

WORLD METEOROLOGICAL ORGANIZATION

COMMISSION FOR BASIC SYSTEMS

CBS STEERING GROUP SEVERE WEATHER FORECASTING DEMONSTRATION PROJECT (SWFDP)

Fourth Meeting

GENEVA, SWITZERLAND, 28 FEBRUARY – 2 MARCH 2012



FINAL REPORT



Dongyan Mao, Dan Beardsley, Young-Youn Park, Jeff Wilson, Bill Bothofer, Yuki Honda, Bernard Strauss, Eugene Poolman, Erik Andersson, Alice Soares, Steve Ready, Roy Bhowmik, James Kongoti, Ken Mylne, Dai Khan Nguyen, Ian Shepherd



Gerald Fleming, Paul Davies, and Peter Chen

EXECUTIVE SUMMARY

The fourth meeting of the Steering Group of the Severe Weather Forecasting Demonstration Project (SWFDP) was held in Geneva, Switzerland, from 28 February to 2 March 2012.

The Project Steering Group (PSG) reviewed progress in the implementation of the SWFDP in Southern Africa, South Pacific, Eastern Africa, Southeast Asia and Bay of Bengal (South Asia) and identified issues, including sustainability, training aspects, and support for the full participation of NMHSs, that were considered under the relevant agenda items.

The PSG noted that the sixteenth session of the World Meteorological Congress (Cg-XVI, Geneva, Switzerland, May 2011) approved a vision for the SWFDP as an end-to-end cross-programme collaborative activity led by the GDPFS. In this context, the PSG discussed the integration of satellite information, testing GIFS-TIGGE developments, synergies with Flash Flood Forecasting, agricultural meteorology, and developed a strategy for integrating new components in the SWFDP, as presented in Annex III.

The PSG noted that SWFDP strategic issues include the limited effectiveness of the current project activities in addressing the needs of those NMHSs with very constrained forecast capacity, due to limited or inadequate resources (human and financial). The PSG agreed that to address this issue, a number of activities might be targeted specifically to these NMHSs to address gaps and weaknesses, in order to bring them fully on board. The PSG developed a set of recommendations to support the full and sustainable participation of NMHSs, including those from LDCs, as presented in Annex IV.

The PSG reviewed the *SWFDP Overall Project Plan* and *SWFDP Guidebook on Implementing Regional Subprojects*, and agreed on a number of issues that should be added and/or modified, as presented in Annex V. The PSG requested the WMO Secretariat to work with members of the Group in updating these two documents, which should be presented to the meeting of the ICT-DPFS (Paris, France, 21-25 May 2012) for consideration.

The PSG noted that a revised Manual on the GDPFS (WMO-No. 485) is being prepared for consideration by CBS-XV, in September 2012. In this context, the PSG reviewed the draft text for the new Manual on a proposed specification of a network of regional and national centre(s) participating in severe weather forecasting, as given in Annex VI.

The PSG discussed future directions for the SWFDP, including prospects for new regional Subprojects and preparations for EC-LXIV and CBS-XV.

GENERAL SUMMARY OF THE WORK OF THE SESSION

1. OPENING OF THE SESSION

1.1 The fourth meeting of the Steering Group of the Severe Weather Forecasting Demonstration Project (SWFDP) was opened by Mr Bernard Strauss, Chairperson of the Steering Group, and Chairperson of the CBS OPAG on Data-Processing and Forecasting System (DPFS), at 0930 hours on Tuesday, 28 February 2012, in the WMO Headquarters, Geneva, Switzerland. Mr Strauss welcomed participants to the meeting, and invited Mr Peter Chen, the Chief of the Data-Processing and Forecasting System Division, to address the meeting.

1.2 On behalf of the Secretary-General of the WMO, Mr Peter Chen welcomed participants to the meeting, to Geneva in general and to the WMO in particular. Mr Chen noted that much has taken place in the SWFDP since our first planning workshop held in Toulouse in 2004, including much progress and much achievement, as the Steering Group had hoped and envisioned. He also noted that the SWFDP has been in either implementation or development phase in five regions. While noting that the detailed outcomes (including recommendations and requests) of the WMO Constituent Body sessions, including the 2010 extraordinary session of CBS (CBS-Ext.(10), Windhoek, Namibia, November 2010) and the sixteenth session of the World Meteorological Congress (Cg-XVI, Geneva, Switzerland, May 2011), related to or relevant to the SWFDP will be addressed under agenda item 3, Mr Chen pointed out that there are two challenging points which require consideration and guidance by the Project Steering Group (PSG). These are (1) the development of a specific component(s) within the SWFDP to fully support the participation of NMHSs including those with less capability, and (2) the expansion of the SWFDP framework to facilitate cross-programme coordination or integration as a means of increasing the overall effectiveness of the results. He recalled that the PSG should review the SWFDP strategy, taking into account future directions and planning for the SWFDP for consideration by CBS at its fifteenth session, in September 2012.

1.3 Concluding, Mr Chen expressed gratitude to the meeting participants for their contributions to the work of the CBS Steering Group of the Severe Weather Forecasting Demonstration Project, which would continue to assist WMO to provide even better assistance to its Members in facing the challenges of improving severe weather forecasting and warning services. He concluded by wishing everyone a successful meeting and an enjoyable stay in Geneva.

2. ORGANIZATION OF THE MEETING

2.1 Adoption of the agenda

2.1.1 The Project Steering Group (PSG) adopted the provisional agenda without change, as provided in Annex I to this report.

2.2 Working arrangements

2.2.1 All working documents and presentations submitted for the meeting are referenced and hyperlinked in the Documentation Plan (INF. 1), which had been posted on the WMO web site at:

http://www.wmo.int/pages/prog/www/DPFS/Meetings/SG-SWFDP_Geneva2012/DocPlan.html

2.2.2 The PSG agreed its hours of work and other practical arrangements for the meeting. Participants briefly introduced themselves, to facilitate interactions throughout the meeting. The list of participants in the meeting is provided in Annex II to this report.

3. OUTCOMES OF WMO CONSTITUENT BODY SESSIONS (CBS-EXT.(10), Cg-XVI) RELATED OR RELEVANT TO THE DEVELOPMENT OF THE SWFDP

3.1 The PSG was presented with a report on the outcomes of WMO Constituent Bodies, in particular the 2010 extraordinary session of CBS (CBS-Ext.(10), Windhoek, Namibia, November 2010) and the sixteenth session of the World Meteorological Congress (Cg-XVI, Geneva, Switzerland, May 2011), related or relevant to the development of the SWFDP. The PSG agreed to discuss the issues raised therein under the relevant agenda items.

3.2 The PSG noted that CBS-Ext.(10) re-established and re-affirmed the mandate for the Steering Group of the SWFDP to continue to give guidance and to monitor the further development of existing and new regional subprojects. In this context, the PSG recalled that CBS-Ext.(10) reconfirmed the importance of moving the SWFDP forward with a phased approach, starting with the most feasible elements and taking into account both local requirements and scientific and technical developments that might contribute towards its successful implementation. CBS also agreed that, in the initiation of new regional subprojects, the number of participating countries should ideally be limited to three or four countries, and the focus should be on hazards of strong winds and heavy precipitation, with possible expansion to additional countries and other weather-related hazards in a subsequent phase(s).

3.3 In addition, the PSG noted that CBS-Ext.(10) endorsed the *Strategy for the SWFDP*, developed by the PSG at its third meeting (Geneva, Switzerland, February 2010) and agreed that building capacity, especially in human skills and competencies, together with adequate tools (including innovative technology, such as high-performance computing), are essential and necessary in Developing and Least Developed Countries.

3.4 The PSG recognised that one of the main challenges for the SWFDP was the need for very short-range forecasting (including the first 12 hours) tools, to address especially the rapid onset of localized severe thunderstorms which can produce heavy precipitation and strong winds, given the absence of adequate real-time observational networks, especially weather radar coverage. In this context the PSG was informed that CBS-Ext.(10) encouraged continued coordination between the PSG and the CBS Expert Team on Satellite Utilization and Products (ET-SUP), to explore collaboration related to training, satellite information (data and products) and dissemination mechanisms to support the SWFDP.

3.5 The PSG was informed that Cg-XVI approved a vision for the SWFDP as an end-to-end, cross-programme collaborative activity led by the GDPFS. In this context, Cg-XVI agreed that the SWFDP should be maintained and supported as an important model for enhancing Members' disaster risk reduction and service delivery programmes, and therefore requested the Executive Council to continue to guide the cross-programmatic integration in the SWFDP, including engagement of users, addressing regional needs, and creating sustainable transitions to operations of SWFDP outcomes.

3.6 The PSG noted that Cg-XVI acknowledged the importance of continued project-critical support from advanced centres that provided NWP and satellite-based products, as well as the roles played by the Regional Centres, and in commending these centres for their enthusiastic participation in SWFDP regional subprojects thus far it strongly encouraged them to continue these efforts. In addition, the PSG noted that Cg-XVI recognized that a significant increase of resources (both human and

budgetary) is required to support multiple simultaneous sub-projects, including crucial regular training, commitment by the participating centres, and coordination and support by the Secretariat.

4. REVIEW AND EVALUATION OF SWFDP SUBPROJECTS (Status of the implementation)

4.0 The PSG was presented with progress reports on the implementation of the SWFDP regional subprojects in Southern Africa, South Pacific, Eastern Africa, Southeast Asia and Bay of Bengal (South Asia), by the Chairpersons of the respective Regional Subproject Management Teams. They expressed, on behalf of the participating countries in their regional subprojects, appreciation to WMO for the support and coordination of the SWFDP, and to the global centres for the products and support provided to their regions through this project.

4.1 SWFDP in Southern Africa

4.1.1 Mr Eugene Poolman (South Africa), Chairperson of the Regional Technical Implementation Team (RTIT) of the SWFDP – Southern Africa, presented the status and progress of the regional subproject, and recalled its development, which started with a planning meeting in August 2006 in Pretoria, (South Africa). Five countries were involved in the demonstration phase of SWFDP – Southern Africa (namely Botswana, Madagascar, Mozambique, Tanzania and Zimbabwe). Following the request by the Meteorological Association of Southern Africa (MASA), representing the NMHSs of the fifteen SADC (Southern African Development Community) countries, to WMO, the SWFDP – Southern Africa expanded its activities to all fifteen SADC countries (original five in addition to Namibia, Lesotho, Swaziland, Zambia, Malawi, Democratic Republic of the Congo, Angola, Seychelles, South Africa and Mauritius), as well as the Comoros. The PSG noted that WMO was enabled to support the full demonstration of the SWFDP – Southern Africa, which lasted up to December 2011, only because WMO surplus funds became available.

