriate;
- (p) Production of materials related to public information and education on the activities of the Typhoon Committee, particularly storm warning and disaster prevention and preparedness;
- (q) Establishment of disaster research and training institutes.

D. Training

- (a) Organization of seminars on the socio-economic impact of disasters, vulnerability and risk assessment and technology for disaster prevention;
- (b) Training of personnel through fellowships under the United Nations Development Programme, technical co-operation among developing countries, voluntary co-operation programme or other bilateral schemes on:
 - (i) Tropical cyclone forecasting;
 - (ii) Meteorology;
 - (iii) Flood loss prevention;
 - (iv) River engineering;
 - (v) Technology for disaster prevention;
 - (vi) Maintenance of electronic equipment;
- (c) Training by Typhoon Committee secretariat staff assisted by counterpart staff in meteorology, hydrology and electronics, in particular on the calibration, maintenance and repair of electronic equipment, including on-the-job training;

- (d) Exchange of information and identification of training facilities available among WMO members in areas of concern, and survey of available fellowship and scholarship assistance;
- (e) Participation in study tours and seminars relevant to the Committee's programme organized by members or international bodies;
- (f) Organization of training courses/seminars with bilateral/multilateral assistance on:
 - (i) Flood forecasting;
 - (ii) Disaster prevention and preparedness;
 - (iii) Socio-economic impact of disasters;
 - (iv) Disaster vulnerability and risk assessment;
 - (v) Meteorology;
 - (vi) Hydrology;
 - (vii) Electronics;
- (g) Provision of short-term fellowships with external support on:
 - (i) Utilization of software for integrating satellite/radar/rainfall data;
 - (ii) Quantitative precipitation assessment and forecast models;
 - (iii) Storm surge and wave prediction;
 - (iv) Flood forecasting;
- (h) Exploration of the possibility of:
 - (i) Providing facilities for the training of personnel in disaster prevention and preparedness;
 - (ii) Flood loss prevention;
 - (iii) Establishment of a Typhoon Committee training centre for the maintenance of electronic equipment;
- (i) Exchange of forecasters between tropical cyclone forecasting and warning centres.

E. Research

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

(b) Promotion of the exchange of information on typhoon-related research activities and their results, including development outside the region;

(c) Encouragement of co-operation in the study of typhoon-related topics, among researchers in the field of meteorology, hydrology and social sciences;

(d) Initiation and/or continuation of research on the following topics:

In meteorology

- (i) Utilization of TOPEX data sets (radar, satellite, upper-air soundings, etc.) in tropical cyclone numerical and physical modelling with the aim of improving existing methods of predicting formation, development and steering;
- (ii) Establishment and operation of a typhoon data bank for the western Pacific and East Asia with compatible software exchange between members;
- (iii) Development of an operational numerical weather prediction model for typhoon movement and development;
- (iv) Methods of typhoon location and accuracy;
- (v) Development mechanism and forecasting;
- (vi) Disastrous weather associated with typhoons;
- (vii) Objective forecasting of precipitation;
- (viii) Meso- and micro-scale weather systems related to typhoons;
- (ix) Interaction between typhoons and the tropical circulation;
- (x) The possibility of extended track forecasting methods;
- (xi) Sensitivity of objective methods to initial data distribution and quality;
- (xii) Compilation of a forecasters' guide for western north Pacific typhoon prediction.

In hydrology

- (i) Research and study on comprehensive flood loss prevention and management;
- (ii) Research and study on flood risk analysis, including flood risk mapping;

(iii) Review of the existing flood run-off models and development of appropriate models for the region;

(iv) Further study on application of meteorological inputs to flood forecasting.

In disaster prevention and preparedness

- (i) Studies on the socio-economic impact of disasters;
- (ii) Vulnerability and risk assessment of disasterprone areas;
- (iii) Socio-economic implications of inaccurate typhoon and flood forecasts and warnings.

