WORLD METEOROLOGICAL ORGANIZATION

PUBLIC WEATHER SERVICES CORE
IMPLEMENTATION / COORDINATION TEAM (ICT/PWS)
Shanghai, China
20-24 September 2010

FINAL REPORT

EXECUTIVE SUMMARY

The Implementation/Coordination Team (ICT) of the Commission for Basic Systems (CBS) Public Weather Services (PWS) Open Programme Area Group (OPAG) met in Shanghai, China, 20-24 September 2010. In addition to the Chairperson and the Co-Chairperson of the OPAG, the meeting was attended by the Chairs of the two of the three Expert Teams active in the OPAG, together with the Chair of the Inter-Commission Task Team (ICTT) on Meteorological Services for Improved Humanitarian Planning and Response. Regrets were received from Mr John Guiney, Chairperson of the Expert Team on Services and Products Improvement (ET/SPI) who had to withdraw from attendance at short notice.

The ICT discussed the changing landscape within WMO as the effects of the Strategic Planning Process worked their way through the organisational structures. Of particular importance to the OPAG was the positioning of Service Delivery as one of the key Strategic Thrusts of the Organisation. The ICT discussed how the WMO Strategy for Service Delivery, currently under preparation, might best be reflected in the OPAG and Commission work. As a first step, it decided to propose to CBS a restructuring of the Expert Teams within the PWS OPAG to align them with the Strategy for Service Delivery.

Noting that the OPAG had a Term of Reference (TOR) relating to relationships between National Meteorological and Hydrological Services (NMHSs) and the private sector, and that the Sixtieth Session of the Executive Council (EC-LX, June 2008) had requested certain actions in this area, the ICT considered that the strong policy dimensions meant that this topic was not entirely suited to the mandate of the OPAG. However, it agreed to request clarification, through the President of CBS, as to what initiatives were in train in relation to this topic within the Secretariat.

Matters of particular note arising from the reports to ICT from the Chair of the ICTT and the Chairs of the ETs include the:

- The timeframe being pursued by the ICTT on assistance to Humanitarian Agencies, with the aspiration of having a report ready for the Sixteenth Session of WMO Congress (Cg-XVI, May 2011);

- Changes to the role of the operational forecaster driven by improvements in Numerical Weather Prediction (NWP) and an increasing focus on Service Delivery;

- Engagement of Google with the World Weather Information Service (WWIS) and Severe Weather Information Centre (SWIC) projects to increase their use and enhance their usability;

- Preparation of short “How-To” guides, of two pages or less, deriving from existing PWS Guidelines and designed for ease of reference; and,

- Development of a comprehensive listing of areas of expertise and competencies within PWS. This will be used to identify individuals with appropriate expertise and competency to contribute to PWS activities, both through engagement in ETs and otherwise.

The ICT received a thorough briefing on progress with the World EXPO 2010 Nowcasting Services (WENS) Demonstration Project from the staff of the China Meteorological Administration (CMA)/Shanghai Meteorological Bureau (SMB). The Team also visited the Bureau’s forecast office and the innovative “Service Delivery Platform” which has been established there. Finally, the Team visited the Meteoworld Pavilion at the EXPO 2010 and was pleased to see how many of the concepts promoted by the ICT had been incorporated into the design and content of the Pavilion.

An item which received special attention during the ICT discussions was how to measure effectiveness, both of the work of the PWS OPAG and the PWS Programme and of the output of NMHSs to user groups. The Team developed a number of strategies on how to improve the measurement and verification process. Central to these was the enlarging of the network of PWS Focal Points within NMHSs, and the greater engagement of this network with PWS activities.
Among the Deliverables agreed by the ICT are:

- The exploring by OPAG of the possibility of a joint conference with the International Association of Broadcast Meteorology (IABM) on changes and developments in the communication of weather information, in particular the growing use of social media;

- The development of a comprehensive list of PWS Experts to act as a resource for PWS activities;

- The literature review of existing relevant studies in the area of socio-economic applications of weather, water and climate services and the publication of a synthesis document;

- Updating, completing and publishing of a Guide to Meteorological Support to Olympic Games, currently in draft form. It was noted that this would have relevance to many large sporting and other events;

- Undertaking a range of activities by the PWS OPAG and the PWS Programme to support the concept of the Single Official Voice at times of severe weather; and,

- Exploring opportunities by the PWS OPAG and the PWS Programme for the provision of communication skills training for senior NMHS managers.

1. INTRODUCTION

1.1 At the kind invitation of the China Meteorological Administration (CMA) / Shanghai Meteorological Bureau (SMB), a meeting of the Public Weather Services (PWS) Core Implementation/Coordination Team (ICT) was held in Shanghai, China, from 20 to 24 September 2010. The meeting was chaired by Mr Gerald Fleming, the Chairperson of Commission for Basic Systems Open Programme Area Group on Public Weather Services (CBS OPAG/PWS). Opening the meeting Mr Fleming welcomed the participants, especially Mr Michel Jean of Canada who was attending his first ICT meeting as the Chairperson of the ICTT on Meteorological Services for Improved Humanitarian Planning and Response. He conveyed to the meeting the regrets of Mr John Guiney, Chairperson of the Expert Team on Services and Products Improvement (ET/SPI) who had to withdraw from attendance at short notice. Mr Fleming thanked the Director and staff of the SMB who had welcomed the participants and had made excellent arrangements for the meeting.. Ms Haleh Kootval of the WMO Secretariat welcomed the participants on behalf of the Secretary-General and briefed the participants on the objectives of the meeting and the most important events that had taken place since the ICT last met in Shanghai in 2008. These included the Fourteenth Session of CBS (CBS-XIV, Dubrovnik, Croatia, March/April 2009), and the Third World Climate Conference (WCC-3, Geneva, Switzerland, August/September 2009).

1.2 The Terms of Reference (TORs) of the ICT/PWS, as approved by CBS, are as follows:

a) Coordinate and keep under review the work of the PWS Expert Teams (ETs);

b) Identify and advise on the role of WMO's cross-cutting programmes relating to PWS, and keep under review the progress of Global Earth Observation System of Systems (GEOSS);

c) Continue with appropriate arrangements for consultation and collaboration with relevant technical commissions on cross-cutting issues, and with other CBS OPAGs to ensure coordination of services and systems;

d) Review and report on PWS support to WMO programme on disaster prevention and mitigation and also THe Observing system Research and Predictability EXperiment (THORPEX);

e) Explore the mechanisms to strengthen dialogues between NMHSs and the private service providers;

f) Continue to provide guidance to Members on the issue of NMHSs as the sole authority in the provision of official severe weather warnings;

g) Review and report on the effectiveness of the information and guidance material produced by the PWS Programme among NMHSs and relevant media and user groups;

h) Review and report on the effectiveness of PWS training activities;

i) Review and report on the improvements in national PWS programmes and activities as a result of activities under the WMO PWS Programme;

j) Keep abreast of the developments in the application of economics to meteorology and hydrology and on the economic benefits of PWS; develop strategies for advising NMHSs as appropriate;

k) Explore the mechanism to strengthen dialog between WMO and International Olympics Committee (IOC) in the context of meteorological support for the Olympic Games; and,

l) Devise means to optimize awareness and the dissemination of all relevant material arising from the work of the ETs to the PWS community.

2. BACKGROUND AND OBJECTIVES

2.1 Introducing the topics to be discussed at the meeting, the Chairperson of the OPAG outlined some of the broad scale issues that would bear on the work in PWS over the forthcoming period. The Strategic Planning process having been largely implemented at the Executive Council and at Secretariat level, is now feeding down to the level of the Technical Commission work. The CBS has prepared an Operating Plan in which the PWS activities and deliverables for the forthcoming financial period (2012-2015) are drafted. The relationships between the Commissions and the Secretariat are changing. The PWS OPAG had, in the past, been the only service component of CBS as the other three OPAGs were part of the World Weather Watch Programme focusing on systems. Now, however, the OPAGs on Integrated Observing System (IOS) and Information Systems and Service (ISS) are focusing on WMO Integrated Global Observing System Branch (WIGOS) and WMO Information System (WIS), respectively, while the OPAG on Data Processing and Forecasting System (DPFS) is placed within the Secretariat in the Department for Disaster Risk Reduction and Service Delivery (DRR and SD). In practical terms, the OPAGs on PWS and DPFS have worked, and continue to work, collaboratively on the Severe Weather Forecast Demonstration Project (SWFDP).