4.1.2 The PSG recalled that the regional centres for the SWFDP – Southern Africa were RSMC Pretoria, responsible for the basic guidance forecasts and dissemination of NWP/EP5 products, and RSMC La Reunion, responsible for tropical cyclone forecasting. An important addition to the regional modelling was the inclusion of RSMC La Reunion's 8km Aladin Reunion products, (made available via the RSMC Pretoria website) particularly those covering the Southwest Indian Ocean domain. Three global centres (i.e. ECMWF, NOAA/NCEP and the UK Met Office) participate and continue to provide NWP and EPS products to the regional subproject. The PSG noted that additional hazards were introduced during the full demonstration phase, to include winter weather as well as high swell and waves, particularly important to South Africa and the small island states.

4.1.3 The PSG noted that a meeting of the RTIT was held in Mauritius, in July 2011, to evaluate the full demonstration of the regional subproject and to discuss the "Continuing Development Phase" (referred to as "Phase 4") which consists of the transition of the successful and mature elements of the SWFDP – Southern Africa into operations, while allowing for future developments. The PSG noted that at this meeting MASA expressed its strong support for the SWFDP – Southern Africa and highlighted the enormous benefit of the project to its Members. The Ministers of SADC responsible for meteorology recognized that SWFDP is relevant to regional socio-economic benefits and development, and also contributes to climate change adaptation by improving severe weather prediction. They requested that their NMHSs secure the future of the regional subproject through sufficient budget allocation. MASA also requested the continued participation of the global and regional centres, and continued coordination with WMO. The RTIT meeting prepared a set of messages to MASA that will be tabled at the upcoming meeting of MASA, in March or April 2012.

4.1.4 The PSG noted that, at the RTIT meeting, evaluation of the subproject was presented based on the quarterly reports of participating countries. Feedback from the participating NMHSs was generally very positive, as it has improved warning services in many countries and contributed to the

improvement of relations between NMHSs and disaster management authorities. The PSG noted that all sixteen countries had participated in the training sessions, but that four of them have not participated fully in the SWFDP required activities. It noted with concern that there are a few countries which face varying difficulties with full participation and agreed that these countries need special attention to bring them properly on board. The PSG agreed to address this issue under agenda item 5.2.

4.1.5 While products provided by the RSMCs and the Global Centres were highly commended by the RTIT, the PSG noted that there are a number of issues and challenges identified from the subproject. These include:

- Verification of forecasts needs further development.
- Relationships between NMHSs and disaster risk management authorities, and between NMHSs and the media, need to be formalized in a number of participating countries, with emphasis on the joint development of contingency plans and Standard Operating Procedures.
- The further pursuit of user feedback from the rural communities.

4.1.6 The PSG noted that the SWFDP – Southern Africa initiated its Phase 4 in January 2012, continuing the operational activities from global and regional centres as in Phase 3. While noting that MASA's support is crucial for the sustainability of the SWFDP – Southern Africa, the RTIT proposed that its structure should continue to ensure seamless technical management, but that it should evolve from management by CBS to management by the SADC Regional Management, while maintaining regular reporting to the CBS Steering Group for SWFDP. RTIT also decided to develop an implementation plan for Phase 4 to address areas that need strengthening within the SWFDP framework beyond Phase 3. Continued training is regarded as of high importance and needs to be addressed through a variety of approaches (this issue is further addressed under agenda item 6.2). In addition, there is a need for (1) improvements in the current system and methodologies (e.g. verification, RSMC Pretoria Website, reporting, etc.), (2) synergy with the implementation of the Southern African Regional Flash Flood Guidance (SARFFG) project, and (3) integration of GIFS-TIGGE products.

4.1.7 The PSG expressed some concern about the sustainability of the SWFDP mature subprojects and agreed to address this issue under agenda item 6.1, when reviewing the concept and implementation of "Phase 4".

4.2 SWFDP in South Pacific

4.2.1 Mr Steve Ready (New Zealand), Chairperson of the Regional Subproject Management Team (RSMT) of the SWFDP – South Pacific, presented the status of implementation and progress of the subproject. The PSG recalled that the SWFDP – South Pacific entered Phase 1 (the planning stage) at the first meeting of the RSMT, in Wellington, in April 2009. Following this meeting, the subproject website, *MetConnect Pacific*, was built and a special forecaster's tool was constructed to help generate the RSMC Wellington guidance. The PSG noted that Phase 2 (the pilot phase) commenced on 1 November 2009 with the inclusion of RSMCs Wellington and Darwin (with geographical specialization) and RSMC Fiji (with activity specialization in Tropical Cyclones), together with three NMHSs (Solomon Islands, Vanuatu and Samoa). The PSG noted that the second meeting of the RSMT was held in Wellington, in November 2010, to evaluate the pilot phase of the subproject; this also coincided with the start up of Phase 3 (the Full Demonstration part of the subproject) which involved five additional NMHSs (Kiribati, Tuvalu, Tonga, Niue and Cook Islands). The subproject was still in Phase 3 at the time of this meeting.

4.2.2 Main highlights from this subproject include:

- RSMC Wellington produces the South Pacific Guidance twice a day, every day, detailing areas, if any, of heavy rain, strong wind, large waves and tropical cyclone outlook or current activity.
- The criteria for producing the South Pacific Guidance charts changed from 1 December 2010 in light of the experience during Phase 2.
- A verification process was started by RSMC Wellington to evaluate the usefulness of South Pacific Guidance charts in picking up heavy rain, strong wind, large waves and in assessing tropical cyclone potential over the following 5 days.
- *MetConnect Pacific*, the Project website continues to be hosted in “The Cloud”, with no performance issues. An upgrade to this website was installed on 15 December 2010 including addition of Australian Bureau of Meteorology ACCESS-T products.
- Progress Reports every 4 months are received from the 3 RSMCs and 9 NMHSs providing information about recent severe weather or wave events and progress on achieving the Project goals. Next reports due 17 March 2012.
- Training:
 - One round of in-country training visits to 8 participating countries (all except Niue).
 - WMO/JICA training course in Nadi, 1-12 August 2011;
 - 9th WMO/Australian Bureau of Meteorology Southern Hemisphere Tropical Cyclone and Public Weather Services course in Melbourne, 5-23 September 2011;
 - Tuition by Australian Bureau of Meteorology in use of TC Module software, Vanuatu, Fiji, Samoa and Tonga, February-April 2012;
 - A second round of in-country training for all participating NMHSs planned between May and November 2012.

4.2.3 The PSG noted the results of the subproject evaluation based on the feedback from the participating NMHSs (progress reports). The achievements relative to the SWFDP’s goals were summarized:

- Improved ability of NMHSs to forecast severe weather and wave events (it increased the skill and confidence of forecasters in issuing forecasts, and the enhanced the interactions between RSMC Wellington and participating countries);
- Increased lead-times for issuing forecasts and warnings (1 to 2 days in advance for damaging swell warnings; 6 to 24 hour for heavy rainfall (excluding mesoscale events));
- Improved interaction of NMHSs and DMCPAs (suggestion that the quality of exchanges with DMCPAs has improved but not the frequency; more work needs to be done in this area);
- Gaps and areas for improvement were identified (no wave observations (except for eye witness accounts), lack of skill in forecasting localized heavy rainfall events, poor internet connectivity, lack of forecasting skills and experience in the region, little or no verification work done)
- Improvement in the skill of products from Global and Regional Centres through feedback (global ensemble guidance weak for rainfalls $\geq 100\text{mm}$, enhanced satellite products required to help with forecasting localised heavy rainfall events).

4.2.4 Main issues and challenges identified from the subproject include:

- Long-term sustainability of SWFDP – external funding absolutely essential to address ongoing issues like training, meetings and technology changes including website upgrades.
- NMHSs developing new and/or revised products and so opening the way to verifying forecasts and warnings.
- Meaningful roles for NMHSs with strong dependence on Fiji for some or all of its forecasting and warning services.
- NMHSs playing a more proactive role at the service delivery end of the Cascading Process.

- Appropriate tools for forecasting more localized severe convective downpours.

4.3 SWFDP in Eastern Africa

4.3.1 Mr James Kongoti (Kenya), Chairperson of the Regional Subproject Management Team (RSMT) of the SWFDP – Eastern Africa, presented the status of implementation and progress of the subproject. The PSG was informed that the first phase of the SWFDP – Eastern Africa commenced with the Technical-Planning Workshop on the SWFDP Development for Eastern Africa, held in Nairobi, in October 2010. This was followed by the development of the Regional Subproject Implementation Plan (RSIP) and the subproject Web site. Phase 2 of the subproject (demonstration) started-up in September 2011, with the participation of the NMHSs of Burundi, Ethiopia, Kenya, Rwanda, Tanzania and Uganda. The Regional Specialized Meteorological Centre (RSMC) Nairobi acts as the regional centre for the project, providing daily guidance products covering the entire project footprint. A SWFDP – Eastern Africa Web site and Portal for the subproject has been developed, and is running at RSMC Nairobi. Global centres are the Met Office UK, NOAA/NEC, ECMWF and DWD (for providing the GME data needed for nesting HRM and COSMO).

4.3.2 The PSG noted that in addition to severe weather forecasting and warning services for the benefit of the general public and socio-economic sectors, in particular agriculture, across the entire project footprint, the SWFDP – Eastern Africa includes a specific component addressing severe weather forecasting and warning services over Lake Victoria. This element is focused on the safety and protection of fishers, living in nearshore communities and operating daily in small vessels. A forecast and warnings verification module is also part of this subproject component. The PSG noted that the Regional Forecasting Support Centre (RFSC) Dar-es-Salaam coordinates and provides specialized products from high-resolution NWP (LAM) over Lake Victoria, together with daily forecast guidance products. The PSG also noted that the Met Office UK runs the UM covering the Lake Victoria region at 4 Km resolution. Products are available through the SWFDP – Eastern Africa Website and Portal, as well as on the Website www.metoffice.gov.uk/weather/africa/lam. Targeted severe weather events are heavy rain, strong winds, hazardous waves (South-west Indian Ocean and Lake Victoria) and dry spells.