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LIMITED

WRD/TC.18/L.1

11 July 1985

ORIGINAL: ENGLISH

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

Typhoon Committee

Eighteenth session
8-14 October 1985
Beijing

PROVISIONAL AGENDA

1. Opening of the session.
2. Election of officers.
3. Adoption of the agenda.
4. The Committee's activities during 1985:
 - (a) Meteorological component;
 - (b) Hydrological component;
 - (c) Disaster prevention and preparedness component;
 - (d) Training;
 - (e) Research.
5. Flood risk analysis and mapping.
6. Support for the Committee's programme.
7. Programme for 1986 and beyond.
8. Review of the 1984 and 1985 typhoon seasons/Annual publication.
9. Co-ordination with other activities of the WMO Tropical Cyclone Programme.
10. Consideration of the agenda for the nineteenth session.
11. Date and place of the nineteenth session.
12. Scientific lectures.
13. Adoption of the report.

LIMITED

WRD/TC.18/L.1
11 July 1985

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 13. Adoption of the report.
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LIMITED

WRD/TC.18/L.2

11 July 1985

ORIGINAL: ENGLISH

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

Typhoon Committee

Eighteenth session
8-14 October 1985
Beijing

ANNOTATED PROVISIONAL AGENDA

1. Opening of the session

The eighteenth session of the Typhoon Committee will be held at Beijing and begin on 8 October 1985.

2. Election of officers

Rule 6 of the rules of procedures of the Typhoon Committee states, "The Committee shall, at its first meeting of the year, elect from among its representatives a chairman and a vice-chairman who shall hold office until their successors are elected. They shall be eligible for re-election".

3. Adoption of the agenda

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

4. The Committee's activities during 1985

A review of the activities of the Committee since the seventeenth session will be made under this item (WRD/TC.18/1). The review will cover each of the five components of the programme, namely: (a) meteorological; (b) hydrological; (c) disaster prevention and preparedness; (d) training; and (e) research. The Committee is invited to assess the progress made since its seventeenth session, comment on the

activities undertaken in 1985 and offer suggestions for accelerating those not completed. The members may also wish to report on the establishment in their countries in 1985 of any relevant facilities not covered by the report.

5. Flood risk analysis and mapping

The results of the project on the improvement of disaster prevention systems based on risk analysis of natural disasters related to typhoons and heavy rainfall, implemented jointly by ESCAP and TCS will be reported in document WRD/TC.18/2. The Committee is invited to comment on the results of the project and give its views and recommendations on further action which should be taken at both national and regional levels to implement the recommendations of the first and second missions which visited the countries in connection with this project.

6. Support required for the Committee's programme

Document WRD/TC.18/3 will review the resources currently available from all sources to support the Committee's programme of activities, both with regard to the contributions made by members themselves and to the external support available from a variety of sources such as UNDP, the WMO/VCP, ESCAP/XB, TCDC, etc.

UNDP has supported the Committee's programme since 1968. The present UNDP project, RAS/81/054, "Programme Support to the Typhoon Committee" will terminate in December 1986. The post of Telecommunication/Electronics Expert will expire by June 1986.

It is expected that the Committee will pursue its deliberations on the subject of cash contributions which was taken up at the seventeenth session and which had elicited favourable comments of the Commission at its forty-first session.

On the basis of its foreseen needs; the Committee may wish to express its views on the extent to which these needs are expected to be met by the available resources and to propose measures to meet any shortfalls.

7. Programme for 1986 and beyond

It is proposed that the Committee may wish to continue its practice of selecting specific items of work on which it wishes to concentrate, with the assistance of TCS, during the coming year. In the light of the revised medium- to long-term plan, it may be desirable for

the Committee to review the future need for this item or to decide how it would wish to translate the appropriate activities in the plan into a more detailed work programme for a single year. A document (WRD/TC.18/4) will be submitted to the Committee for its consideration.

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At its fourteenth session the Committee decided to include in its subsequent sessions a review of the typhoon seasons. The review for this session would cover, as in the past, the period from 1 September 1984 to 31 August 1985. A country paper will be prepared by each member containing information on typhoons and associated floods and their corresponding damage based on the format prepared with the help of UNDRO and LRCS "Report on Damage Caused by Cyclones, Floods and Drought" adopted by the Committee. The Committee may wish to express its views on the reports to be submitted by members to the eighteenth session.

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10. Consideration of the agenda for the nineteenth session

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

11. Date and place of the nineteenth session

Rule 1 of the Committee's rules of procedure states: The Committee shall hold at least one session annually. The venues and date of its sessions shall be decided by the Committee". Members may wish to make offers to host the nineteenth session.