2.2 A major addition has been made to the work and responsibilities of the OPAG with the establishment of the ICTT on Meteorological Services for Improved Humanitarian Planning and Response. This ICTT, Chaired by Mr Michel Jean, held its first meeting in late August / early September 2010 and is focused on building stronger engagement with a key user sector. The ICTT includes representatives from the Commission for Climatology (CCl) and the Commission for Hydrology (CHy) and will possibly encompass representation from the Commission for Atmospheric Sciences (CAS) in the future, as well as strong representation from the specific user sector.

2.3 The ICT recognised that many of the concepts which have been developed and championed by the PWS Programme through the years have not only become mainstreamed in WMO, but are now encapsulated in Service Delivery, which is one of the primary Strategic Thrusts of the Organization. This is a broad concept and it is clear that it needs to be applied across all time scales, from nowcasting to climatological, and to hydrology as well as meteorology. The PWS Programme had traditionally dealt with Service Delivery issues as they applied to weather; the challenge was to see how the PWS OPAG, located within CBS, might contribute to and mobilize the effective implementation of SD in other areas of the work of WMO which were traditionally dealt with through other Technical Commissions.

2.4 The Chair also noted that the Executive Council had established a Working Group on Disaster Risk Reduction and Service Delivery (EC-WG DRR & SD), and another Working Group with responsibility for WIS and WIGOS; thus areas of work which had traditionally reported exclusively through CBS now have another line of reporting directly to EC. These changes have a bearing on the respective responsibilities of EC, the Commissions and indeed also the Regional Associations (RAs).

2.5 The Chairperson referred to the development of the Global Framework for Climate Services (GFCS) as an output from the Third World Climate Conference (WCC-3) and the associated High Level Taskforce (HLT), which is composed primarily of individuals outside the WMO community. The GFCS will be an important driver of SD concepts with respect to information at climatological time-scales.

2.6 The meeting was informed by Ms Kootval that CBS-XIV (Dubrovnik, Croatia, March/April 2009), had reviewed the work of the PWS OPAG and agreed to a new set of TORs. CBS had agreed that the work of the PWS Programme should continue to be coordinated through the Expert

Team on Service and Product Improvement (ET/SPI); the Expert Team on Communication, Outreach and Public Education (ET/COPE); the Expert Team on PWS in Support of Disaster Prevention and Mitigation (ET/DPM); and the Implementation/Coordination Team (ICT). All three ETs have met in the period since the last meeting of the ICT in Shanghai (ET/DPM, Kuala Lumpur, Malaysia, May 2009; ET/COPE, Havana, Cuba, November 2009; and ET/SPI: Hong Kong, China, May 2010).

3. THE WMO STRATEGY FOR SERVICE DELIVERY AND THE ROLE OF THE PWS OPAG IN THE STRATEGY AND ITS IMPLEMENTATION

3.1 The ICT held a wide-ranging discussion on the concept of Service Delivery (SD) and on the implications of developing and implementing this concept within NMHSs. There was agreement that this new paradigm had significant implications for the traditional work of the forecast office. A user-driven service is fundamentally based on the needs of the users, leading to a service model for NMHSs in which forecast information is provided that has been interpreted for the specific needs of the users concerned.

3.2 Many of the themes which had been strongly pursued within the PWS OPAG and PWS Programme over the years, such as user engagement, quality of presentation, innovation in products and services, etc., will be essential components in a successful SD Strategy; thus the PWS OPAG and PWS Programme will clearly have a strong role to play in promoting and advancing the strategy within WMO and the NMHSs.

3.3 The operational weather forecast components of NMHSs, because of the nature of their work and the importance to communities of quality weather information, have, over many years, developed expertise in delivering services and are frequently well ahead of other government services in marketing and delivering their services to the public. Their historical close ties to the media have helped greatly in transferring such skills into what are primarily scientific institutions.

3.4 The change of paradigm towards a SD Strategy can best be described by defining the new task of Meteorology and Hydrology (Weather, Water and Climate) to be “How to help users with their decision-making”. The challenge of the SD Strategy is to embed this thinking into all interactions between NMHSs and their users.

3.5 The concept incorporates an ambition to deliver information seamlessly across all time scales, from minutes to decades and even centuries. The delivery system will obviously depend on the time-scale; in particular, decision-making at the longer time scales (which incorporate climate change predictions) will generally be concerned with governmental strategic planning and will have strong political and economic dimensions.

3.6 Historically, meteorology has been divided into “weather” and “climate” and the question could be asked – When does weather stop and Climate begin? The ICT considered this to be an ill-posed question. An integrated SD Strategy must transcend time-boundaries. Thus, it is clear that whatever structures are established across WMO to promote the SD Strategy must encompass both CBS and CCl.

3.7 The scope of the work undertaken by the Applications of Meteorology Programmes (AMP) and their associated members representational structures suggests that the Commission for Agricultural Meteorology (CAgM), Commission for Aeronautical Meteorology (CAeM) and Joint WMO/IOC Technical Commission for Oceanography and Marine Meteorology (JCOMM) must also become closely involved in the work flowing from the SD Strategy.

3.8 In a similar manner, the ambition to incorporate hydrological forecasts, warnings, advice and guidance within an SD Strategy pre-supposes the engagement of CHy.

3.9 If Service Delivery is to be truly end-to-end, receiving feedback from users about the utility of products and services and developing new approaches to forecasting to meet user needs, then clearly the research community must also be integrated within whatever WMO structure is

established to promote SD. This implies developing an involvement with the World Weather Research Programme (WWRP) and CAS.

3.10 Taking all the above into account the ICT of the PWS OPAG considered a number of options as to how it should reflect the SD imperative in the structure of the OPAG and how, with time, the expertise of all the Commissions (but particularly the expertise residing within the CBS/OPAG on PWS; CCl/OPACE 3, Climate Products and Services; CHy/OPACHE III, Hydrological Forecasting and Prediction) might be engaged. It decided that a cascading series of changes, beginning within the OPAG itself, represented the best option for addressing this task.

3.11 The ICT noted that the WMO Strategy for Service Delivery can be articulated through four connected components that represent the "services chain"; design, development, delivery and evaluation. The design stage encompasses interaction and consultation with users, during which services requirements are defined. During the development stage, products, services and delivery channels are developed. The delivery stage represents the ongoing and routine delivery of services to users and is the 'operational' component. Evaluation involves the ongoing monitoring of performance, an essential component of which is user feedback, performance assessment and verification. The ICT noted that these four components are already reflected to a strong degree in the draft of the WMO Service Delivery Stratey.

3.12 In order to reflect this model within the PWS OPAG structure, the ICT agreed to re-focus the work of the three existing Expert Teams, whilst recognising that some of the existing structure was already consistent with this model. Accordingly, the ICT proposed a possible structure along the following lines:

- Expert Team on PWS User Needs;
- Expert Team on PWS Services and Products;
- Expert Team on PWS Delivery; and,
- Expert Team on PWS Monitoring and Evaluation.

3.13 Recalling that the draft of the CBS Operating Plan for 2012-2015 has already proposed the formation of one extra ET to focus on Service Delivery, the ICT suggested that the existing ET/DPM and this new ET should focus on the two remaining Strategic Areas (PWS User Needs, Monitoring Service Performance) not covered by the remit of the existing ET/SPI and ET/COPE, thus mapping the work of the ETs directly to the WMO Strategy for Service Delivery. Since early warnings and DPM are within the scope of the service to be delivered, these will now be put under all four Expert Teams.

3.13 The ICT further proposed that the Chairperson of the PWS OPAG should raise, initially with the President and Vice-President of CBS, and later with the CBS Management Group (MG), the possible alignment and coordination of the work of other OPAGs within the Commission with the WMO Strategy for Service Delivery.

3.14 The ICT also proposed that the President of CBS should consult with the Presidents of the other Technical Commissions to investigate how best to coordinate the work within CBS on Service Delivery with similar work within other Commissions, in particular CCl and CHy.

3.15 The ICT considered that, in time, a structure might evolve within WMO that would allow the work on improving SD to be seamlessly addressed across all time scales and all disciplines (weather, climate and water).