4.3.3 The PSG noted that 2-week training workshops were held in Dar-es-Salaam and Arusha (Tanzania), in October 2010 and November 2011, respectively. These workshops trained forecasters to correctly interpret and apply the various advanced forecasting products made available through the Subproject Web Portal. Training was also provided on how to improve the delivery of forecasts and warning services for key users (including general public, agriculture, fisheries, media and disaster management organizations), as well as on the forecasters' responsibilities in the project (e.g. reporting severe weather events, and progress of the project). Different agricultural applications and PWS were discussed in detail during the second training week. The PSG noted that, during these events, the following gaps and areas for improvement have been identified (and that an action plan has been prepared to address them):

- NMHSs lack a "warnings" or "alerts" link on the homepages of their websites;
- It was found desirable to develop a colour-coded map indicating areas under alert or warning;
- Participants appreciated the need to develop a database of warnings and corresponding weather parameters with records on severity intensity, which would be useful for encouraging the continuous improvement of warning services;
- At least one NMHS had no operational website.

4.3.4 Other issues and challenges identified from the subproject include:

- The NMHSs and their respective DMCPAs need to build strong synergies to ensure response and feedback mechanisms to the warnings/advisories by the agencies and communities involved.

- The participating Regional Centres and NMHSs should strengthen their interactive methodologies in order to enhance both the evaluation process and the on-line discussions on topical issues, or on severe weather event and its adverse impacts.
- NMHSs should prepare simple and clear forecast information and warning/advisory messages, giving clear statements on what is happening, forecasts of what may happen, and the expected impact, including what actions should be taken.
- NMHSs should design an appropriate strategy to obtain feedback from the public and media about the usefulness and effectiveness of warnings/advisories, perhaps using a questionnaire to be completed by the users after each severe weather event.
- “Fine tune” the Web portal design for easy navigation and accessibility by the participating NMHSs, and promote improvement in the Internet connectivity of all the participating Regional Centres and NMHSs.
- Encourage active participation of the “Expert Group” or focal points to address the key operational issues pertaining to the SWFDP.
- Focal points in the participating NMHSs need to submit SWFDP Quarterly Progress Reports as prescribed on a regular basis.

4.3.5 Noting that the SWFDP – Eastern Africa is in an early stage of implementation, the PSG strongly encouraged the participating NMHSs to prepare case studies.

4.4 SWFDP in Southeast Asia

4.4.1 Mr Yuki Honda (Japan), the RA II Theme Leader on NWP Systems and Products, reported on the current status and the future plan of the SWFDP in Southeast Asia. The PSG noted that following the Workshop on SWFDP Development for Southeast Asia (Ha Noi, Viet Nam, February 2010), a small Project Development Team was formed, with the participation of Mr Lai (Hong Kong, China), Mr Nguyen (Viet Nam) and Mr Honda (Japan). The Team drafted a Regional Subproject Implementation Plan (RSIP) based on the outcomes of the workshop and refined it reflecting the outcomes of a meeting to develop a strategy for preparing an Implementation Plan for an SWFDP in Southeast Asia (Tokyo, Japan, September 2010). The PSG noted that a Regional Subproject Management Team (RSMT) was established in 2010, with NMHS’ representatives appointed by the respective Permanent Representatives with WMO. The first RSMT meeting was held at the Headquarters of the Viet Nam Hydro-Meteorological Service in Ha Noi, Viet Nam, in October 2011. The meeting reviewed the status of preparation in the participating countries and discussed the framework and the schedule of the SWFDP – Southeast Asia. The final draft of the RSIP was prepared according to the outcomes of the meeting. The PSG noted that the demonstration phase would start in April 2012 and was expected to last for one year.

4.4.2 The PSG noted that NMHSs from Cambodia, Lao PDR, Thailand and Socialist Republic of Viet Nam participate in the SWFDP – Southeast Asia. Regional Centres are the Viet Nam Hydro-Meteorological Service (regional forecasting support), Hong Kong Observatory (training and technical support), and RSMC Tokyo and RSMC New Delhi (Typhoon / Tropical Cyclone forecasting support). China Meteorological Administration (CMA), Japan Meteorological Agency (JMA), Korea Meteorological Administration (KMA) and Deutscher Wetterdienst (DWD) participate in the SWFDP – Southeast Asia as Global Centres. Targeted severe weather events for the demonstration phase are tropical cyclones and heavy rain. The target domain is bounded by 10°S, 40°N, 80°E and 140°E.

4.4.3 The PSG noted that one of the main issues and challenges of the SWFDP – Southeast Asia is the establishment of a regional forecasting function since there is no RSMC in the target domain. The concept of a new centre, named as Regional Forecasting Support Centre (RFSC), which undertakes responsibility for the regional forecasting function, has been developed and the Viet Nam Hydro-Meteorological Service in Ha Noi has been assigned as the RFSC for this subproject. The main functions of this centre are the issuance of Daily Severe Weather Forecasting Guidance (which is

issued once per day at 08UTC), and the development and maintenance of the RFSC Web site and Portal.

4.4.4 The PSG noted that, following the action item from the seventh session of the THORPEX Asian Regional Committee (June 2010), the Meteorological Research Institute (MRI) of JMA will provide GIFS products through the SWFDP – Southeast Asia. These include TC track forecast and TC strike probability maps, using the TIGGE CXML data under the THORPEX North Western Pacific Tropical Cyclone Track Ensemble Forecast (NWP-TCTEF) research project, and risks of high-impact weather (i.e. heavy rainfall, extremely high/low temperature, and strong wind) using the TIGGE data from 4 global NWP/EPS centres (ECMWF, JMA, NCEP and UKMO). The participating NMHSs will evaluate these products using the Severe Event Evaluation Form, and the RFSC Ha Noi will provide feedback to MRI/JMA on their usefulness.

4.4.5 The PSG noted that the Meteorological Satellite Centre (MSC) of JMA will provide satellite-based products through the SWFDP – Southeast Asia, including additional satellite image sectors in line with user requirements and satellite products indicating potential areas of heavy rainfall associated with deep convective clouds. These products will be evaluated. The National Meteorological Centre (NMC) of CMA will develop and provide FY2 satellite products to the SWFDP – Southeast Asia. The PSG noted that there is a requirement for training of forecasters on these products.

4.4.6 The PSG noted that the SWFDP – Southeast Asia focuses on severe weather forecasting and warning services for the general public, media and disaster management organizations. In accordance with the PWS Guidance on Developing Service Delivery Mechanisms in NMHSs, the participating NMHSs are expected to develop an implementation plan for improving service delivery. The plan will be tested during the field phase and will be evaluated at the end of this phase to verify its usefulness and to identify areas for improvement.

4.4.7 The PSG noted that a 2-week SWFDP – Southeast Asia preparatory training workshop on GDPFS and PWS was held in Hong Kong, China, in July 2011. A second training workshop is tentatively planned in July in conjunction with the SWFDP – Bay of Bengal.

4.5 SWFDP in Bay of Bengal

4.5.1 Mr Roy Bhowmik (India) informed the Group that a WMO mission to the India Meteorological Department (IMD) and to its Regional Specialized Meteorological Centre (RSMC) New Delhi (with activity specialization in Tropical Cyclones) was carried out on 7 and 8 November 2011, to gather information on and discuss how operational weather forecasting is presently organized and carried out within IMD. Also discussed was the potential for expanding the role of the RSMC New Delhi to carry out the role of the lead regional centre for the SWFDP – Bay of Bengal (South Asia). The programme also included the visit to IMD facilities in New Delhi and to the National Centre for Medium Range Weather Forecasting (NCMRWF), Noida.

4.5.2 The PSG noted that a Technical-Planning Workshop on SWFDP for the Bay of Bengal (South Asia) was held in New Delhi, India, from 23 to 27 January 2012. Participants included representatives of Bangladesh, India, Maldives, Myanmar, Sri Lanka and Thailand, representatives from global products centres (JMA, NOAA/NCEP and IMD/NCMRWF; UK Met Office and ECMWF by videoconference), and the WMO Secretariat (DPFS, PWS, AgM and DRA programmes). The PSG noted that participants in this workshop unanimously agreed in principle that the implementation of a SWFDP in the Bay of Bengal region would be technically feasible and would bring benefits to countries of the region, including Bangladesh, India, Maldives, Myanmar, Sri Lanka and Thailand. These benefits would include the enhancement of technical capacity in operational weather

forecasting and advancement in service delivery to the general public and to key application areas such as agriculture and fisheries. Specifically, the PSG noted that the proposed regional subproject would focus on the following severe weather events (and their associated hazards such as flooding, droughts, etc.): heavy rain (50mm, 100mm), strong winds (17 knots, 34 knots), high waves / swells (2.5 m), and storm surge (1 m). It was agreed that IMD New Delhi will carry out the functions of the lead regional forecasting support centre for this regional subproject. It will be responsible for synthesizing all available and relevant products and information and for making the best use of these products in order to provide daily severe weather forecasting guidance. IMD New Delhi will also be responsible for developing and managing the Project Web Portal. The participating countries will be responsible for the warning services to the key users (general public, agriculture and fisheries). The Global NWP Centres to be involved in the project are New Delhi (IMD supported by NCMRWF), UK Met Office, NOAA/NCEP, ECMWF and JMA. The Regional Subproject Implementation Plan will be developed over the coming months.

4.5.3 While noting that the SWFDP – Bay of Bengal is focused on the safety of coastal communities, the PSG expressed some concern about the complexity of this subproject due to (1) the variety of weather conditions occurring in the region; (2) the number of national organizations potentially engaged in this regional subproject; and (3) the number of global NWP centres involved in the subproject. The PSG recommended that these aspects, including the roles and responsibility of the various centres, and the hazardous weather phenomena to be addressed in the first phase of this subproject, be clarified and well documented in the Regional Subproject Implementation Plan.