12. Scientific lectures

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

13. Adoption of the report

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

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LIMITED

WRD/TC.18/L.2

11 July 1985

ORIGINAL: ENGLISH

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

Typhoon Committee

Eighteenth session
8-14 October 1985
Beijing

ANNOTATED PROVISIONAL AGENDA

1. Opening of the session

The eighteenth session of the Typhoon Committee will be held at Beijing and begin on 8 October 1985.

2. Election of officers

Rule 6 of the rules of procedures of the Typhoon Committee states, "The Committee shall, at its first meeting of the year, elect from among its representatives a chairman and a vice-chairman who shall hold office until their successors are elected. They shall be eligible for re-election".

3. Adoption of the agenda

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

4. The Committee's activities during 1985

A review of the activities of the Committee since the seventeenth session will be made under this item (WRD/TC.18/1). The review will cover each of the five components of the programme, namely: (a) meteorological; (b) hydrological; (c) disaster prevention and preparedness; (d) training; and (e) research. The Committee is invited to assess the progress made since its seventeenth session, comment on the

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activities undertaken in 1985 and offer suggestions for accelerating those not completed. The members may also wish to report on the establishment in their countries in 1985 of any relevant facilities not covered by the report.

5. Flood risk analysis and mapping

The results of the project on the improvement of disaster prevention systems based on risk analysis of natural disasters related to typhoons and heavy rainfall, implemented jointly by ESCAP and TCS will be reported in document WRD/TC.18/2. The Committee is invited to comment on the results of the project and give its views and recommendations on further action which should be taken at both national and regional levels to implement the recommendations of the first and second missions which visited the countries in connection with this project.

6. Support required for the Committee's programme

Document WRD/TC.18/3 will review the resources currently available from all sources to support the Committee's programme of activities, both with regard to the contributions made by members themselves and to the external support available from a variety of sources such as UNDP, the WMO/VCP, ESCAP/XB, TCDC, etc.

UNDP has supported the Committee's programme since 1968. The present UNDP project, RAS/81/054, "Programme Support to the Typhoon Committee" will terminate in December 1986. The post of Telecommunication/Electronics Expert will expire by June 1986.

It is expected that the Committee will pursue its deliberations on the subject of cash contributions which was taken up at the seventeenth session and which had elicited favourable comments of the Commission at its forty-first session.

On the basis of its foreseen needs; the Committee may wish to express its views on the extent to which these needs are expected to be met by the available resources and to propose measures to meet any shortfalls.

7. Programme for 1986 and beyond

It is proposed that the Committee may wish to continue its practice of selecting specific items of work on which it wishes to concentrate, with the assistance of TCS, during the coming year. In the light of the revised medium- to long-term plan, it may be desirable for

the Committee to review the future need for this item or to decide how it would wish to translate the appropriate activities in the plan into a more detailed work programme for a single year. A document (WRD/TC.18/4) will be submitted to the Committee for its consideration.

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10. Consideration of the agenda for the nineteenth session

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

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Rule 1 of the Committee's rules of procedure states: The Committee shall hold at least one session annually. The venues and date of its sessions shall be decided by the Committee. Members may wish to make offers to host the nineteenth session.

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

13. Adoption of the report

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

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LIMITED

WRD/TC.18/L.2
11 July 1985

ORIGINAL: ENGLISH

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

Typhoon Committee

Eighteenth session
8-14 October 1985
Beijing

ANNOTATED PROVISIONAL AGENDA

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LIMITED

WRD/TC.18/L.2

11 July 1985

ORIGINAL: ENGLISH

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

Typhoon Committee

Eighteenth session
8-14 October 1985
Beijing

ANNOTATED PROVISIONAL AGENDA

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LIMITED

WRD/TC.18/L.2
11 July 1985

ORIGINAL: ENGLISH

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

Typhoon Committee

Eighteenth session
8-14 October 1985
Beijing

ANNOTATED PROVISIONAL AGENDA

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the Committee to review the future need for this item or to decide how it would wish to translate the appropriate activities in the plan into a more detailed work programme for a single year. A document (WRD/TC.18/4) will be submitted to the Committee for its consideration.