4. ICT WORK PROGRAMME

4.1 The ICT reviewed the Deliverables that it had established for the period 2008-2010. A table showing these Deliverables and the progress made, etc. is provided in Annex IV.

4.2 In discussing the lack of progress with respect to its Deliverable No 1 (engagement with the Private Sector) the ICT, noting that the initiation of actions requested by the Sixtieth Session of the Executive Council (EC-LX, Geneva, June 2008) in this area were still awaited, considered that the issues surrounding the interaction of NMHSs with the private sector had strong policy dimensions and were not appropriate to the mandate of the OPAG, but more properly belonged to the mandate of EC and Congress.

4.3 The OPAG requested the President of CBS to clarify with the Secretariat what initiatives were underway to advance the dialogue with the private sector in line with the request of EC-LX.

4.4 In regard to Deliverable No 2, on actions arising from the WENS Demonstration Project, the ICT noted that these were the responsibility of the SMB and would be completed following the conclusion of the operational phase of WENS at the end of October 2010.

4.5 The ICT noted with satisfaction that the work encompassed by the other Deliverables had all been accomplished within the proposed time-frame.

5. REPORT OF THE CHAIRPERSON OF THE TASK TEAM ON "METEOROLOGICAL SERVICES FOR IMPROVED HUMANITARIAN PLANNING AND RESPONSE"

5.1 The Task Team on "Meteorological Services for Improved Humanitarian Planning and Response" was established by the Commission of Basic Systems (CBS) of the World Meteorological Organization (WMO) at its Fourteenth Session (Dubrovnik, Croatia, March/April 2009). The objective of the Task Team is to work towards the development of operational capacities to provide meteorological, hydrological and climate information products and services to humanitarian agencies at international, regional and national levels to support their emergency contingency planning, preparedness and response.

5.2 Following the establishment of the Task Team, a brainstorming session on "Meteorological Services for Improved Humanitarian Emergency Contingency Planning and Response" was held at the WMO Headquarters, in Geneva, Switzerland, on 17 April 2009. The objective of the meeting was to explore how to proceed with the development of information products and services to support humanitarian contingency planning and response. The meeting was attended by experts from international and United Nations (UN) humanitarian agencies involved in humanitarian contingency planning, including the: International Federation of Red Cross and Red Crescent Societies (IFRC); Office for the Coordination of Humanitarian Affairs (OCHA); Office of the United Nations High Commissioner for Refugees (UNHCR); United Nations Children's Fund (UNICEF); United Nations Institute for Training and Research (UNITAR); World Food Programme (WFP); World Health Organization (WHO); and staff from the WMO Secretariat.

5.3 The brainstorming session took stock of the mechanisms used by the humanitarian agencies to access and exchange information, the type of information products they use, their level or meteorological expertise and the needs and requirements for meteorological, hydrological and climate information products and services. The session recommended the need to:

i) Better understand the decision processes and timing of emergency contingency planning and response of humanitarian agencies, including current sources of meteorological, hydrological and climate information;

ii) Better understanding of the needs and requirements of humanitarian agencies for meteorological, hydrological and climate information-products and services (contents, timing, format, distribution mechanisms);

iii) Engage experts from humanitarian agencies, WMO operational network and leading experts from meteorology, hydrology and climate;

iv) Include hydrological and climate aspects in the work of the Task Team.

5.4 To reflect hydrological and climate aspects in the work of the Task Team, the Presidents of CHy and CCl nominated experts to the Task Team. The President of CBS approved revised TORs for the Task Team.

5.5 The Task Team on "Meteorological Services for Improved Humanitarian Planning and Response" held its first meeting at the WMO Headquarters, in Geneva, Switzerland, from 31 August to 2 September 2010. The meeting was attended by 29 experts from international and UN agencies involved in the coordination of humanitarian contingency planning and response, experts in operational meteorology, hydrology and climate forecasting and WMO Secretariat staff. The meeting:

I. Reviewed the structure and decision-making processes of the humanitarian agencies at global, regional and national levels;

II. Reviewed the meteorological hydrological and climate information products and services currently used by humanitarian agencies, including their sources and dissemination mechanisms;

III. Reviewed needs and requirements of humanitarian agencies for meteorological, hydrological and climate information products and services;

IV. Reviewed the capacities available through the WMO operational network for provision of meteorological, hydrological and climate information products and services;

V. Identified major gaps with respect to the utilization of meteorological, hydrological and climate information products and services; and,

VI. Recommend concrete actions leading to the initiation of pilot projects for the development of prototype products and services targeted at the needs and requirements of the humanitarian agencies.

5.6 The first meeting of the Task Team did not explicitly examine the research aspects associated with the existing and future needs of humanitarian agencies. The initial priority was to take advantage of existing research and prototypes that are currently running, but not in an operational mode. The second stage will be for research to help the Task Team address the gaps and continuously improve the systems. For this to work, participants agreed that research aspects needed to be represented in the future work of the ICTT.

5.7 The meeting concluded that:

a. Currently there are many meteorological, hydrological and climate information products and services available from different sources. This results in lack of systematic use of meteorological, hydrological and climate information products as different sources provide different products. Humanitarian agencies require systematic and consistent sources of information from the regional to the national level.

b. There is a strong need for partnerships between the producers of meteorological, hydrological and climate information products and services and the users. Partnerships enable better understanding of user needs, building of trust and the provision of feedback leading to the continuous improvement of service delivery.

c. As a first step in ensuring that the requirements of humanitarian agencies for meteorological, hydrological and climate information products and services are met through the WMO operational network of NMHSs, Regional Climate Centres (RCCs), Regional Specialized Meteorological Centres (RSMCs) and Drought Monitoring Centres, there is a need to take stock of the products that are currently available and being used within the structures of the humanitarian agencies for their emergency contingency planning, preparedness and response.

d. The work of the Humanitarian Task Team will focus on meteorological, hydrological and climate information products at global and regional levels. Aspects related to provision of this information at national level, including the relationship between the NMHSs, humanitarian agencies and disaster risk management agencies would be addressed through the prototypes to be developed as part of the outcomes of the work of the Humanitarian Task Team.

e. To implement the first pilot, the Caribbean and Southern Africa were considered as potential regions. Consideration was based on: (i) good governance, including: political will; existence of coordination structures for DRM; availability of institutional and technical capabilities; and allocation of resources for DRM; (ii) political stability and demonstrated progress in DRM; (iii) capacity development activities being carried out by WMO and partners; and, (iv) presence in these regions of the humanitarian agencies.

6. REPORT OF THE CHAIRPERSON OF THE EXPERT TEAM ON SERVICES AND PRODUCTS IMPROVEMENT (ET/SPI)

6.1 The Chairperson of the Expert Team on Services and Products Improvement (ET/SPI) provided a review of the Team's activities and accomplishments since the Fourteenth Session of CBS (CBS-XIV). The work in 2009-2010 and future plans of the ET are summarised below.

6.2 The ET/SPI reviewed previous initiatives and reported on their progress since the last meeting. All Team deliverables associated with the TORs, which were approved by the Thirteenth Session of CBS (CBS-XIII, St Petersburg, February / March 2005), have been completed. As per the 2008 PWS ICT recommendation, responsibility for the WWIS and SWIC Websites was transfer to ET/DPM. ET/SPI reviewed the publication of the "Supplement to Guidelines on Biometeorology and Air Quality Forecasts" and the "Users Guide for the WWIS and SWIC". The ET/SPI also reviewed its contribution to the "Guidelines on Communicating Forecast Uncertainty" published by ET/COPE in 2009. The ET/SPI noted the useful guidance and information provided by guideline documents and supported the idea of developing a set of training materials for use in relevant WMO training workshops. The ET/SPI recommended the establishment of an inventory of training material on the use and communication of probabilistic information, making reference to best practices and guidelines from different regions around the world.

6.3 With regard to the WWIS Website, Deutscher Wetterdienst (DWD) has developed a scheme for a simple verification of WWIS temperature forecasts. The system outputs a country-based verification report which may be produced by DWD. The ET/SPI has asked if DWD would be willing to explore the possibility of developing a similar standard WWIS verification report for all WMO regions, since such information would be very useful, especially for developing countries. The ET/SPI also discussed a new approach of event-oriented verification of warnings. Since this approach is of more value to users, and will help to improve warning quality, the ET/SPI believes that further action is warranted to develop expertise in this field.