4.5.4 The PSG also expressed some concern about the overlap of the subproject domain with the subproject in Southeast Asia, and the potential participation of the NMHS of Thailand in multiple subprojects. This is particularly important when guidance differs, as guidance preparation draws on products made available by different global centres. The PSG recommended that special attention be paid by the NMHS of Thailand to the avoidance any possible problems.

5. DEVELOPMENTS REQUIRED IN THE SWFDP

5.1 Integration of new components

5.1.0 The PSG noted that Cg-XVI approved a vision for the SWFDP as an end-to-end cross-programme collaborative activity led by the GDPFS. Cg-XVI recommended that the SWFDP should engage all WMO programmes that concern the real-time prediction of hydro-meteorological hazards, through their respective Technical Commissions, from observations and information exchange to delivery of services, and from education and training to the transfer of relevant promising research outputs into operations. In this context the PSG discussed the integration of new components in the SWFDP, including the integration of satellite information, the testing of GIFS-TIGGE developments, synergies with Flash Flood Forecasting, and agricultural meteorology. Finally, the PSG developed a strategy for integrating new components into SWFDP (agenda item 5.1.5).

5.1.1 Integration of satellite information

5.1.1.1 The PSG was presented with an overview of WMO satellite-related activities of potential benefit to SWFDP in the areas of (i) soliciting support by satellite operators, (ii) regional requirements specification, (iii) product development, (iv) user training. The PSG recognized the important role of satellite data for the SWFDP and showed great interest in further enhancing the collaboration with satellite operators and with the WMO Space Programme.

5.1.1.2 The PSG was informed that two documents on SWFDP were submitted to the 2011 meeting of the Coordination Group for Meteorological Satellites (CGMS), one on a SWFDP strategy for improving the use of satellite data in SWFDP regional subprojects and another on the specific needs of the Lake Victoria Basin region (e.g. satellite-based products over inland waters). The PSG agreed that recommendations and actions which arose from the CGMS meeting should be addressed by either the Regional Subproject Management Teams of the various regional subprojects or by the WMO Secretariat in collaboration with relevant experts. In this context, the PSG stressed the need for satellite focal points in each regional subproject to ensure proper linkage with satellite operators and CGMS. The PSG suggested that, following the example of the EUMETSAT dialogue with users in RA I, regional SWFDP subprojects should clearly express their requirements for satellite products, based on lists of available products. This would provide input to the more general expression of regional requirements for satellite data, as recommended by WMO.

5.1.1.3 While noting that satellite data are already being used in a number of SWFDP regional subprojects, the PSG agreed that further improvement in user acceptance and uptake is required. The PSG therefore recommended continuing tailored support by the satellite operators, together with user training. In this context, the PSG encouraged all regional subprojects in need of training on satellite matters to call upon the regional Centres of Excellence in the WMO Virtual Laboratory for Education and Training in Satellite Meteorology.

5.1.1.4 The PSG confirmed the usefulness of EUMETSAT products, such as the Global Instability Index, for nowcasting purposes. In this context it realized that the EUMETSAT Satellite Application Facilities provide a broad range of operational satellite-based products, for example Nowcasting and Land Surface Applications, which could be used by the SWFDP regional subprojects. The PSG noted that for some products, such as land use/land cover maps, support from communities outside the NMHSs would be required.

5.1.1.5 The PSG agreed that satellite rainfall estimates have proven particularly useful in regions where rain gauges and radar coverage is sparse. It further agreed that forecast skill depends on the smart use of a combination of data sources, including model outputs and satellite-derived nowcasting products. In this context, the PSG stressed the importance of integrating satellite information into forecasting tools, and expressed the view that more information on such tools would be desirable.

5.1.1.6 The PSG noted that WMO, through the CBS Expert Team on Satellite Utilization and Products (ET-SUP), has started working on the Sustained, Co-Ordinated Processing of Environmental Satellite Data for Nowcasting (SCOPE-NWC) initiative, the main aim being to establish a network of facilities ensuring enhanced and sustained provision of high-quality satellite products related to nowcasting. This should primarily benefit users in NMHSs of smaller or developing nations, where expertise and facilities for processing and utilizing satellite data may be limited, but also more advanced nations where efficiencies could be gained through combining resources and efforts. The PSG agreed that SCOPE-NWC will contribute to the SWFDP.

5.1.2 Testing GIFS-TIGGE developments

5.1.2.1 Ms Young-Youn Park (Republic of Korea) recalled that ten lead global forecast centres provide regular ensemble predictions to support research on predictability, dynamical processes and the development of probabilistic forecasting methods. TIGGE data is made available for research after a 48-hour delay. Near real-time access may be granted for specific projects through the THORPEX International Project Office. The main objectives of TIGGE are as follows: (1) enhance collaboration on ensemble prediction, both internationally and between operational centres and universities; (2) facilitate research on ensemble prediction methods, especially methods to combine ensembles and to correct systematic errors; and (3) enable evolution towards a prototype operational system, the "Global Interactive Forecast System" (GIFS). After the successful completion of TIGGE

phase 1, the GIFS-TIGGE Working Group is focusing on the development and evaluation of prototype products for GIFS, using pilot studies in the context of regional forecast demonstration projects, and research and development projects. Products are being developed to enhance the prediction of high-impact weather. The first step focused on tropical cyclone prediction as one of the highest priority application areas. This will be followed by the development of products to support forecasts of heavy rainfall and strong wind.

5.1.2.2 The PSG note that the first GIFS-TIGGE prototype products on tropical cyclone track forecasts were first made available in real time during the THORPEX Pacific-Asian Regional Campaign (T-PARC) for use during the field phase (<http://cawcr.gov.au/projects/THORPEX/TC/index.html>). The data continues to be available since the end of T-PARC. The forecast data is being used by other research projects, including the NW Pacific Tropical Cyclone Ensemble Forecast Project and the Typhoon Landfall Forecast Demonstration Project. Several interested centres are using these data as the basis for developing tropical cyclone forecast products and are assessing their value. The PSG noted that the NW Pacific Tropical Cyclone Ensemble Forecast Project provides guidance in the form of tropical cyclone ensemble forecasts in near real-time to the ESCAP/WMO Typhoon Committee Members, to explore the utility of ensemble forecast products through the TIGGE CXML data and thus promote application of the products to the operational forecasting of tropical cyclones in the region. A Web site was set up under the Project and TC ensemble forecasts of major NWP centres have been distributed to the Typhoon Committee Members on a near real-time basis. It is accessible at <http://tparc.mri-jma.go.jp/cyclone/> with password protection (Web site developed by MRI/JMA). The PSG was informed that in the future it is planned to explore the use of TIGGE data to forecast tropical cyclone intensity and size; this information is currently not well predicted by the current generation of global ensemble prediction models.

5.1.2.3 The PSG noted that, in the next phases of GIFS development, probabilistic products for precipitation and near surface wind will be considered. At this stage, some prototype products for extreme weather events (i.e. heavy rainfall and strong winds) have been developed and are available after 3-days (using TIGGE data that is only available after a 2-day delay from the TIGGE archive) through the Web site <http://tparc.mri-jma.go.jp/TIGGE/>. For application to real-time forecasting promising products will be selected and used as the basis for developing real-time products, which will then be evaluated in the context of the SWFDP and other regional projects. The PSG expressed the view that it is desirable to reduce this delay to the production time to enhance support to operational forecasting.

5.1.2.4 The PSG recalled that, at its third meeting in 2010, it had agreed on collaborative arrangements with the GIFS-TIGGE Working Group, which is focused on the development and evaluation of prototype GIFS products for the SWFDP regional subprojects. Examples of the prototype products were presented at the ninth GIFS-TIGGE Working Group meeting (Geneva, Switzerland, September 2011). Since then, these products have been documented and forecasters at the regional centres of the SWFDP regional subprojects (especially, the SWFDP – Southern Africa, the SWFDP – South Pacific and the SWFDP – Eastern Africa, which are in implementation) have been invited to evaluate the products (in terms of usefulness, the need for additional products, the need for improvement) and to provide feedback to the GIFS-TIGGE Working Group.

5.1.2.5 While noting with interest these developments, the PSG expressed some concerns about the complexity of the information provided on the Web site for the forecasters at the regional and national centres participating in the SWFDP regional subprojects (i.e. they have a lot of information available but little training). In this context, the PSG suggested the development of a simplified Web page, presenting only the best products resulting from the research, which could be used by each of the SWFDP regional subprojects. The PSG was informed that a questionnaire related to severe weather is being prepared to assist in getting feedback from users. For tropical cyclones, the questionnaire has been already prepared and distributed to ESCAP/WMO Typhoon Committee Members.

5.1.3 Flash Flood Forecasting

5.1.3.1 Mr Paul Davies (United Kingdom) presented an overview of the challenges and opportunities in developing a flash flood forecasting component for the SWFDP. Among the main challenges in forecasting flash floods is the need for very short-range forecasting (including the first 12 hours) tools, especially to address the rapid onset of localized severe thunderstorms that produce heavy precipitation. In addition, there is no unique and simple theory about the runoff production on catchments during flash flood events. The main reason is that a variety of processes can be involved. These include the characteristics of the catchment (land use, soil type and depth, sub-soil, local slope, area of upstream contribution and the antecedent moisture conditioning). Therefore, in order to forecast flash floods reliably, the temporal and spatial resolutions of the underpinning meteorological and hydrological model should ideally be coupled to small scales. In recent years the possibility of a fully coupled meteorological – hydrological model has become more realistic.