8. Review of the 1984 and 1985 typhoon seasons/annual publication

At its fourteenth session the Committee decided to include in its subsequent sessions a review of the typhoon seasons. The review for this session would cover, as in the past, the period from 1 September 1984 to 31 August 1985. A country paper will be prepared by each member containing information on typhoons and associated floods and their corresponding damage based on the format prepared with the help of UNDRO and LRCS "Report on Damage Caused by Cyclones, Floods and Drought" adopted by the Committee. The Committee may wish to express its views on the reports to be submitted by members to the eighteenth session.

The production of an annual publication was discussed at the seventeenth session and it was agreed that members would designate a national editor. Hong Kong had volunteered to provide the chief editor to the editorial board. The Committee may wish to review and comment on the report of the chief editor which would be submitted to the eighteenth session on the status of the annual publication.

9. Co-ordination with other activities of the WMO Tropical Cyclone Programme (TCP)

Development under the WMO Tropical Cyclone Programme (TCP) will be reported to the Committee under this item. A status report on the implementation of TCP is issued each year and the report up to 30 June 1985 will form the basis for the document submitted to the Committee at its eighteenth session (WRD/TC.18/5) giving information on the general and regional activities under the programme. The Committee may wish to review the effectiveness of the present arrangement for co-ordination of such activities and the exchange of information thereon.

10. Consideration of the agenda for the nineteenth session

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

11. Date and place of the nineteenth session

Rule 1 of the Committee's rules of procedure states: The Committee shall hold at least one session annually. The venues and date of its sessions shall be decided by the Committee". Members may wish to make offers to host the nineteenth session.

12. Scientific lectures

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

13. Adoption of the report

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

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LIMITED

WRD/TC.18/L.2
11 July 1985

ORIGINAL: ENGLISH

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

Typhoon Committee

Eighteenth session
8-14 October 1985
Beijing

ANNOTATED PROVISIONAL AGENDA

1. Opening of the session

The eighteenth session of the Typhoon Committee will be held at Beijing and begin on 8 October 1985.

2. Election of officers

Rule 6 of the rules of procedures of the Typhoon Committee states, "The Committee shall, at its first meeting of the year, elect from among its representatives a chairman and a vice-chairman who shall hold office until their successors are elected. They shall be eligible for re-election".

3. Adoption of the agenda

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

4. The Committee's activities during 1985

A review of the activities of the Committee since the seventeenth session will be made under this item (WRD/TC.18/1). The review will cover each of the five components of the programme, namely: (a) meteorological; (b) hydrological; (c) disaster prevention and preparedness; (d) training; and (e) research. The Committee is invited to assess the progress made since its seventeenth session, comment on the

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activities undertaken in 1985 and offer suggestions for accelerating those not completed. The members may also wish to report on the establishment in their countries in 1985 of any relevant facilities not covered by the report.

5. Flood risk analysis and mapping

The results of the project on the improvement of disaster prevention systems based on risk analysis of natural disasters related to typhoons and heavy rainfall, implemented jointly by ESCAP and TCS will be reported in document WRD/TC.18/2. The Committee is invited to comment on the results of the project and give its views and recommendations on further action which should be taken at both national and regional levels to implement the recommendations of the first and second missions which visited the countries in connection with this project.

6. Support required for the Committee's programme

Document WRD/TC.18/3 will review the resources currently available from all sources to support the Committee's programme of activities, both with regard to the contributions made by members themselves and to the external support available from a variety of sources such as UNDP, the WMO/VCP, ESCAP/XB, TCDC, etc.

UNDP has supported the Committee's programme since 1968. The present UNDP project, RAS/81/054, "Programme Support to the Typhoon Committee" will terminate in December 1986. The post of Telecommunication/Electronics Expert will expire by June 1986.

It is expected that the Committee will pursue its deliberations on the subject of cash contributions which was taken up at the seventeenth session and which had elicited favourable comments of the Commission at its forty-first session.

On the basis of its foreseen needs; the Committee may wish to express its views on the extent to which these needs are expected to be met by the available resources and to propose measures to meet any shortfalls.