6.4 The ET/SPI continues to pursue and support WMO cross-cutting activities and initiatives with a focus on improving PWS products and services. The ET/SPI discussed the PWS involvement in the SWFDP sponsored by the CBS OPAG on Data-Processing and Forecasting Systems (DPFS). The Chairperson also provided an update on the contributions of the PWS

Programme to the World EXPO 2010 in Shanghai. These included the World Expo Nowcasting Services (WENS) Demonstration Project, and the Symposium on Meteorological Service Delivery and Disaster Risk Reduction (Shanghai, China, May 2010).

6.5 Probabilistic forecasting techniques have become state-of-the-art for a wide assortment of meteorological forecasts and are used for all timescales. The ET/SPI discussed a study from Sweden about how to use ensemble predictions for operational flood forecasting, which indicates that effective training and communication are clearly necessary to overcome the substantial institutional and communicative challenges in the application of Ensemble Prediction System (EPS). In addition, more attention needs to be paid to the specific decision structures and institutional challenges of end-users. The ET/SPI identified several actions to enhance the training material for the upcoming PWS training activities.

6.6 An important tenet of PWS is for NMHSs to have a comprehensive understanding of user requirements. Surveys of key user groups can help to identify areas where improvements in PWS can be made. As an example, surveys in some NMHSs have noted the need for improved accuracy, detail and timeliness of forecasts and warnings. The data retrieved from PWS user surveys on levels of user satisfaction with NMHS products and services could be a valuable tool in assisting with the verification of their services.

6.7 The ET/SPI noted the increasing acceptance of Quality Management Systems (QMS) as standard by many NMHSs. The formal adoption of quality management principles by service providers was becoming a requirement for certain international user communities, such as aviation and marine. It would be valuable for NMHSs which have implemented QMS to share their experiences with other NMHSs who are seeking to implement a QMS scheme. The ET/SPI proposed that its TORs should reflect the importance of QMS and other systems (such as the Information Technology Infrastructure Library (ITIL)) in improving service delivery, and that guidance should be provided in achieving these improvements.

6.8 PWS training activities cut across all socio-economic sectors of a country's development. Therefore, while identifying subject matter experts to contribute to PWS training activities, it would also be beneficial to consider identification of experts from among stakeholders. The ET/SPI also noted the importance of keeping abreast of specific needs associated with developing countries, including five basic skills areas which are applicable to addressing PWS aspects namely: Verification; Quality Management; Application of Probabilistic Forecasting for PWS; Service Delivery; and, Emerging Technology / Applications.

6.9 The ET/SPI noted that Numerical Weather Prediction (NWP) model outputs are increasingly "fit for purpose" for many PWS forecast products, with forecaster input unnecessary much of the time. Forecasting tools are also becoming much more sophisticated, and the ET/SPI reviewed the benefits of the digital forecasting workstations currently used in several NHMSs. The dominance of web-technology, particularly for forecast dissemination, was acknowledged. These issues are both motivating and facilitating the changing role of the forecaster, away from production and towards interpretation and interaction with users.

6.10 The ET/SPI continues to pursue collaboration opportunities with other CBS OPAGS. The Chairperson of the ET/SPI is a member of the Severe Weather Forecasting Demonstration Project (SWFDP) Steering Group sponsored by the CBS OPAG on Data-Processing and Forecasting System (DPFS). The ET/SPI is presently pursuing potential collaboration with the World Weather Research Programme/Joint Working Group on Forecast Verification Research (WWRP/JWGFVR) on user-oriented verification.

7. REPORT OF THE CHAIRPERSON OF THE EXPERT TEAM ON PWS ASPECTS OF DISASTER PREVENTION AND MITIGATION (ET/DPM)

7.1 The ET/DPM met in Kuala Lumpar, Malaysia, from 25 to 29 May 2009. The ET/DPM reviewed the work done by the previous ET/DPM and deliberated on issues covered under the present TORs of the ET. It also went over the relevant requirements identified by CBS-XIV and the 2006 WMO DRR Country-level Survey.

7.2 The status of the works associated with the various items under the TORs is as follows.

- TOR (b): In connection with the Shanghai 2010 World EXPO Multi-Hazard Early Warning Systems (MHEWS) Project, a Workshop on "DPM and Service Delivery" was held in Shanghai in May 2010. The event was an outcome of Deliverable 4 of the ET.

- TOR (c): In assisting developing countries in their efforts to improve disaster prevention and mitigation, no specific deliverable has been identified but several possible areas of development were noted including online resources for capacity building in respect of DPM, success stories in DPM, innovative dissemination methods and partnership with stakeholders. Regarding success stories, it was considered that there was already a good collection of examples of good practice in the relevant guidelines documentation, and that, therefore, there might not be the need to promulgate these separately.

- TOR(d): In connection with the development of the World Weather Information System (WWIS) and the Severe Weather Information Centre (SWIC), a new Google Earth version of the WWIS was launched in May 2010, incorporating a number of new features discussed at the ET meeting. The preparation of the Russian version of the WWIS is near completion. A mobile version of WWIS is also being planned. In collaboration with Typhoon Committee, a small software element, SWIdget, was launched on SWIC to connect users' PC desktop with warnings issued by NHMSs which were participating in the pilot project in warning dissemination. To support the development of the register of meteorological warning authorities, a sample register entry was developed and provided to the data management team of WMO as an outcome of Deliverable 2.

- TORs (e) and (g): In the development of reference material on early warning and the application of nowcasting, a draft of a new document "Guidelines on Early Warning Systems and Application of Nowcasting in Warning Operations" was completed as Deliverable 5 of the ET.

- TOR (f): In the development of reference material on cross-border exchange of warnings, the drafting of a new document "Guidelines On International and Cross-border Collaboration in the Warning Process" is near completion and will be Deliverable 6 of the ET.

- TOR (h): In the development of a list of experts in PWS aspects of DPM, a list of expertise required was drawn up as Deliverable 7 of the ET. It will be consolidated with the list of expertise in respect of SPI and COPE, and letters will be written to the Permanent Representatives (PRs) of WMO to seek appropriate nominations.

- TOR (i): Regarding collaborative activities with other CBS OPAGs and Technical Commissions, the meeting noted a number of collaborative projects in train with other WMO groups including: Regional Association II (RA II, Asia); Typhoon Committee; GDPFS; and WWRP.

7.3 The ICT recognised a strong connection between the scope of this ET and the Task Team on "Meteorological Services for Improved Humanitarian Planning and Response". It was agreed that there should be more information exchange between the two Teams, in particular,

about the operational relationship between the NMHSs, humanitarian agencies and disaster risk management agencies (see paragraph 5.7(d) above).

8. REPORT OF THE CHAIRPERSON OF THE EXPERT TEAM ON COMMUNICATION, OUTREACH AND PUBLIC EDUCATION ASPECTS OF PWS (ET/COPE)

8.1 The Chairperson of the Expert Team on Communication, Outreach and Public Education Aspects of Public Weather Services (ET/COPE) provided a review of the Team's accomplishments since the last ICT meeting (Muscat, Oman, June 2007), the subsequent Fourteenth Session of CBS (CBS-XIV, Dubrovnik, Croatia, March/April 2009) and the most recent meeting of the Team in Havana, Cuba, November 2009.

8.2 New TORs for the ET/COPE were developed at the last ICT meeting and were subsequently endorsed at CBS-XIV. The new TORs expand the scope of the Team's work to include – alongside communication aspects of Public Weather Services – an additional focus on outreach and public education, including the needs of developing countries, partnerships with media organisations, user education, communicating uncertainty and confidence in forecasts, media attribution, and communication with stakeholders. Activities undertaken by the Team against these TORs are described below.

8.3 The Team developed a publication entitled "Guidelines on Communicating Forecast Uncertainty" (PWS 18, WMO TD-No. 1422) that provides advice for NMHSs on how to effectively present and communicate forecast uncertainty information to users. These Guidelines will be updated as new uncertainty and confidence forecast methods are developed and will incorporate further examples of good practice.

8.4 The Team has recognised that some of the most effective ways to demonstrate concepts and ideas is through the use of examples. Accordingly, the Team produced a publication entitled "Examples of Best Practice in Communicating Weather Information" (PWS 17, WMO TD-No. 1409) which presents a host of examples in print and electronic (including Internet) media that demonstrate good ways to communicate PWS information.