5.1.3.2 The PSG noted that the WMO is attempting to address operational prediction of flash floods in the 1-6 hour time-range by introducing Flash Flood Guidance System (FFGS) projects in various developing regions of the world. The FFGS is a hydrometeorological modelling system that predicts the flash flood guidance value for each small river basin based on hydrological conditions, i.e. the rainfall amount needed for a given duration (1, 3 or 6 hours) that may lead to minor flooding in a specific basin. Mr Eugene Poolman (South Africa) informed the Group that the Southern African Regional Flash Flood Guidance (SARFFG) project is one of the sub-regional projects of the WMO's global FFGS programme. The PSG noted that the operational system will be rolled out in 2012. Seven countries in Southern Africa (Namibia, Botswana, Mozambique, Zimbabwe, Zambia, Malawi and South Africa), a regional centre (RSMC Pretoria) and a global centre would participate in the SARFFG through a mechanism of cascading of information to the NMHSs. SARFFG involves a combination of regular hydrological modelling for small catchments over the entire domain with real time precipitation information from satellites to determine catchments which had the potential to experience flash floods. The PSG agreed that similar to SWFDP, the SARFFG would allow forecasters in NMHSs to use the information received from the global and regional centres to issue nowcast information on potential flooding to the disaster management structures (end-users) in their countries. The PSG expressed the importance of developing an excellent collaboration between weather forecasters and hydrologists, and between weather forecasters and disaster managers, in each country for the successful implementation of the SARFFG. Recognizing the similarities between the SWFDP activities and the SARFFG system, the PSG recommended synergy between the cascading frameworks of SWFDP and the SARFFG to optimize existing structures in the region. In a broader context, the PSG recommended a dialogue between CBS and CHy on synergy between the two activities, and agreed to further consider this issue when discussing the strategy for integrating new components in SWFDP (see agenda item 5.1.5).

5.1.4 Agricultural Meteorology

5.1.4.1 The PSG reviewed the various aspects of using weather forecasts for agricultural decision-making. It was noted that the weather forecast applications for agriculture and disaster management continued the cascading forecasting process. The PSG noted the example of India where medium-range weather forecasts are used to provide advisory services to farmers. The India Meteorological Department (IMD) provides Agromet Advisory Services (AAS) to the country's farming community in the form of bulletins. These advisories are prepared jointly by the experts of IMD and agricultural specialists at respective state departments of agriculture and are tailored to the requirements of farmers in the given state. It was stressed that under the mandate of the WMO Commission for Agricultural Meteorology, the definition of agriculture includes row crops, tree crops, forests, livestock (animals and rangeland), and food aspects of fisheries. Agricultural users included international agencies, government officials, agricultural extension agents, farmers, ranchers, foresters, and fishers.

5.1.4.2 Agricultural weather forecasts or advisories are based on standard weather elements such as temperature, precipitation, relative humidity, and wind speed. Fundamental questions that need to be asked include: what weather events impact agricultural decision-making? and how to relate weather / climate information to meaningful agricultural actions / practices? For the weather time scale (1-10 days), this involves tactical agricultural applications which are decisions based on crop state and current or forecast weather and include cultivation, irrigation, spraying, and harvesting. Direct agricultural losses can occur from the following weather hazards: frost, heavy rain / floods, strong winds, hail, sand and dust storm, forest and bush fires, and drought.

5.1.4.3 The PSG discussed the potential of using NWP products for agricultural applications. Some advantages of using NWP products are that they provide worldwide weather data with temporal and spatial resolution that could be sufficient for many applications in agricultural meteorology; there are no missing data with NWP output, therefore, no need to fill data gaps from ground stations. However, some drawbacks include the need for significant technical resources (computers, programmers) and that NWP outputs at the surface are modelled estimates not observed data and therefore must be used with caution, especially if NWP outputs are provided directly to users. The PSG noted the following NWP applications that have been used for agriculture: statistical downscaling of NWP, forest fire danger rating and fire behaviour, crop and animal pest and disease forecasting, irrigation scheduling, drought prediction, and crop production forecasting. There was some discussion on obtaining high quality topographical, soil, and land use data to improve the NWP models and the importance of vegetation cover in modelling soil moisture.

5.1.4.4 The PSG noted the outcomes of the SWFDP – Eastern Africa Agrometeorology Working Group meeting that was held from 20 to 21 February 2012, in Entebbe, Uganda. The purpose of the Working Group and the meeting was to assist the AgM representative of the Regional Subproject Management Team (RSMT) in his responsibilities as stated in Paragraph 3.3.5 of the Regional Subproject Implementation Plan for the Demonstration Phase of the SWFDP – Eastern Africa. These are as follows:

- Researching and defining required forecast products relevant for agrometeorology;
- Coordinating the agromet working group on relevant issues, including service delivery to the agriculture community;
- Advising NMHSs on the use of products from the SWFDP project in improving agricultural weather forecasts and advisories, and in determining potential crop production impacts, especially due to extreme events.

5.1.4.5 The PSG noted the this Agromet Working Group (WG) will research and develop a list of all existing agrometeorological products that are useful to the region and identify products that they would like to see on the subproject Website and Portal. The WG made recommendations on revising the SWDFP RSMC-Nairobi and RFSC-Dar Es Salaam Websites. The WG also discussed the possible creation of a regional Agromet Guidance Product that could be used for disaster early warning and could potentially be linked with existing products and processes from the NOAA Africa Desk and FEWSNET. The PSG noted the possible list of agrometeorological products that was developed during this meeting, including previous 10-day rainfall anomaly maps, cumulative forecast rainfall, number of rainy days, rainfall intensity, Normalized Difference Vegetation Index (NDVI), extreme temperature forecasts, evapotranspiration maps, soil moisture maps and a gridded map of the crop water requirement satisfaction index (WRSI). The Secretariat emphasized that this is still a draft list of products and that there needs to be further coordination between the WG and the global and regional centres on the development of these products. The PSG noted the potential linkages of using the Next Phase of the World Agrometeorological Information Service (WAMIS-www.wamis.org) as a test-bed for assisting the regions in developing some of the possible products listed by the Agromet WG.

5.1.4.6 The PSG noted other agrometeorological applications being demonstrated in the region that are linked to the SWFDP – Eastern Africa. These projects are focused on determining new dissemination methods for providing weather forecasts and warnings to user communities. In Uganda, there is a current project to provide weather information from the Ugandan Department of Meteorology (UDoM) to farmers via the Grameen Foundation which is an international NGO. The Grameen Foundation has a network of Community Knowledge Workers (CKWs) in Uganda who are given a smartphone which has an expert system menu designed to provide assistance to farmers. There is a 1-year demonstration project in one of the agricultural districts of Uganda where UDoM provides a daily weather forecast which is disseminated through this network of CKWs. The results of this demonstration project will be used to determine whether this could be scaled up to other regions in Uganda. Another demonstration project in Uganda was focused on providing weather forecasts for Ugandan fishers on a selected portion of Lake Victoria. This project is nearing completion and the final report will be shared with all members of the PSG, as well as the RSMT of the SWFDP – Eastern Africa, to determine if this could be expanded to other parts of Lake Victoria and/or to other countries.

5.1.5 Strategy for Integrating new Components into SWFDP

5.1.5.1 Based on discussions under the previous agenda items, and the lessons learned, especially from the SWFDP – Southern Africa where the subproject has reached a mature stage, the PSG developed a strategy for integrating new components in SWFDP, as presented in Annex III.

5.2 Specific component to support full participation of all NMHSs including those of LDCs and SIDSs

5.2.1 The PSG recalled that Cg-XVI recommended the use of the SWFDP as a framework or project development process for regionally-driven initiatives to improve the capability and capacity of WMO Members in the production of forecasts and warnings with greater precision, for multi-hazard disaster risk reduction and improved service delivery. In this context Cg-XVI agreed that the SWFDP concept should be further implemented and should be expanded into more regions, and in addition requested CBS to consider the possibility of implementing similar projects, with particular attention to LDCs and SIDSs. The PSG noted that SWFDP is presently ongoing, or in subproject development phase, in five regions, involving 41 developing countries. These include 23 LDCs (including some LLDCs and SIDSs), 3 additional LLDCs and 6 additional SIDSs.

5.2.2 While noting that the SWFDP is currently progressing well in the five regional subprojects the PSG recognized that there are a few participating countries that have been experiencing difficulties with full participation in the activities that are designed to improve their essential capacities in relation to severe weather forecasting and the delivery of warning services. A further difficulty is that, in some of these countries, the NMHSs have low recognition nationally. This perpetuates the inadequacy of resources and prevents necessary renewal and modernization of their infrastructure, and their capacity to deliver relevant hydrometeorological services. The PSG noted that SWFDP strategic issues include the limited effectiveness of the current project activities in addressing the needs of those NMHSs which have very limited forecasting capacity, due to limited or inadequate resources (human and financial). The PSG agreed that, to address this issue, there are a number of activities that could be targeted specifically to these NMHSs, to address gaps and weaknesses, in order to bring them fully on board. The PSG thus developed a set of recommendations to support the full and sustainable participation of NMHSs, including those from LDCs, as presented in Annex IV.

6. TRANSITION TO SUSTAINABLE OPERATIONS

6.1 Review of phase 4 concept and implementation

6.1.1 The PSG, at its third meeting (Geneva, Switzerland, February 2010), developed an additional project phase entitled: “Continuing Development Phase” (referred to as “Phase 4”), for when a subproject had sufficiently developed its framework through its initial phases for it to be fully assumed under the responsibility of the relevant Regional Association. This phase included identification and sourcing of the necessary resources to sustain the regional subproject. The PSG reviewed the Phase 4 concept and implementation, and further developed the concept while discussing the strategy for integrating new components into the SWFDP (see agenda item 5.1.5 and Annex III).

6.2 On-going training programme

6.2.1 The PSG noted that training activities within the framework of the SWFDP have been carried out regularly (e.g. annually), and opportunistically with other training activities, to cover new developments and to allow for the normal cycling of new operational weather forecasters in the forecasting centres. In-country training has also been carried out, in particular in the SWFDP – South Pacific. The PSG discussed options to address training within the SWFDP (e.g. establishment of Regional Training Desks, involvement of Regional Training Centres for ongoing regional and national training support, etc.) and developed a set of recommendations which suggested possible solutions to support the full and sustainable participation of NMHSs in SWFDP, including those from LDCs (see agenda item 5.2 and Annex IV).

7. DOCUMENTATION

7.1 Updating *SWFDP Overall Project Plan* and the *SWFDP Guidebook on Developing Regional Subprojects*

7.1.1 The PSG recognized the need for updating the *SWFDP Overall Project Plan* and *SWFDP Guidebook on Implementing Regional Subprojects*, and agreed that these documents are relevant and required for the planning and implementation of the SWFDP. The PSG reviewed these documents and agreed on a number of issues that should be added and/or modified, as presented in Annex V.

7.1.2 The PSG requested the WMO Secretariat to work with members of the Group in updating these two documents, which should be presented to the meeting of the ICT-DPFS (Paris, France, 21-25 May 2012) for consideration.