7. Programme for 1986 and beyond

It is proposed that the Committee may wish to continue its practice of selecting specific items of work on which it wishes to concentrate, with the assistance of TCS, during the coming year. In the light of the revised medium- to long-term plan, it may be desirable for

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12. Scientific lectures

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

13. Adoption of the report

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

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LIMITED

WRD/TC.18/L.2
11 July 1985

ORIGINAL: ENGLISH

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

Typhoon Committee

Eighteenth session
8-14 October 1985
Beijing

ANNOTATED PROVISIONAL AGENDA

1. Opening of the session

The eighteenth session of the Typhoon Committee will be held at Beijing and begin on 8 October 1985.

2. Election of officers

Rule 6 of the rules of procedures of the Typhoon Committee states, "The Committee shall, at its first meeting of the year, elect from among its representatives a chairman and a vice-chairman who shall hold office until their successors are elected. They shall be eligible for re-election".

3. Adoption of the agenda

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

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A review of the activities of the Committee since the seventeenth session will be made under this item (WRD/TC.18/1). The review will cover each of the five components of the programme, namely: (a) meteorological; (b) hydrological; (c) disaster prevention and preparedness; (d) training; and (e) research. The Committee is invited to assess the progress made since its seventeenth session, comment on the

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activities undertaken in 1985 and offer suggestions for accelerating those not completed. The members may also wish to report on the establishment in their countries in 1985 of any relevant facilities not covered by the report.

5. Flood risk analysis and mapping

The results of the project on the improvement of disaster prevention systems based on risk analysis of natural disasters related to typhoons and heavy rainfall, implemented jointly by ESCAP and TCS will be reported in document WRD/TC.18/2. The Committee is invited to comment on the results of the project and give its views and recommendations on further action which should be taken at both national and regional levels to implement the recommendations of the first and second missions which visited the countries in connection with this project.

6. Support required for the Committee's programme

Document WRD/TC.18/3 will review the resources currently available from all sources to support the Committee's programme of activities, both with regard to the contributions made by members themselves and to the external support available from a variety of sources such as UNDP, the WMO/VCP, ESCAP/XB, TCDC, etc.

UNDP has supported the Committee's programme since 1968. The present UNDP project, RAS/81/054, "Programme Support to the Typhoon Committee" will terminate in December 1986. The post of Telecommunication/Electronics Expert will expire by June 1986.

It is expected that the Committee will pursue its deliberations on the subject of cash contributions which was taken up at the seventeenth session and which had elicited favourable comments of the Commission at its forty-first session.

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

13. Adoption of the report

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

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LIMITED

WRD/TC.18/L.2
11 July 1985

ORIGINAL: ENGLISH

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

Typhoon Committee

Eighteenth session
8-14 October 1985
Beijing

ANNOTATED PROVISIONAL AGENDA

1. Opening of the session

The eighteenth session of the Typhoon Committee will be held at Beijing and begin on 8 October 1985.

2. Election of officers

Rule 6 of the rules of procedures of the Typhoon Committee states, "The Committee shall, at its first meeting of the year, elect from among its representatives a chairman and a vice-chairman who shall hold office until their successors are elected. They shall be eligible for re-election".

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activities undertaken in 1985 and offer suggestions for accelerating those not completed. The members may also wish to report on the establishment in their countries in 1985 of any relevant facilities not covered by the report.

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

13. Adoption of the report

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

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LIMITED

WRD/TC.18/L.2
11 July 1985

ORIGINAL: ENGLISH

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

Typhoon Committee

Eighteenth session
8-14 October 1985
Beijing

ANNOTATED PROVISIONAL AGENDA

1. Opening of the session

The eighteenth session of the Typhoon Committee will be held at Beijing and begin on 8 October 1985.

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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".

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13. Adoption of the report

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LIMITED

WRD/TC.18/L.2
11 July 1985

ORIGINAL: ENGLISH

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

Typhoon Committee

Eighteenth session
8-14 October 1985
Beijing

ANNOTATED PROVISIONAL AGENDA

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13. Adoption of the report

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

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LIMITED

WRD/TC.18/L.2
11 July 1985

ORIGINAL: ENGLISH

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

Typhoon Committee

Eighteenth session
8-14 October 1985
Beijing

ANNOTATED PROVISIONAL AGENDA

1. Opening of the session

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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 1985

A review of the activities of the Committee since the seventeenth session will be made under this item (WRD/TC.18/1). The review will cover each of the five components of the programme, namely: (a) meteorological; (b) hydrological; (c) disaster prevention and preparedness; (d) training; and (e) research. The Committee is invited to assess the progress made since its seventeenth session, comment on the

activities undertaken in 1985 and offer suggestions for accelerating those not completed. The members may also wish to report on the establishment in their countries in 1985 of any relevant facilities not covered by the report.