8.5 Members of the Team contributed to the International Symposium on Public Weather Services, which was held in Geneva, Switzerland, December 2007, including presentations on communication skills and media training, service delivery from a developing country perspective, and the communication of forecast uncertainty.

8.6 Workshops and seminars are an integral component of capacity-building. PWS training courses often include a component on effective communication and presentation. To assist in the preparation of such courses, the Team developed a set of criteria to be used by organisers to help identify appropriate trainers and trainees and ensure that the courses are delivered by people with the right skills and are attended by those who will obtain the most benefit.

8.7 In order for NMHSs to effectively communicate with the user community, specific staff skills are required. Accordingly, the Team has developed a 'job description' that can assist NMHSs to identify staff members who can operate effectively in the roles of communicator and public educator.

8.8 The most significant activity undertaken recently by the Team has been the development of a series of short "Summary Guides" that succinctly communicate the key principles and information contained in various relevant guidelines and reports published over the years. Subjects covered by the "Summary Guides" include:

- Working with the Media;
- Using Surveys to Evaluate Services;

- PWS Communication, Outreach and Public Education - A short guide for developing countries;
- Communicating Forecast Uncertainty;
- Strategies for Communication and Public Education; and,
- Communicating with the Public.

8.9 A particular focus of the Team continues to be the issue that many NMHSs in developing countries suffer low visibility related to low government funding and poor communication skills. There is an ongoing need for NMHSs to put in place PWS communication, outreach and public education systems that not only target the general public but also policy makers. A "Summary Guide" has been developed to specifically address this issue.

8.10 The Team has recognised the role that can be played by surveys in improving weather services, and developed a "Summary Guide" to help NMHSs develop such surveys for their own needs.

8.11 The Team continued to place emphasis on the important role that NMHSs play in ensuring that both new and existing PWS products are used effectively. To successfully undertake this role NMHSs should cultivate good working relationships with user and interest groups and maintain regular public communication campaigns. The Team drew on existing publications, in particular "Examples of Best Practice in Communicating Weather Information" and "Guidelines on the Improvement of NMHSs - Media Relations and Ensuring the Use of Official Consistent Information" to develop "Summary Guides" that addressed these areas.

8.12 A new focus for the Team is the role of social media and the opportunities it offers to assist NMHSs. These include the use of services such as Facebook and Twitter to engage with the user community, to build organisational visibility, and to deliver operational services, public education material and other information of benefit to users. A set of Guidelines is in preparation by the Team that will assist NMHSs who may be considering using this technology by highlighting the opportunities as well as the potential pit-falls. Another area of particular importance to the overall effectiveness of Public Weather Services delivery is recognition, amongst policy makers and users, of the socio-economic benefits of weather services. The Team recognised the usefulness of a set of Guidelines that can assist NMHSs to communicate to these groups the value of weather services. Such Guidelines will draw on the results of relevant studies to present clear and succinct information on the socio-economic benefits that weather services deliver to the community and to Governments.

9. REVIEW OF THE WENS DEMONSTRATION PROJECT

9.1 An account of the experiences gained to date during the operational phase of the WENS Demonstration Project was presented to the ICT by Drs Zhaohong Yuan and Jinhua Dai of the Shanghai Meteorological Bureau (SMB).

9.2 The typhoon season had been very quiet in Shanghai during the EXPO period with only one tropical cyclone impacting Shanghai, and then not severely. A total of 62 Warnings Signals had been issued by the SMB to the EXPO organisers to the date of the ICT discussion; more than half of these (38 warnings) were issued for Heat.

9.3 Of all the EXPO activities cancelled to date more than half (288 out of 565) were due to severe weather. The forecasting of strong winds was still a difficult problem. Nowcasting products need to be developed for Wind Gusts, Hail and Lightning.

9.4 Despite the advanced technology, forecaster knowledge of system performance and behaviour is very important and forecaster evaluation is on-going. Training is a major issue, and is very time-consuming.

9.5 A presentation on the Impact Assessment work incorporated into WENS was given by Ms Mi Weihong of the SMB. Surveys of the public indicated that interest by users in the weather forecast services of the SMB increased with age, but was at a high level for those aged 35 and over.

9.6 High levels of satisfaction were registered with forecasts and warnings of Heavy Rain and Thunderstorms; the satisfaction ratings for warnings of strong winds were a little lower. After the conclusion of WENS, a complete analysis will be carried out of the information gathered in surveys, and a report will be prepared and published in due course.

10. MEASUREMENT OF EFFECTIVENESS OF PWS PROGRAMME AND OPAG

10.1 In considering the question of measuring the effectiveness of the work of the PWS Programme and the OPAG, the ICT identified two distinct areas where it would be desirable to collect effectiveness metrics:

1. From the work of the PWS Programme directly with the PWS community, encompassing training activities, project work (SWFDP and Learning Through Doing (LTD) Projects especially), workshops and seminars, etc.; and,

2. The work of national PWS Programmes with their various user communities.

10.2 The ICT also recognised that there were two distinct approaches to user surveys:

a) General surveys incorporating a standard set of questions addressed to a large number of recipients, typically conducted (often by specialist firms) via telephone, web, or post (the term “large” here being used relative to the possible total sample population); and,

b) Intensive surveys of key users or clients, involving smaller numbers but typically much more labour intensive and not suitable for outsourcing. Post-event surveys of Emergency Managers after a severe weather event would fall into this category.

10.3 The ICT reviewed the results and analysis of a survey of PWS Focal Points (FPs) that had been established in NMHSs; this network extends to 78 FPs and of these 34 had responded to the survey. The feedback was almost completely positive in nature; many NMHSs used the PWS guidelines and felt that they benefited from PWS training courses and other initiatives. Other NMHSs which had not yet had an opportunity to participate in PWS training events expressed a keen desire to do so.

10.4 The survey did reveal that knowledge and use of the PWS web pages on socio-economic benefits and assessments was relatively limited and the ICT recognised the need to promote these web pages among the PWS community.

10.5 Recognising the value of this network of PWS FPs, the ICT recommended that the network be extended to cover as many NMHSs as possible; that the FPs be engaged more vigorously with the work of the PWS OPAG and Programme, and that routine bi-annual surveys of the FPs be conducted to gauge the effectiveness of PWS activities. These surveys would satisfy the requirement as outlined in 10.1(1) above for general feedback from NMHSs to the Public Weather Service Programme (PWSP) using the techniques outlined in 10.2(a).

10.6 The Secretariat routinely distributes questionnaires to PRs of NMHSs whose staff have been engaged in PWS training and capacity-building activities. The rate of return is not as high as

might be wished. However, this activity satisfies the needs referred to in 10.1(1) above using techniques as outlined in 10.2(b).

10.7 The ICT viewed it highly desirable for all Members to engage in regular broad-ranging surveys of the general public and specific user groups as a means of measuring the effectiveness of their work and of gathering metrics which would be valuable in presenting business cases to financial and other government departments.

10.8 The ICT also recommended the use of intensive surveys of small numbers of key users, especially after periods of high-impact weather, through focus groups or other survey devices.

10.9 The ICT recognised that the full value of information flowing from surveys could not be realised unless this feedback was integrated into the decision-making and planning processes of NMHSs.

10.10 In consideration of the pressures on time experienced by all senior NMHS managers, and with a view to maximising the rate of return of PWS surveys, the ICT recommended that the use of on-line surveys be investigated as possibly providing a better and more time-effective solution (for Secretariat as well as NMHS staff) for the gathering of survey data.

11. DEFINITIONS OF EXPERTISE REQUIRED FOR PWS EXPERTS

11.1 Recalling a decision taken at the previous meeting of the ICT (Shanghai 2008) to establish a roster of PWS Experts who could resource training events, workshops and seminars, the Team noted the work reported by the Chairpersons of ET/DPM and ET/COPE in developing a list of areas of PWS expertise which needed to be provided by these Experts.

11.2 It was agreed that the Chairpersons of these two ETs would refine these listings of expertise and re-cast them to reflect personal expertise and competencies rather than areas of expertise; that these lists would then be merged by the Secretariat, and that the merged list would be sent to the Chairperson of ET/SPI so that he could add the expertise and competencies relevant to the mandate of his Team. It was anticipated that these tasks could be completed by the end of 2010 (see list of Deliverables).