7.2 Specification of regional and national centre(s) participating in severe weather forecasting, to be included in the new *Manual on the GDPFS*

7.2.1 The PSG noted that Cg-XVI agreed that there are fundamental changes under way in the Basic Systems and that the review of the *Manual on the GDPFS* (WMO-No. 485) should be carried out with the existing system of world, regional and national centres of the GDPFS, and the future evolution of the GDPFS, in mind. The review should allow for the inclusion of all WMO operated meteorological centres that provide operational data-processing and forecasting services (including those coordinated by CBS and joint CBS-other Technical Commissions and/or WMO Programmes, as well as joint WMO-other international organizations centres). The review should take into account the developments in WIGOS and WIS, lessons learned from the SWFDP, and anticipated results of, and operational implications from, the WWRP/TIGGE project “Global Interactive Forecast System”. In this context the PSG was informed of the outcomes of the Expert Meeting on the Revision of the Manual of

the Global Data-Processing and Forecasting System (GDPFS) that was held in Geneva, Switzerland, from 19 to 21 October 2011.

7.2.2 Noting that a first version of the new Manual will be presented to CBS-XV (in September 2012) for consideration, the PSG reviewed the draft text for the new Manual on a proposed specification of regional and national centre(s) participating in severe weather forecasting, as given in Annex VI.

8. FUTURE DIRECTIONS

8.1 Prospects for new Regional Subprojects

8.1.1 The PSG recalled that at its previous meeting in 2010 it considered a list of eight prospective subprojects (as given in Annex VII) in addition to the two active subprojects at that time (southern Africa and South Pacific). While stressing that all eight projects were valuable and should be implemented, it considered that the resources which were likely to be made available in the following two years or so would probably allow the initiation of three new projects at most; it therefore assigned top priority to three of the proposed projects, and second priority to another one. In the two years since that meeting, three new projects have been initiated, two 1st priority and the 2nd priority one, in view of emerging opportunities.

8.1.2 In view of the limited resources available, the PSG considered that, in the short term, any new project initiation should be delayed until at least one of the existing subprojects has reached Phase 4, i.e., continuing development phase, including full transfer of the project management to the regional level.

8.1.3 The PSG noted that the concern about resources necessary for setting up new subprojects extends to the continued success and further development of the entire SWFDP. It considered that this is dependent on securing a sustainable management resource with responsibility for coordination of WMO support for regional subprojects, including:

- Working with resource mobilization teams to secure long-term sustainable funding, and to manage the effective use of funds so as to ensure the sustainability of subprojects;
- Assisting where necessary the establishment of funding to enable the regional and global centres to transition their contributions from short-term demonstration to long-term sustainable services;
- Organizing central train-the-trainers workshops to support the regions in providing up-to-date training;
- Planning and implementing specific training and development activities in support of LDCs, such as the establishment of training desks in regional and global centres, organizing the exchange of staff, including forecasters, and developing appropriate mentoring schemes;
- Supporting the initiation of new subprojects and providing such support as is required to progress subprojects through to phase 4 (the continuing development phase) including full transfer of the subproject management to the regional level;
- Managing the cross-programme links of the SWFDP with other WMO programmes, including WWRP GIFS-TIGGE research, and application programmes such as the aviation, marine, hydrology, agriculture and health programmes.

8.1.4 The PSG considered that the sustainable provision of this support to the existing and new subprojects requires a dedicated office, and it recommended that a study is urgently required to scope

the resource requirements of such an office, starting from an evaluation of the resources utilized by the Project thus far.

8.2 Preparation for CBS-XV (September 2012)

- 8.2.1 The PSG agreed that the main issues to be reported to CBS at its forthcoming session were:
- the status and progress of the five existing subprojects,
 - the proposed strategy for integrating new components into the SWFDP,
 - recommendations for addressing LDCs in the SWFDP,
 - recommendations and questions relating to sustainability and transition to operations, including the question of resources.

9. ANY OTHER BUSINESS (AOB)

- 9.1 There were no other issues raised during the meeting.

10. CLOSING

10.1 In closing the meeting, the Chairperson expressed its appreciation to all participants for their very positive and valuable input to the discussions.

10.2 The meeting closed at 15:20 hours on Friday, 2 March 2012.

AGENDA

1. **OPENING**
2. **ORGANIZATION OF THE MEETING**
 - 2.1 Adoption of the agenda
 - 2.2 Working arrangements
3. **OUTCOMES OF WMO CONSTITUENT BODY SESSIONS (CBS-EXT.(10), Cg-XVI) RELATED OR RELEVANT TO THE DEVELOPMENT OF THE SWFDP**
4. **REVIEW AND EVALUATION OF SWFDP SUBPROJECTS (Status of the implementation)**
 - 4.1 SWFDP in Southern Africa
 - 4.2 SWFDP in South Pacific
 - 4.3 SWFDP in Eastern Africa
 - 4.4 SWFDP in Southeast Asia
 - 4.5 SWFDP in Bay of Bengal
5. **DEVELOPMENTS REQUIRED IN THE SWFDP**
 - 5.1 Integration of new components
 - 5.1.1 Integration of satellite information
 - 5.1.2 Testing GIFS-TIGGE developments
 - 5.1.3 Flash Flood Forecasting
 - 5.1.4 Agricultural Meteorology
 - 5.1.5 Strategy for Integrating New Components into SWFDP
 - 5.2 Specific component to support full participation of all NMHSs including those of LDCs and SIDSs
6. **TRANSITION TO SUSTAINABLE OPERATIONS**
 - 6.1 Review of phase 4 concept and implementation
 - 6.2 On-going training programme
7. **DOCUMENTATION**
 - 7.1 Updating *SWFDP Overall Project Plan* and the *SWFDP Guidebook on Developing Regional Subprojects*
 - 7.2 Specification of regional and national centre(s) participating in severe weather forecasting, to be included in the new *Manual on the GDPFS*
8. **FUTURE DIRECTIONS**
 - 8.1 Prospects for new Regional Subprojects
 - 8.2 Preparation for CBS-XV (September 2012)
9. **ANY OTHER BUSINESS (AOB)**
10. **CLOSING**

Annex II

LIST OF PARTICIPANTS

Mr Bernard **STRAUSS** (Chairperson)
Météo-France
42 Ave. G. Coriolis
31057 Toulouse
France

Tel: +33 567 698 703
Fax: +33 567 698 709
Email: bernard.strauss@meteo.fr

Mr Ian John **SHEPHERD**
Bureau of Meteorology
P.O. Box 50040
Casuarina
0811 Northern Territory
Australia

Tel: +61 8 8920 3821
Fax: +61 8 8920 3829
Email: i.shepherd@bom.gov.au

Ms Dongyan **MAO**
46, Sth avenue
Zhongguancun
BEIJING
China P. R

Tel.: +86 10 6840 7966
Fax: +86 10 5899 3022
Email: maody@cma.gov.cn

Mr Roy S.K. **BHOWMIK**
NWP Division
India Meteorological Department
Lodi Road
110063 NEW DELHI
India

Tel : +91 11 43824266, 24615815
Fax : +91 11 24699216
E-mail: skr.bhowmik@imd.gov.in
skrb.imd@gmail.com

Mr Gerald **FLEMING**
Met Eireann
Glasnevin Hill, 9
DUBLIN
Ireland

Tel.: +353 1 80 64 208
Fax: +353 1 80 64 275
Email: gerald.fleming@met.ie

Mr Yuki **HONDA**
Japan Meteorological Agency
1-3-4 Otemachi Chiyoda-ku
TOKYO 100-8122
Japan

Tel: +(81 3) 3212 8341 (Ext. 3305)
Fax:
Email: honda.yuuki@met.kishou.go.jp

Mr James G. **KONGOTI**
Deputy Director
Kenya Meteorological Dept.
P. O. Box 30259 00100
Nairobi
Kenya

Tel: +254 (0)20 3867880
Fax: +254 (0)20 3876955 / 3877373
Email: kongoti@meteo.go.ke

Ms Young-Youn **PARK**
Korea Meteorological Administration (KMA)
45 Grsangcheong-gil, Dongjak-gu
SEOUL 156-720
Korea (Rep. of)

Tel: +822 2181 0513
Fax: +822 2181 0907

Email: yypark@kma.go.kr

Mr Steve **READY**
METSERVICE
30 Salamanca Road
PO Box 722
Wellington
New Zealand

Tel: +644 470 0737
Fax: +644 473 5231

Email: steve.ready@metSERVICE.com

Mr Eugene **POOLMAN**
South African Weather Service
442 Rigel Ave South
Erasmusrand 0181
Private Bag X097
PRETORIA 0001
South Africa

Tel: + 27 12 367 6001
Fax: + 27 12 367 6189

E-mail: eugene.poolman@weathersa.co.za

Mr Ken **MYLNE**
Met Office
FitzRoy Road
EX 1 3PB
Exeter
United Kingdom

Tel: +44 1392 88 60 70
Fax: +44 1392 88 56 81

Email: ken.mylne@metoffice.gov.uk

Mr Paul **DAVIES**
Met Office
Fitzroy Road
EX1 3PB
Exeter,
United Kingdom

Tel: +44 1392 886264
Fax:

E-mail: Paul.davies@metoffice.gov.uk

Mr Erik **ANDERSSON**
Operations Department
ECMWF
Shinfield Park
RG2 9AX
Reading
United Kingdom

Tel: + 44 118 949 9060
Fax: + 44 118 986 9450

Email: erik.andersson@ecmwf.int

Mr William C. **BOLHOFER**
Meteorologist, International Activities Office
National Weather Service
National Oceanic and Atmospheric
Administration (NOAA)
USA

Tel: +1 (301) 713-0645 ext 144
Fax: +1 (301) 587-4524

Email: William.Bolhofer@noaa.gov

Mr Daniel P. **BEARDSLEY**
Project Manager, International Activities Office
National Weather Service
National Oceanic and Atmospheric
Administration (NOAA)
USA

Tel: +1 (301) 713-0645 ext 134
Fax: +1 (301) 587-4524
Email: Dan.Beardsley@noaa.gov

Mr Dai Khanh **NGUYEN**
18T2, Trung Hoa, Nhan Chinh
Tranh Xuan Dist.
HA NOI
Vietnam