5. Flood risk analysis and mapping

The results of the project on the improvement of disaster prevention systems based on risk analysis of natural disasters related to typhoons and heavy rainfall, implemented jointly by ESCAP and TCS will be reported in document WRD/TC.18/2. The Committee is invited to comment on the results of the project and give its views and recommendations on further action which should be taken at both national and regional levels to implement the recommendations of the first and second missions which visited the countries in connection with this project.

6. Support required for the Committee's programme

Document WRD/TC.18/3 will review the resources currently available from all sources to support the Committee's programme of activities, both with regard to the contributions made by members themselves and to the external support available from a variety of sources such as UNDP, the WMO/VCP, ESCAP/XB, TCDC, etc.

UNDP has supported the Committee's programme since 1968. The present UNDP project, RAS/81/054, "Programme Support to the Typhoon Committee" will terminate in December 1986. The post of Telecommunication/Electronics Expert will expire by June 1986.

It is expected that the Committee will pursue its deliberations on the subject of cash contributions which was taken up at the seventeenth session and which had elicited favourable comments of the Commission at its forty-first session.

On the basis of its foreseen needs; the Committee may wish to express its views on the extent to which these needs are expected to be met by the available resources and to propose measures to meet any shortfalls.

7. Programme for 1986 and beyond

It is proposed that the Committee may wish to continue its practice of selecting specific items of work on which it wishes to concentrate, with the assistance of TCS, during the coming year. In the light of the revised medium- to long-term plan, it may be desirable for

the Committee to review the future need for this item or to decide how it would wish to translate the appropriate activities in the plan into a more detailed work programme for a single year. A document (WRD/TC.18/4) will be submitted to the Committee for its consideration.

8. Review of the 1984 and 1985 typhoon seasons/annual publication

At its fourteenth session the Committee decided to include in its subsequent sessions a review of the typhoon seasons. The review for this session would cover, as in the past, the period from 1 September 1984 to 31 August 1985. A country paper will be prepared by each member containing information on typhoons and associated floods and their corresponding damage based on the format prepared with the help of UNDRO and LRCS "Report on Damage Caused by Cyclones, Floods and Drought" adopted by the Committee. The Committee may wish to express its views on the reports to be submitted by members to the eighteenth session.

The production of an annual publication was discussed at the seventeenth session and it was agreed that members would designate a national editor. Hong Kong had volunteered to provide the chief editor to the editorial board. The Committee may wish to review and comment on the report of the chief editor which would be submitted to the eighteenth session on the status of the annual publication.

9. Co-ordination with other activities of the WMO Tropical Cyclone Programme (TCP)

Development under the WMO Tropical Cyclone Programme (TCP) will be reported to the Committee under this item. A status report on the implementation of TCP is issued each year and the report up to 30 June 1985 will form the basis for the document submitted to the Committee at its eighteenth session (WRD/TC.18/5) giving information on the general and regional activities under the programme. The Committee may wish to review the effectiveness of the present arrangement for co-ordination of such activities and the exchange of information thereon.

10. Consideration of the agenda for the nineteenth session

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

11. Date and place of the nineteenth session

Rule 1 of the Committee's rules of procedure states: The Committee shall hold at least one session annually. The venues and date of its sessions shall be decided by the Committee. Members may wish to make offers to host the nineteenth session.