11.3 This list would then be augmented as necessary with any further additions flowing from the experience of conducting training events, etc., and the complete list sent to PRs with a request to nominate suitable Experts who were available and willing to contribute to PWS work.

11.4 The list would also serve as a reference when assessing offers from Members of personnel to serve on the ETs within the OPAG.

12. DELIVERABLES FOR THE ICT FOR THE PERIOD 2010-2012

12.1 The ICT reviewed its own TORs and also the list of PWS Deliverables as outlined in the CBS Operating Plan for the period 2011-2015. Based on these documents it drew up a list of ICT/PWS Deliverables for the period 2010-2012. This list is appended to this report as Annex V. The relevant section of the CBS Operating Plan is appended as Annex VI.

13. PREPARATIONS FOR THE COMMISSION FOR BASIC SYSTEMS EXTRA-ORDINARY SESSION CBS-EXT.(10) AND THE CBS TECHNICAL CONFERENCE (CBS-TECO), WINDHOEK NAMIBIA, NOVEMBER 2010

13.1 The meeting reviewed the programme for the CBS-TECO on End-to-End Service Delivery as provided by the Vice-President of CBS, and noted the tasks and responsibilities that fell to the ICT Members. There was concern at the tight schedule of the TECO and the possibility that any time over-runs in the presentations would be difficult to retrieve. Contributors were asked to keep their presentations well within the time allowed.

13.2 It was confirmed that Mr Michel Jean would report on the work of the ICTT on "Meteorological Services for Improved Humanitarian Planning and Response" during that part of the CBS agenda devoted to receiving a report from the CBS DRR Co-ordinator. The Chairperson of the OPAG would make brief reference to this ICTT during his own presentation.

13.3 The Secretariat informed the ICT that the PWS document for CBS was at an advanced stage of drafting; that it would be edited to reflect the outcomes and decisions of this ICT meeting, and then passed to the Chairperson of the OPAG for final edits and as a basis for the presentation that the Chair would make to the Commission Members.

14. VISIT TO THE SMB FORECAST OFFICE AND SERVICE DELIVERY PLATFORM

14.1 The ICT paid a visit to the premises of the Shanghai Meteorological Bureau where it toured the forecast office (including the special WENS area incorporated within this room) and the Service Delivery Platform; a separate office dedicated to the effective communication of forecasts and warnings to users.

14.2 Dr Yang Yinming, Director of the Shanghai Weather Centre, made a presentation on the work of the Centre as the principal forecast office for the Shanghai region. The presentation outlined the organisation of the operational work and described some of the specialised products and services which had been developed for users. The Powerpoint presentation is appended as Annex VII – changed to PDF format for web purposes… (http://www.wmo.int/pages/prog/amp/pwsp/eventsexpertmeetings_en.htm).

14.3 Mr Feng Lei provided a presentation on the Service Delivery Platform during which he described some of the specific challenges in delivering a weather forecast and warnings service in the context of a mega-city. The weather service system is defined around the concept of Point, Line, Area and People (PLAP). Point identifies particular vulnerabilities or areas of high density. Line indicates the urban lifelines (utilities, traffic, etc.) which form the basic supply infrastructure of the city; Area refers to the broad dissemination of weather information via electronic screens, signal towers, etc.; People indicates the specific, human-centered weather services (Public weather health services, environmental weather, etc.) which encapsulate the impact of weather variables on citizens.

14.4 The Powerpoint presentation describing the work of the Service Delivery Platform is appended as Annex VIII. The ICT recognised that the establishment of this Service Delivery Platform represented an innovative and best-practice approach to the delivery of weather services to specialised clients and the public generally. The Team applauded the initiative of the SMB in re-organising its structure in this service-oriented fashion.

15. VISIT TO THE METEOWORLD PAVILION AT THE SHANGHAI EXPO 2010

15.1 At the kind invitation of the SMB, the Team was taken on a tour of selected pavilions at the Shanghai 2010 World Expo. This included an extensive and in-depth tour of the Meteoworld Pavilion which was of special interest, as the ICT had been consulted at an early stage in regard to the content and design of this showcase for the world of Meteorology.

15.2 Members of the ICT admired the wonderful visual displays which had been devised to illustrate aspects of weather and climate science. Highlights included: the Climate Change Gallery; the 4-D cinema; the Science-on-a-Sphere; and, the working weather office and weather broadcast studio which were at the heart of the Pavilion.

15.3 The Team viewed the animated film which had been produced to illustrate how meteorological technology and service delivery could help to bring a better quality of life to families in the future. This imaginative and powerful short feature was applauded by the ICT members.

15.4 The philosophy behind the design of the pavilion encouraged visitors to take some time to work through the various exhibition areas and not to rush; while this approach does limit total throughput it provides for a better-quality experience for the visitor. This approach has been vindicated by the numbers of visitors; the Pavilion has been operating at full capacity for almost all of the Expo period.

15.5 In addition, many Chinese weather broadcasters have come to Shanghai to broadcast from the Pavilion to their home audiences. This has helped to give the Meteoworld Pavilion a very high profile within the Expo and provides an outstanding example of outreach and public education to the rest of the meteorological community.

16. ADOPTION OF THE MEETING REPORT OF THE CBS OPAG ICT/PWS

The structure of the report was reviewed by the ICT and the section headings and draft text adopted. The Chairperson will finalise the report in consultation with the Secretariat and the ICT Members.

17. CLOSURE OF THE SESSION

17.1 The Chair and Members of the ICT expressed the gratitude of the Team to Dr Tang Xu and all the staff of the Shanghai Meteorological Bureau for the time and effort they had put into the hosting of the meeting. Special thanks were expressed to the meeting coordinator, Ms Wuyun, for the exceptional energy, dedication and warm friendship she displayed in exercising her role.

17.2 The meeting closed at 1500 hours on Friday, 24 September 2010.

List of Annexes to the Final Report of the Public Weather Services
Core Implementation Coordination Team (ICT/PWS)
Shanghai, China, 20-24 September 2010

Annex I: List of Participants

Annex II: Programme for the Meeting

Annex III: Terms of Reference (TORs) of the ICT/PWS

Annex IV: ICT/PWS Team Deliverables and Action Sheet for the period 2008/2010

Annex V: ICT/PWS Deliverables and Action Sheet for the period 2010/2012

Annex VI: CBS Operating Plan – PWS Section (Excel Spreadsheet)

Annex VII: Impact Assessment Implementation Progress of WENS (Shanghai, 22 September 2010) (see PWS Website at: http://www.wmo.int/pages/prog/amp/pwsp/eventsexpertmeetings_en.htm)

Annex VIII: Review of the World Expo Nowcasting Service (WENS) Demonstration Project Group, Shanghai (22 September 2010) (see PWS Website at: http://www.wmo.int/pages/prog/amp/pwsp/eventsexpertmeetings_en.htm)

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PARTICIPANTS AT THE MEETING OF THE PUBLIC WEATHER SERVICES CORE IMPLEMENTATION COORDINATION TEAM (ICT/PWS)

(Shanghai, China, 20-24 September 2010)

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Public Weather Services Core Implementation/Coordination Team

(Shanghai, China, 20-24 September 2010)