Tel: +84 4 38244120
Fax: +84 4 38260779
Email: daikhanh@kttv.gov.vn

WMO Secretariat
7 bis avenue de la Paix
Case postale 2300
1211 GENEVE 2
Switzerland

[WWW website](#)

Mr Peter **CHEN**
Data-Processing and Forecasting Division
Weather and DRR Services Department

Tel: +(41 22) 730 8231
Fax: +(41 22) 730 8128
Email: pchen@wmo.int

Mrs Alice **SOARES**
Data-Processing and Forecasting Division
Weather and DRR Services Department

Tel: +(41 22) 730 8449
Fax: +(41 22) 730 8128
Email: asoares@wmo.int

Mrs Haleh **KOOTVAL**
Public Weather Services Division
Weather and DRR Services Department

Tel: +(41 22) 730 8333
Fax: +(41 22) 730 8128
Email: hkootval@wmo.int

Mr Samuel **MUCHEMI**
Public Weather Services Division
Weather and DRR Services Department

Tel: +(41 22) 730 8137
Fax: +(41 22) 730 8128
Email: smuchemi@wmo.int

Mr Robert **STEFANSKI**
Agricultural Meteorology Programme

Tel: +(41 22) 730 8252
Fax: +(41 22) 730
Email: rstefanski@wmo.int

Mr Stephan **BOJINSKI**
WMO Space Programme

Tel: +(41 22) 730 8319
Fax: +(41 22) 730
Email: sbojinski@wmo.int

Mr Tetsuo **NAKAZAWA**
World Weather Research Programme

Tel: +(41 22) 730 8071
Fax: +(41 22) 730 8128

Mr Jeffrey **WILSON**
Education and Training

Email: tnakazawa@wmo.int

Tel: +(41 22) 730 8294

Fax: +(41 22) 730

Email: jwilson@wmo.int

Mrs Mary **POWER**
Resource Mobilization Office

Tel: +(41 22) 730 8003

Fax: +(41 22) 730

Email: mpower@wmo.int

Ms Salla **HIMBERG**
Resource Mobilization Office

Tel: +(41 22) 730 8513

Fax: +(41 22) 730

Email: shimberg@wmo.int

Annex III**STRATEGY FOR INTEGRATING NEW COMPONENTS INTO SWFDP**

The SWFDP framework has been successful in providing support to NMHSs and enhancing their capability to provide effective warnings of severe weather to DMCPAs and to the public for the protection of life and property. Cg-XVI (Geneva, Switzerland, May 2011) approved a vision for the SWFDP as a cross-programme collaborative activity and requested that the SWFDP should engage all WMO Programmes that concern the real-time prediction of hydrometeorological hazards. This strategy considers how that may best be achieved.

Principles

Recognizing the success of the SWFDP development framework, the development of future regional subprojects should be based on the experience of the more advanced subprojects. The scope and evolution of each subproject should be decided by the Regional Subproject Management Team (RSMT) according to the needs of the NMHSs and the capabilities of the designated Regional Centres. However, it is recommended that the following principles of success from previous subprojects should provide guidance:

- Start small with focus on most important severe weather identified by the participating countries for protection of life and property.
- Keep scope of project manageable.
- Measure success through metrics compared to an initial baseline.
- In the final phase expand scope including cross-programme activities as required, to meet the needs for additional services identified by the region.

Phased structure for the development of subprojects

Each subproject should develop in several phases as outlined below. It should be noted that the boundaries between phases are not precise, and may vary according to the needs of the region, but in general should follow this pattern:

Phase 1 – Set up of basic cascading structure of forecast data and information from global centres through regional centres to a small group of NMHSs. Initial planning of PWS structures within the countries to ensure warnings are acted upon to protect life and property.

Phase 2 – Demonstration of benefits of the cascading system and of PWS structures within the countries, within the confines of the limited scope set up under Phase 1. Collect feedback and verification to measure benefits relative to the initial baseline (Figure 1 below).

Phase 3 – Inclusion of additional countries/NMHSs in the region and the extension to additional severe weather hazards as required. Possible trialling of new severe weather products, for example from GIFS-TIGGE. Planning of structures and mechanisms to ensure sustainability in the region (Figure 2 below).

Phase 4 – Sustainability and development of SWFDP activities including the exploring of synergies with other WMO programmes in order to respond to the needs of other user sectors (e.g. aviation, marine, hydrology, agriculture, etc) (Figure 3 below).

Important considerations from Phase 3 onwards:

- Management of sustainable operations within the region.

- Requirements for cascading of additional information in support of new services.
- Long-term funding structures in support of contributions to the SWFDP from global centres, regional centres and training centres.
- Testing of new guidance materials developed under WWRP research activities such as GIFS-TIGGE products.

Severe Weather Forecasting Demonstration Project (SWFDP) main components

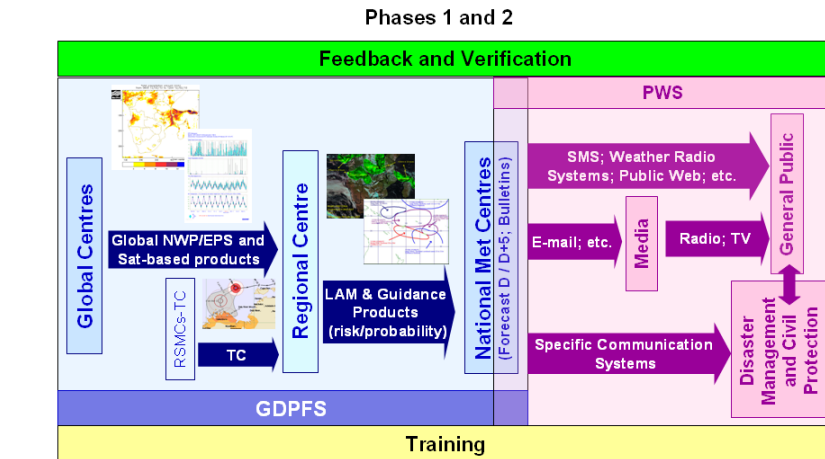


Figure 1 – Phases 1 and 2 of the SWFDP.

Severe Weather Forecasting Demonstration Project (SWFDP) main components

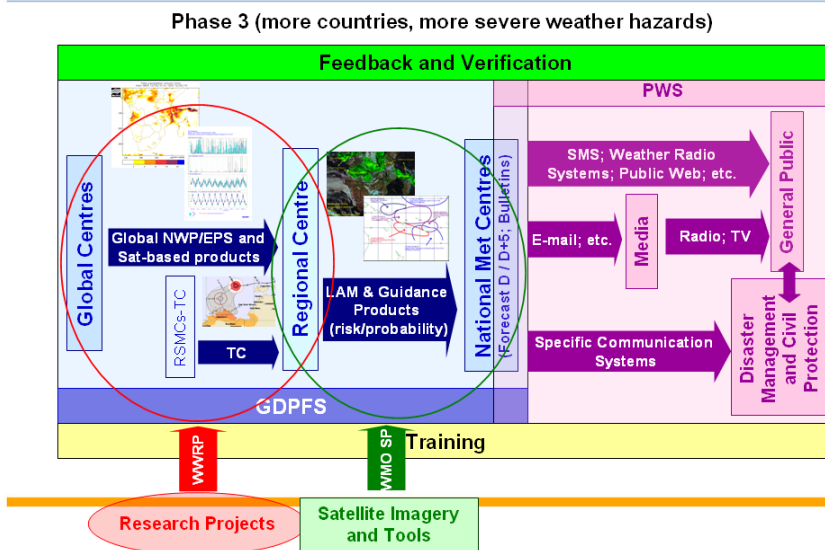


Figure 2 – Phase 3 of the SWFDP.

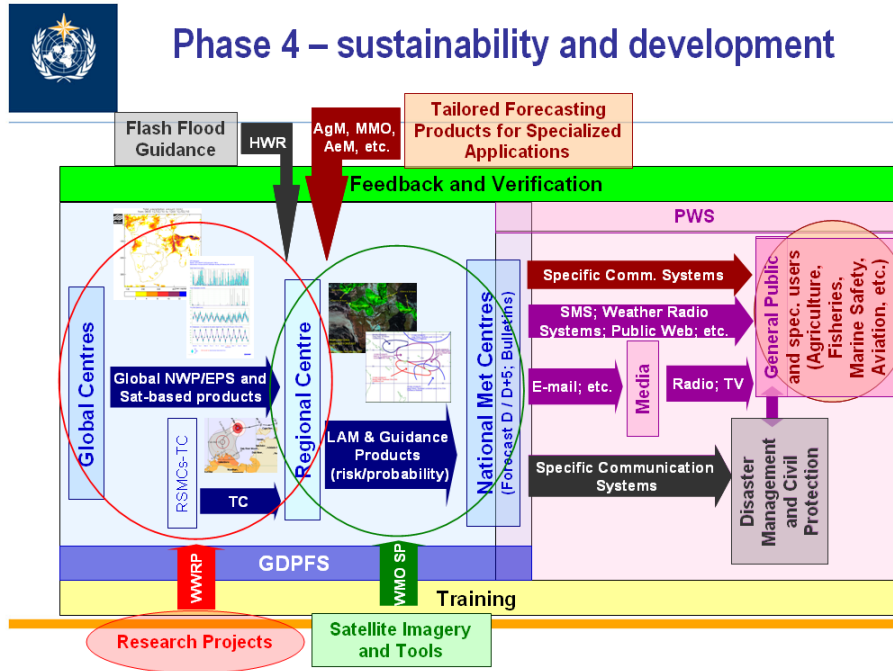


Figure 3 – Phase 4 of the SWFDP.