12. Scientific lectures

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

13. Adoption of the report

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

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FOR PARTICIPANTS ONLY

WRD/TC.18/2
14 August 1985

ORIGINAL: ENGLISH

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

Typhoon Committee

Eighteenth session
8-14 October 1985
Beijing

FLOOD RISK ANALYSIS AND MAPPING
(Item 5 of the provisional agenda)

Note by the ESCAP secretariat

Introduction

1. Under the hydrological component of the Typhoon Committee, members have been installing and carrying out structural measures to mitigate flood damage such as flood control reservoirs, levees, floodways, channel improvement, etc. Non-structural measures aimed at minimizing flood losses include flood forecasting and warning, evacuation and providing relief. Past experience has shown that large investments in the construction of flood control facilities had not always resulted in an overall reduction of flood losses. Besides, the effectiveness of flood mitigation by flood control facilities is limited and takes a considerable time to materialize. Even after the completion of a flood control project, floods exceeding the design value can cause considerable damage.
2. Considering the limited effectiveness of the conventional structural measures mentioned above, it is evident that optimum benefits can only be obtained when both structural and non-structural measures are co-ordinated to mitigate recurring flood loss as part of a co-ordinated plan for comprehensive flood loss prevention and management.
3. In the long-term programme adopted at its eleventh session in 1978, the Typhoon Committee expanded the scope of the hydrological component to include comprehensive flood loss prevention and management. Under this programme, an advisory team was sent to members in 1980 to provide advisory services with regard to the selection of pilot areas or basins for comprehensive flood loss prevention and management.
4. At its fourteenth session in 1981, the Typhoon Committee was requested to make strong representations to ESCAP for the allocation within the context of its mandate of a portion of its resources to support priority projects of the Committee. In response to this request, the ESCAP secretariat, in June 1982 informed the Typhoon Committee secretariat Co-ordinator that it would be prepared to consider, together with all other ESCAP requirements for extrabudgetary support, requests for support for any activities within the framework of the Typhoon Committee's programme of work on the basis of the priority criteria established by ESCAP. Accordingly, the Co-ordinator requested the members to submit appropriate proposals for projects to take advantage of the offer made by ESCAP.

5. At its fifteenth session, the Committee considered that the project on flood damage analysis and risk mapping would be the first step to be considered in evaluating the flood risk and seeking applicable measures for comprehensive flood loss prevention and management in the areas vulnerable to floods. The flood risk map contains invaluable information on the magnitude of floods and distinct flood hazard areas.

6. Subsequently, at its sixteenth session, the Typhoon Committee incorporated in its medium- to long-term plan an item on flood damage analysis and risk mapping in one or two demonstration areas as a part of comprehensive flood loss prevention and management.

7. Thereafter, the Typhoon Committee secretariat, in close consultation with the ESCAP secretariat, prepared a project proposal based on the proposals made by members. Finally, ESCAP endorsed the proposed project on improvement of disaster prevention systems based on risk analysis of natural disasters related to typhoons and heavy rainfall. At the request of ESCAP, the Japanese Government extended its generous financial support to the project.

1. Objectives of the project

8. The long-term objective of the project is to assist the countries concerned in the planning and formulation of appropriate measures through the application of a comprehensive approach to flood loss prevention and management.

9. The short-term objectives are to assess the need for and to identify deficiencies in establishing pilot areas for comprehensive flood loss prevention and management, in particular, in the implementation of flood risk analysis. The overall objective is to prepare recommendations for each member and formulate a concrete implementation programme on flood risk analysis in one or two specific areas in the Typhoon Committee region.

2. First mission

10. In co-operation with the Typhoon Committee secretariat, ESCAP organized the first mission for the project. The mission members comprised Dr. A. Tsuchiya, a senior expert in flood risk analysis, and Mr. H. Yokouchi, hydrologist from the Typhoon Committee secretariat. The mission visited six members of the Typhoon Committee (Republic of Korea, Hong Kong, the Philippines, Malaysia, Thailand and Viet Nam) from 24 September to 19 October 1984.

11. In each country or area, the mission assessed the need for and identified deficiencies in establishing a pilot area for comprehensive flood loss prevention and management, in particular, in the implementation of flood risk analysis. It also assessed the available existing data and material, together with the preparedness and capability of the respective members for the implementation of flood risk analysis, and made appropriate recommendations.

12. After assessment of the situation in each of the six members, it recommended that the Upper Klang River basin in Malaysia be selected as a demonstration area for implementing flood risk analysis, especially flood risk mapping. This recommendation was endorsed by the Typhoon Committee at its seventeenth session in December 1984.