PROGRAMME

	Monday, 20 September 2010	**Tuesday, 21 September 2010**	**Wednesday, 22 September 2010**	**Thursday, 23 September 2010**	**Friday, 24 September 2010**
0900 1045	**1.** Opening and welcome address. **2.** Background information, and Objectives. (H.Kootval)	**7.** Review of the Shanghai Expo: WENS ➢ Operations ➢ Impacts ➢ Lessons learnt Issues of concern (SMB)	**11.** Report of the Coordinator of the DRR Task Team on support to Humanitarian Organizations (M. Jean)	**15.** Report on various PWS LTD projects (H.Kootval) (TOR g) **16.** How best to measure effectiveness of the PWSP at NMHS and user levels? (All)	**20.** Preparations for the session of CBS-Ext.(10) (Namibia, November 2010) (G. Fleming)
1115 1230	**3.** Report of the OPAG Chair on OPAG activities including those under TORs b and c. (G. Fleming) **4.** Outline of the report of the meeting.	**8.** Discussions on WENS including follow up plans (SMB, All)	**12.** Report of the Chair ET/SPI ➢ Status of deliverables ➢ The future directions (TOR a)	**6b.** Review of the role of the OPAG on PWS (All)	**21.** Preparation of ICT Report – Initial Drafts. (All)
	Lunch	**Lunch**	**Lunch**	**Lunch**	**Lunch**
1400 1530	**5.** The Service Delivery Strategy of WMO and the role of PWS in the Strategy and its implementation (Led by G. Fleming; All)	**9.** Application of WENS for nowcasting to other NMHSs (SMB, All)	**13.** Report of the Chair ET/DPM ➢ Status of deliverables ➢ The future directions (TOR a)	**17.** Definitions of expertise required for PWS and identification of experts in those areas (ET Chairs) **18.** Initial Draft of ICT Report	**22.** Adoption of ICT Report (All)
1600 1730	**6a.** Review of the role of the OPAG on PWS (All)	**10.** Visit to SMB ➢ PWS platform for Service Delivery ➢ WENS office	**14**. Report of the Chair ET/COPE ➢ Status of deliverables ➢ The future directions (TOR a)	**19.** Discussion of the ICT TORs and the need to identify clear and corresponding deliverables (All)	**23.** Closure

TERMS OF REFERENCE (TORS) OF THE ICT/PWS

The ICT is responsible for the overall coordination of the work of the PWS Expert Teams and oversees the implementation of tasks included their Terms of Reference (TORs) and Deliverables.

(a) Coordinate and keep under review the work of the PWS Expert Teams;

(b) Ensure coordination of the work of the OPAG with that of other WMO Programmes which relate to PWS;

(c) Continue to consult and collaborate as required with other Technical Commissions and with other CBS OPAGs to ensure coordination of services and systems;

(d) Continue to encourage stronger dialogue between NMHSs and the private sector – in particular the media – in areas relevant to PWS;

(e) Continue to provide guidance to Members on the importance of NMHSs as the sole authority in the provision of official severe weather warnings;

(f) Review and report on the effectiveness on the information and guidance material produced by the PWS Programme among NMHSs and relevant media and user groups;

(g) Review and report on the improvements in national and regional PWS activities as a result of demonstration projects and other WMO initiatives (following the “Learning Through Doing (LTD)” Project concept) contributed to by the PWS Programme;

(h) Review and report on the effectiveness of PWS training activities;

(i) Develop and maintain a database of PWS Experts who are willing to provide contributions to training activities and workshops;

(j) Assist NMHSs in the identification and assessment of the societal and economic benefits of PWSs and promotion of the benefits to be gained by users;

(k) Explore mechanisms to strengthen dialogue between WMO and the International Olympics Committee (IOC) in the context of meteorological support for the Olympic Games; and,

(l) Continue to promote awareness in the PWS community of all relevant material arising from the work of the Expert Teams.

COMMISSION FOR BASIC SYSTEMS (CBS) OPEN PROGRAMME AREA GROUP (OPAG) ON PUBLIC WEATHER SERVICES (PWS) IMPLEMENTATION / COORDINATION TEAM (ICT/PWS)

TEAM DELIVERABLES – 2008/2010

Deliverable 1: Consider matter of Private Sector – NMHS relationships in the light of decisions by EC-LX and decide on future actions.				
	Actions:	**Responsible:**	**Due Date:**	**Status:**
1.	Actions were to follow the outcome of ECLX	Secretariat	June 2008	EC-LX requested the Secretary-General to: Gather more knowledge about interaction of NMHSs with private sector by conducting a specific survey on their experiences, and preparing a publication on best practice model; Consider holding a WMO Seminar on interaction with the private sector, with participants including representatives of private companies **NOTE: Neither has been done**
2.				Policy and guidelines for an ethical framework for Secretariat engagement with corporate sponsors and donors was prepared by PWS for the EC-WG on DRR and Service Delivery

Deliverable 2: Prepare a synthesis document on the various components of the PWS Programme activities related to the Shanghai 2010 World EXPO with a distillation of lessons learned for future reference.				
	Actions:	**Responsible:**	**Due Date:**	**Status:**

1.	Synthesis document to be prepared following the discussions at the ICT-2010 meeting	WENS Coordinators and the WMO Secretariat	September 2010	To be done
2.	Lessons learnt for WENS	WENS Coordinators	??	To be done

***Deliverable 3:* Contribute actively to the work of the WENS SSG according to the agreed schedule of activities outlined in the WENS document.**

	Actions:	**Responsible:**	**Due Date:**	**Status:**
1.	Keep abreast of implementation of WENS and intervene as necessary	All led by Chair		Done

***Deliverable 4:* Contribute to the S-PAGE as required.**

	Actions:	**Responsible:**	**Due Date:**	**Status:**
1.	Work with the members of S-PAGE	All led by Chair		Done

***Deliverable 5:* Contribute to the SWFDP Steering Group as required**

	Actions:	**Responsible:**	**Due Date:**	**Status:**
1.	Participation by Chair ET/SPI in the meetings of the Steering Group	Chair, ET/SPI		Done

Deliverable 6: Report to CBS on the effectiveness of PWS material and initiatives, based on feedback received from the network of PWS Focal Points.				
	Actions:	**Responsible:**	**Due Date:**	**Status:**
1.	Survey the Focal Points on the effectiveness of materials and initiatives	Secretariat		Done Results to be reported at the meeting

**COMMISSION FOR BASIC SYSTEMS (CBS) OPEN PROGRAMME AREA GROUP (OPAG)
ON PUBLIC WEATHER SERVICES (PWS) IMPLEMENTATION COORDINATION TEAM (ICT/PWS)**

TEAM DELIVERABLES 2010/2012

(Shanghai, China, 20-24 September 2010)

Deliverable 1: Conduct a joint seminar with the IABM on the optimum use of new media for the effective communication of weather information.

	Actions:	Responsible Member(s):	Due Date:	Status:
1.	Organise and conduct a seminar. Publish results and outcomes.	Chair/OPAG	Prior to CBS 2012; TBD	
2.	GF to raise this at the IABM meeting in October; research options for location, timing, meeting support, etc.	Chair/OPAG		

Deliverable 2: Prepare a synthesis document on the various components of the PWS Programme activities related to the Shanghai 2010 World EXPO with a distillation of lessons learned for future reference.

	Actions:	Responsible Member(s):	Due Date:	Status:
1.	Synthesis document to be prepared following the discussions at the ICT-2010 meeting.	WENS coordinators and the Secretariat	November 2010	SMB
2.	Lessons learnt from WENS.	WENS coordinators	2011	Workshop to be organised.

Deliverable 3: Strengthen the involvement of the NMHS PWS Focal Points with the work of the OPAG and the PWS Programme.

	Actions:	Responsible Member(s):	Due Date:	Status:
1.	Update the list of National Focal Points periodically.	Secretariat	Ongoing	Ongoing

2.	Request PRs to appoint FPs in Member countries where none are as yet identified.	Secretariat		
3.	Carry out a regular survey of FPs and publish results.	Secretariat		
4.	Keep FPs fully involved and informed in the activities of the PWSP and the OPAG.	Secretariat		
Deliverable 4: Detailed feedback from recepients of targetted PWS activities, such as SWFDP, Learning-through-Doing projects, training etc				
	Actions:	**Responsible Member(s):**	**Due Date:**	**Status:**
1.	Organise the collection and analysis of feedback from training participants and PRs.	Secretariat	Ongoing	
2.	Collate information flowing back from the feedback mechanisms built into the SWFDP, and publish on PWS Website.	Co-Chair/OPAG; Secretariat	Ongoing	
3.	Organise the reception of bi-annual reports from Members participating in LTD projects (through FPs where possible) and publish on PWS Website.	Secretariat	Ongoing	
Deliverable 5: List of PWS experts who can contribute to training etc				
	Actions:	**Responsible Member(s):**	**Due Date:**	**Status:**
1.	Develop and refine the existing drafts of PWS Expertise and Competencies relevant to the work areas of the various Expert Teams.	ET Chairs	ET/DPM, ET/COPE End October 2010 ET/SPI End-year 2010	