Annex IV**RECOMMENDATIONS TO SUPPORT THE FULL AND SUSTAINABLE PARTICIPATION OF NMHSs, INCLUDING THOSE FROM LDCS**

The PSG explored the issues around LDC participation in the SWFDP, and suggested and recommended possible solutions to the issues identified, as follows:

a. Capacity**i. Observations**

1. The PSG emphasized the importance of establishing a realistic inventory of observing capacity within each LDC, and of generating a commitment to the timely provision of observations from the LDC to the Regional Centre.
2. There was a need to properly establish the regional requirements for the exploitation of satellite data to assist short-term forecasting e.g. flash flood forecasting.
3. Those NMHSs which had access to radar resources should be encouraged to work with neighbours to establish radar composites for the benefit of all.

ii. Forecasting

1. The PSG recommended the design and definition of a forecast process which mirrored forecast office workflow, and to further develop the current SWFDP websites following the concept of a dashboard, as an aid to better decision-making. Recognizing the potential for information overload in many forecast offices, including in LDCs, the PSG felt that a formalized forecast checklist would help to focus forecasters' attention on the most important weather issues of the day. The PSG emphasized that this dashboard would need to be tailored to the needs of each specific NMHS and should be considered in conjunction with the development of the National Implementation Plans.
2. The PSG also emphasized that the development of a competencies framework was necessary to ensure that forecasters had attained the required levels to properly perform their tasks.

iii. Visualization

1. To facilitate the engagement of LDCs at a minimal entry level, the PSG recommended that visualisation systems be web-browser based with content optimized for the available bandwidth.
2. The PSG emphasized the importance of enhancing the interpretation of satellite imagery through the use of existing web-based visualisation systems.

b. Leadership and organizational culture

1. The PSG emphasized the importance of reinforcing and building on existing practices.
2. To encourage a better user-focus, the PSG suggested the development of exercises that were scenario-based and that engaged users as well as forecasters, to assist in the mutual understanding that underpins good communication.
3. Recognizing that forecasters needed to be fully aware of hazards and their implications, NMHS management should develop strategies to ensure that forecast staff members were fully aware of the potential impact of their work on the community which they serve.
4. The PSG acknowledged the importance of mentoring and training to empower forecasters and to help all NMHS staff develop and maintain the complementary skills, such as communications, team and relationship building, user focus and situational awareness, that optimize the impact of their technical work.

c. Resourcing

- i. The PSG had concerns for the long-standing sustainability of the SWFDP and the systems that support it at global, regional and national level.
- ii. The PSG recognized the need for defining the long-term ownership of each subproject to ensure sustainability and identified some issues that would need to be addressed in this context:
 1. Establishment and implementation of SWFDP training desks at global and regional centres.
 2. Utilization and creation of regular weather briefings from the regional centres.
 3. Involvement of regional training centres for ongoing regional and national training support.
 4. Developing key players' engagement management plan.
 5. Develop country-specific implementation plans.
 6. Establish and run a recruitment, training, succession, and development plan for in-country individuals who will act as focal points / champions / team leaders that can take ownership for the SWFDP activities in that country.
- iii. The PSG recognized the benefits to be gained from better coordination with and facilitation from other WMO activities.
- iv. The PSG recognized that sustainability implied that ownership of the subprojects would ultimately need to move from the Technical Commission level to EC/Cg and to appropriate regional structures (e.g. MASA).

Annex V**REVIEW OF OVERALL PROJECT PLAN**

- Focus of OPP
 - Reflect current activity and management process
 - Current focus on implementation
 - Require description of Phase 3 to 4 transition
- Change in emphasis and additional items:
 - Statement of who is the OPP for? (1.1?)
 - Vision statement (2.1?)
 - Progression from small pilot to full demonstration (3.4?)
 - Role of PSG (5.1, 5.3, 6.2)
 - Coordination and evaluation of ongoing projects
 - Role of WMO Secretariat (9.2)
 - Coordination with other WMO programmes
 - Resource mobilisation
 - Selection and role of lead Regional Centre (5.4, 8.2)
 - Leadership and coordination
 - Resource commitment
 - Training role
 - Establishment of RSMT/RTIT and preparation of RSIP (5.4)
 - PWS aspects (1.3, 3.2)
 - Benefits – improved service delivery
 - Training of PWS focal points, DM and media
 - Incorporate new components (1.3)
 - Satellite data
 - Resourcing and sustainability issues (5.7/5.8?)
 - Referral to Guidebook for planning subprojects (4.2.2?)

REVIEW OF GUIDEBOOK ON PLANNING REGIONAL SUBPROJECTS

- Responsibility of lead Regional Centre (2.2.1, 2.4.2, 3.3.2)
 - Coordination of regional activity
 - Resource allocation
 - Regional training
 - Transition arrangements to Phase 4
- Expected benefits (2.3)
 - New initiatives eg. collaboration with other programmes
 - Synergy with other regional activities
- RSIP: guide for structure and content (3.3)
- Technical preparation (3.3.2)
 - Incorporate new components (eg. satellite data)
 - Training strategy/resources
 - Web page development
 - Verification activities
- Resourcing and sustainability issues (3.3.3)
 - In-kind contributions from participating centres
 - Possible funding sources and strategy
- Update annexes

- Products lists
- evaluation forms

Annex VI

SPECIFICATION OF REGIONAL AND NATIONAL CENTRE(S) PARTICIPATING IN SEVERE WEATHER FORECASTING, TO BE INCLUDED IN THE NEW *MANUAL ON THE GDPFS*

II.2.2.1 – Regional severe weather forecasting

SPECIFICATION

This activity includes a Network of Regional Centre(s) and associated National Meteorological Centres (NMCs) within a geographical region. Regional Centre(s) participating in activity 2.2.1, regional severe weather forecasting, shall:

- Identify targeted severe events and domain in agreement with associated NMCs
- Develop and maintain a dedicated web site and portal (with a password protection, as appropriate)
- Issue Daily Severe Weather Forecasting Guidance products for associated NMCs containing an interpretation of deterministic, EPS and satellite-based products
- Gather information on available resources of forecasting guidance, including NWP/EPS and satellite-based products, and assort all information on a dedicated web site and portal

National Meteorological Centres (NMCs) associated in activity 2.2.1 shall:

- provide criteria for severe weather
- evaluate products, including the Daily Severe Weather Forecasting Guidance, and provide feedback to the Regional Centre(s)
- ensure that warnings are issued

RESPONSIBILITY AND (if required) COORDINATION (Changes to Activity Specification)			
To be proposed by:	CBS/SG-SWFDP	CBS/ICT-DPFS	
To be approved by:	CBS		
To be decided by:	EC / Congress		
DESIGNATION			
To be approved by:	CBS		
To be decided by:	EC / Congress		
COMPLIANCE			
To be monitored by:	CBS/SG-SWFDP		
To be reported to:	CBS/ICT-DPFS	CBS	

Annex VII

**PRIORITIES FOR REGIONAL SUBPROJECTS AS IDENTIFIED AT THE THIRD MEETING OF THE STEERING GROUP OF THE SWFDP (GENEVA, SWITZERLAND, FEBRUARY 2010)
(excerpt of the meeting report)**

A list of the prospective subprojects is found below.

Sub-region	Participating Countries	Existing RSMC	Proposed Regional Centre	DRR project and/or DRM institutional capabilities
Regional Association I				
East/Central Africa	Uganda, Rwanda, Burundi, Ethiopia, Sudan, Somalia, Congo and Kenya	Kenya (Nairobi)	--	--
West Africa	Senegal, Burkina Faso, Gambia, Guinea, Mali, Mauritania and Niger	Senegal (Dakar)	--	--
Regional Association II				
Southeast Asia	Lao PDR, Cambodia, Thailand and Viet Nam	--	Viet Nam	Lao PDR and Cambodia
South Asia – Bay of Bengal	Myanmar, Bangladesh, Maldives, India and Sri Lanka	India (New Delhi)*	Thailand	
Central Asia & Caucasus	Kazakhstan, Kirgizstan, Tajikistan, Turkmenistan, Uzbekistan, Armenia, Azerbaijan and Georgia	--	--	Kazakhstan, Kirgizstan, Tajikistan, Turkmenistan, Uzbekistan, Armenia, Azerbaijan and Georgia (Not yet proposed by RA)
Regional Association III				
South-eastern and Southern South America	Brazil, Argentina, Paraguay, Uruguay, Chile, Bolivia, Peru	Brazil (Brasilia) and Argentina (Buenos Aeries)	--	--
Regional Association IV				
Central America	Costa Rica, El Salvador and Nicaragua	USA (Miami)*	Costa Rica	Costa Rica, El Salvador and Nicaragua
Regional Association V				
Western window	Indonesia, Papua New Guinea, Australia, Timor-Leste and Philippines	Australia (Darwin)	Indonesia (Jakarta)	Indonesia and Philippines

* RSMCs with activity specialization for Tropical Cyclone Forecasting

The PSG further considered this list with the view of deciding relative priorities, and the degree of readiness of project-critical elements for SWFDP subproject development. The following were decided, in three categories of priority:

Priority 1:

RA I

Central/East Africa, starting with a focus on the countries bordering on Lake Victoria (Kenya, Tanzania, Uganda), with RSMC Nairobi, and within the East African Community.

RA II

Southeast Asia, including Cambodia, Lao PDR, Thailand, and Viet Nam, with the role of the regional centre to be developed at Hanoi with the support of Hong Kong Observatory. The PSG noted the results of the recent SWFDP – Southeast Asia Development Workshop, and agreed in principle with its outcomes.

RA V

“Western Window” of the Pacific Islands, including possibly Indonesia, Timor-Leste, Philippines and Papua New Guinea, with RSMC Darwin. This subproject would represent a third subproject domain that would create a 3-subproject contiguous region of SWFDP coverage, from Southeast Asia, to the South Pacific Islands, an area with high risk of disasters from severe weather and tropical cyclone related impacts.

Priority 2:

RA III

Southeast and southern South America, including Argentina, Brazil, Bolivia, Chile, Paraguay, Peru, Uruguay, with RSMC Buenos Aires and RSMC Brasilia. This proposal has already been put forward by the PSG in previous considerations of prospective subprojects. The PSG discussed the challenges facing this proposal and recognized that further clarification is needed on how a SWFDP subproject could complement the “Virtual Centre” project currently established in that region to enhance severe weather forecasting and warning services.

Priority 3:

The remaining proposals should be considered at a future time.

This recommendation is based on the assumption that the resources which could be available to the SWFDP in the coming period will make it possible to initiate a maximum of three new subprojects in the next two or three years. However, the PSG stressed that all eight proposed subprojects are valuable and should be implemented, resources permitting.

The PSG noted that in the initiation of regional subprojects, the number of participating countries should be limited, ideally, to 3 or 4 countries, with possible expansion to additional countries for consideration in a second phase.