3. Second mission

13. On the basis of the result of the first mission, in co-operation with the Typhoon Committee secretariat, ESCAP organized the second mission for the project, comprising Mr. N. Jitsuihiro, an expert in flood risk analysis, and Mr. H. Yokouchi, who visited Malaysia on 25 February 1985. Upon arriving in Kuala Lumpur, the mission discussed arrangements for the work to be carried out by the mission and counterparts with officials concerned from the Drainage and Irrigation Department, Malaysia. While Mr. H. Yokouchi left on 10 March 1985, Mr. Jitsuihiro stayed in Kuala Lumpur to continue the work until 18 April 1985.

14. The mission conducted a reconnaissance of the demonstration area (the Upper Klang River basin), carried out a detailed assessment of the available data and determined the detailed requirements for additional data. It also prepared a detailed implementation programme of flood risk analysis in the demonstration area.

15. After finishing his work in Malaysia, Mr. N. Jitsuihiro left Kuala Lumpur for Manila on 19 April where he remained until 25 April to make final arrangements for the mission report and relevant documents with Mr. H. Yokouchi at the Typhoon Committee secretariat. Subsequently, the Typhoon Committee secretariat submitted the report of the second mission to the ESCAP secretariat and prepared documents for the expert group meeting to be held in July 1985.

4. Expert group meeting

16. As the third stage of the project, ESCAP, in co-operation with the Typhoon Committee secretariat organized an Expert Group Meeting on the Improvement of Disaster Prevention Systems based on Risk Analysis of Natural Disasters Related to Typhoons and Heavy Rainfall, held at Bangkok from 8 to 13 July 1985. The purpose of the meeting was to review the results of the first and second missions and to discuss the detailed implementation programme of flood risk analysis in the countries or areas of the Typhoon Committee members as well as in the selected pilot demonstration basin. Members of the Typhoon Committee were invited to the meeting. ESCAP employed Dr. A. Tsuchiya and Mr. N. Jitsuhiro as resource persons for the meeting. Mr. H. Yokouchi was also invited as one of the resource persons.

17. The meeting made the following recommendations:

(1) Members of the Typhoon Committee visited by the first mission on flood risk analysis should advise the agencies concerned in their respective Governments to study carefully and to seriously consider the report of the first mission with a view to:

(a) Assessing the recommendations as to their clarity and adequacy in providing guidance for future action;

(b) Determining the capacity of local staff to carry out the work involved and any specialized training requirements to upgrade the technical skills of the staff;

(c) Estimating both the national and external resources required to implement the recommendations of the mission; and

(d) Determining any appropriate legislative, fiscal and/or administrative action needed to be taken to initiate flood risk analysis.

(2) Similar action should be taken by the Government of Malaysia with respect to the report of the second mission, setting out a detailed implementation programme for the flood risk analysis of the Upper Klang River basin, as the timely implementation of the project on that demonstration pilot area would provide not only valuable experience for Malaysian technical staff but also useful information for the guidance of other members of the Typhoon Committee in carrying out similar activities.

(3) Developed countries and international agencies should, to the extent possible, provide assistance and support to the Government of Malaysia in the implementation of its flood risk analysis project on the Upper Klang River basin as well as to other members of the Typhoon Committee which would carry out similar activities.

(4) The Typhoon Committee should include in its work plan a project on the preparation of a manual and guidelines on flood risk analysis, as well as on the preparation of material such as pamphlets and film shows for distribution to promote the comprehensive approach to flood loss prevention and management based on flood risk analysis.

(5) Members of the Typhoon Committee should be kept informed of the progress, problems and difficulties encountered in the implementation of the flood risk analysis of the Upper Klang River basin in Malaysia.

(6) When the pilot demonstration project on flood risk analysis of the Upper Klang River basin is completed, a seminar should be organized to demonstrate the methodology and techniques applied for the benefit of the staff of the members of the Typhoon Committee and the Panel on Tropical Cyclones.

In particular, attention is invited to recommendation (4) calling on the Typhoon Committee to include in its work programme a project on the preparation of a manual and guidelines on flood risk analysis as well as the preparation of information material on comprehensive flood loss prevention and management for promotional purpose.

5. Action proposed

18. The Typhoon Committee is invited to:

(a) Take note of the above information;

(b) Express its views on the recommendations of the expert group meeting.

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FOR PARTICIPANTS ONLY

WRD/TC.18/2
14 August 1985

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