2.	Collate and harmonise the three lists of PWS Expertise and Competencies areas into one over-arching list, adding in any other PWS Expertise areas that are identified in feedback from training courses, etc.	Secretariat	End-February 2011	
3.	Based on the list developed in 2 above, write to PRs and ask them to nominate Experts who would be available and willing to participate in PWS work.	Secretariat	April 2011	
4.	Develop a list of Experts with appropriate expertise and competencies as defined through the processes above.			
Deliverable 6: Collate existing studies and research in the area of socio-economic applications of weather, water and climate services. Publish Guidance on the operational use of economic assessment techniques.				
	Actions:	**Responsible Member(s):**	**Due Date:**	**Status:**
1.	Carry out a literature review of existing relevant studies and prepare a synthesis document which summarises the published knowledge.	Option A – Hire a consultant (Talk to John Z). Option B – work with SERA/WWRP group (Brian Mills) Secretariat	TBD	
2.	Publish Guidance document based on the above work.	Secretariat / Chair/OPAG	CBS 2012	
Deliverable 7: Guidelines for Meteorological support to Olympic Games.				
	Actions:	**Responsible Member(s):**	**Due Date:**	**Status:**
1.	Review draft and scope the remaining work.	Michel Jean	Completed	
2.	Update and complete the existing draft document.	Michel Jean	End-2010	

3.	Publish the completed document on the PWS webpages and provide print copies to the IOC and other sporting organisations, NMHSs and other relevant bodies.	Secretariat	April 2011	
Deliverable 8: Market and promote availability and use of PWS material among NMHS/PWS community.				
	Actions:	**Responsible Member(s):**	**Due Date:**	**Status:**
1.	Prepare an electronic "brochure" with links to the various PWS Websites and circulate to the PRs and FPs.	Secretariat	April 2011	
2.	Encourage the FPs to promote and spread knowledge about the "How-To" guides within their own NMHSs.	Secretariat	Ongoing	
3.	Investigate availability of statistics of hits on and usage of PWS pages on WMO Website.	Secretariat	End-2010	
4.	Discuss, with WMO Webmaster, strategies for increasing the ease of access to PWS pages through Google and other search engines.	Secretariat	End-2010	
5.	Make available WMO-No. 834 in soft copy on the PWS pages of the WMO Website.	Secretariat	End-2010	
Deliverable 9: Promote the concept of NMHSs as the Single Official Voice at times of severe weather.				
	Actions:	**Responsible Member(s):**	**Due Date:**	**Status:**
1.	Investigate the use of WMD and any other relevant occasions to promote this concept.	Chair/OPAG and Secretariat	February 2010	
2.	Make use of the new WMO Register of Alerting Authorities to promote and embed the SOV concept.	Chair/OPAG and Secretariat	Ongoing	
3.	Ensure inclusion of this principle in all relevant PWS documents.	Secretariat	Ongoing	

4.	Use the potential partnership with Google to highlight this in all future relevant WMO documentation.	Chair/OPAG and Secretariat	Ongoing	
Deliverable 10: Facilitate the development of one or a number of "one-stop-shops" for the provision of meteorological advice and assistance to the Humanitarian Response community.				
	Actions:	**Responsible Member(s):**	**Due Date:**	**Status:**
1.	Prepare an inventory of data and products that are currently available and can be used by Humanitarian Agencies.	Chair/ICTT and Secretariat	October 2010	
2.	Compile a listing of PWS-based resources relevant to point 1 above and communicate this to Secretariat DPFS, to include basic warnings, basic public forecasts, SWIC, WWIS, etc.	Secretariat	End-2010	
3.	Investigate the use of the delivery structure of WMO (RSMCs, RCCs, etc.) and the network of (national) PWS Focal Points as a resource in the context of national operations of Humanitarian Agencies.	Chair/ICTT and Secretariat	TBD	
Deliverable 11: Investigate the opportunites to develop and assist with improving media and communication skills for PRs and other senior NMHS managers**.**				
	Actions:	**Responsible Member(s):**	**Due Date:**	**Status:**
1.	Investigate with DRA and CPA the possibilities of using Regional Association meetings to deliver training courses aimed at senior NMHS personnel.	Secretariat	February 2010	
2.	Explore options with IABM for resourcing the training of communications in this context.	Chair/OPAG and Secretariat	October 2010	

Delivery 12: Delivery of the report of the ICT.				
	Actions:	**Responsible Member(s):**	**Due Date:**	**Status:**
1.	Finalise report of the ICT meeting in September 2010; circulate to all members and publish on the PWS Website.	Chair/OPAG and Secretariat	End-October 2010	

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CBS Operating Plan – PWS Section

No.	Activities	Deliverables	Progr.	ER(s)	KO	KPI	KPT 2015	Cost by year [in K CHF]				Total Costs	Source of Funding
								2012	2013	2014	2015		
1	Establish an Expert Team on Service Delivery with particular focus on implementation of the WMO Strategy for Service Delivery	Publish Guidance on the means to improve Service Delivery by NMHSs; develop strategies to optimise the implementation of this Guidance	PWS	1	1.1	1.1		60	60	60	60	360	In-kind (expert resources)
2	Complete the WENS project through reviewing progress made and sharing the results	Hold a series of training workshops to identify best practice flowing from the WENS project and to apply this elsewhere	PWS	1	1.1	1.1		24	24	24	24	96	In-kind (expert resources)
3	Improve the communications and networking capabilities of top-level NMHS managers	Workshops and training courses aimed at senior NMHS personnel	PWS	1	1.1	1.1		42	42	42	42	168	In-kind (expert resources)
4	Strengthen NMHS engagement with user communities through Learning Through Doing projects and in particular through the SWFDP	Engagement with SWFDP; development with stand-alone PWS Learning Through Doing projects (in conjunction with Regional Associations)	PWS	1	1.1	1.1		48	48	48	48	192	In-kind (expert resources)
5	Strengthen the cooperation with the Climate community, in particular through contributing to the developemnt of a Global Framework for Climate Services	Joint meetings and workshops organisd with CCl other members of the Climate community. Extension of Guidance, especially in the areas of presentation, communication and user engagement, to the climate time-scales	PWS	1	1.1	1.1		51	51	51	51	204	In-kind (expert resources)

6	Build the knowledge on quantifiable assessment, and deepen appreciation of the social and economic impact of meteorological services	Promote studies and research in the are of socio-economic applications of weather, water and climate services. Publish Guidance on the operational use of economic assessment techniques	PWS	1, 7	1.1	1.1	42	42	42	42	168	In-kind (expert resources)
7	Examine how new and emerging means of using communications technology, including social media, might be best utilised for the delivery of meteorological services	Conduct workshops and develop Guidance material on the optimum exploitation of new and emerging uses of Information and Communications Technologies	PWS	1	1.1	1.1	30	30	30	30	120	In-kind (expert resources)
8	Consider the technological challenges and roadblocks in delivering weather information to users seamlessly	Provide advice and guidance on optimum formats and compatibilities (GIS etc) for the integration of weather information with widely-used decision support systems.	PWS	1	1.1	1.1	18	18	18	18	72	In-kind (expert resources)
9	Continuing to build the Public Education function of NMHSs, especially in regard to impacts of severe weather	Provision of guidance material on recommended advice to be issued in conjunction with Severe Weather Warnings. Workshops and training activities	PWS	1	1.1	1.1	42	42	42	42	168	In-kind (expert resources)
10	Work with the Humanitarian Response community to develop a better understanding of their particular needs, and develop products and services to meet those needs	Facilitate the development of one or a number of "one-stop-shops" for the provision of meteorological advice and assistance to the Humanitarian Response community	DRR	2	2.1	2.1	42	42	42	42	168	In-kind (expert resources)

11	Develop methodologies for the proper assessment and documentation of meteorological hazards	Make studies of, and develop prototype guidelines for monitoring, archiving, mapping and statistical analysis methodologies for a selection of meteorological hazards	DRR	2	2.1	2.1		42	42	42	42	168	In-kind (expert resources)
								393	393	393	393	1,884	

Impact Assessment Implementation Progress of WENS

(Shanghai, 22 September 2010)

(see PWS Website at: http://www.wmo.int/pages/prog/amp/pwsp/eventsexpertmeetings_en.htm)

Review of the World Expo Nowcasting Service (WENS) Demonstration Project Group

(Shanghai, 22 September 2010)

(see PWS Website at: http://www.wmo.int/pages/prog/amp/pwsp/eventsexpertmeetings_en.htm)