



JOINT WMO/IOC TECHNICAL COMMISSION FOR  
OCEANOGRAPHY AND MARINE METEOROLOGY

**FOURTH MEETING OF THE  
WMO COASTAL INUNDATION FORECASTING  
DEMONSTRATION PROJECT (CIFDP)  
STEERING GROUP**

Nadi, Fiji, 22-23 February 2013

***FINAL REPORT***

**FOURTH MEETING OF THE  
WMO COASTAL INUNDATION FORECASTING  
DEMONSTRATION PROJECT (CIFDP)  
STEERING GROUP**

Nadi, Fiji, 22-23 February 2013

***FINAL REPORT***

JCOMM Meeting Report No. 99

## NOTES

### WMO DISCLAIMER

#### Regulation 43 (WMO-No.15)

Recommendations of working groups shall have no status within the Organization until they have been approved by the responsible constituent body. In the case of joint working groups the recommendations must be concurred with by the presidents of the constituent bodies concerned before being submitted to the designated constituent body.

#### Regulation 44 (WMO-No.15)

In the case of a recommendation made by a working group between sessions of the responsible constituent body, either in a session of a working group or by correspondence, the president of that body may, as an exceptional measure, approve the recommendation on behalf of the constituent body when the matter is, in his opinion, urgent, and does not appear to imply new obligations for Members. He may then submit this recommendation for adoption by the Executive Council or to the President of the Organization for action in accordance with Regulation 9 (5).

© World Meteorological Organization, 2011

The right of publication in print, electronic and any other form and in any language is reserved by WMO. Short extracts from WMO publications may be reproduced without authorization provided that the complete source is clearly indicated. Editorial correspondence and requests to publish, reproduce or translate this publication (articles) in part or in whole should be addressed to:

Chairperson, Publications Board  
World Meteorological Organization (WMO)  
7 bis, avenue de la Paix  
P.O. Box No. 2300  
CH-1211 Geneva 2, Switzerland  
Publications@wmo.int

Tel.: +41 (0)22 730 84 03  
Fax: +41 (0)22 730 80 40  
E-mail:

### IOC (OF UNESCO) DISCLAIMER

The designations employed and the presentation of material in this publication do not imply the expression of any opinion whatsoever on the part of the Secretariats of UNESCO and IOC concerning the legal status of any country or territory, or its authorities, or concerning the delimitation of the frontiers of any country or territory.

---

## CONTENTS

General Summary of the Work of the Session .....	1
Annex I List of Participants .....	10
Annex II Agenda.....	12
Annex III Definitive National Agreement for CIFDP-F Implementation (as agreed at the Fiji Stakeholders Workshop for CIFDP, Nadi, Fiji, 18-21 February 2013) .....	13
Annex IV Direction and Outline for CIFDP-B Phase 2 .....	20
Annex V Summary on the progress of CIFDP-S (Shanghai) planning .....	26
Annex VI List of Actions .....	28
Annex VII Acronyms and Other Abbreviations.....	32

## GENERAL SUMMARY OF THE WORK OF THE SESSION

### 1 OPENING OF THE SESSION

#### 1.1 Opening

1.1.1 The 4th Meeting of the WMO Coastal Inundation Forecasting Demonstration Project Steering Group (CIFDP-PSG-4) was opened by the Co-chairs of the Project Steering Group (PSG), Drs Don Resio and Val Swail, at 0900 hrs on Friday 22 February 2013, at the conference room of the Tanoa International Hotel, Nadi, Fiji.

1.1.2 The list of participants is provided in [Annex I](#).

#### 1.2 Adoption of the agenda

1.2.1 The Group adopted its agenda for the meeting based on the provisional agenda that had been prepared by the WMO Secretariat. This agenda is provided in [Annex II](#).

#### 1.3 Working arrangements

1.3.1 The Group agreed its working hours and other practical arrangements for the session. Following the usual practice for JCOMM meetings, the meeting (including the documentation) was conducted in English only, and all documents and information were provided through the meeting web site: <http://www.jcomm.info/CIFDP-PSG-4>.

### 2 REVIEW PROGRESS OF SUB-PROJECTS

2.0 The Group recalled its [Terms of Reference \(ToR\)](#), that the PSG should oversee and advise on overall project planning, implementation, progress review and reporting. One of the main responsibilities of the PSG is to review the progress of National Sub-Projects in each phase, and provide recommendations to the National Coordination Teams (NCTs) and relevant WMO Technical Commissions (Joint WMO-IOC Technical Commission for oceanography and Marine Meteorology, JCOMM; and WMO Commission for Hydrology, CHy) regarding the following steps of the project implementation. In this regard, the Group reviewed the status and issues of all ongoing and planned/proposed National Sub-Projects and made decisions and recommendations as described in the following paragraphs.

#### 2.1 Fiji National Sub-Project (CIFDP-F)

2.1.1 The Group reviewed the outcome of the Fiji Stakeholders Workshop for CIFDP (CIFDP-FSW, Nadi, Fiji, 18-21 February 2013. see <http://www.jcomm.info/CIFDP-FSW>), held prior to this meeting. The Group noted that this Workshop was the kick-off of the national sub-project of CIFDP in Fiji (CIFDP-F), of which Phase 1 was sponsored by the Korea International Cooperation Agency (KOICA), and implemented by WMO in collaboration with the Fiji Meteorological Service (FMS).

2.1.2 The Group congratulated the organizers on the success of the workshop, in engaging key National Stakeholders and Regional Partners to agree on the necessity of the Project in Fiji. In particular, the Group expressed its satisfaction with the agreed Definitive National Agreement (reproduced in [Annex III](#)), which also identified the roles of, and key participants in, the National Coordination Team (NCT). The Group requested the FMS, as the leader of the NCT, to finalize the DNA with all signatures by Ministers of essential participating agencies by April 2013 (**Action**).

2.1.3 The Group noted with satisfaction that the Regional Partners in the South-Pacific region, including the Secretariat of the Pacific Community / Applied Geoscience and Technology Division (SPC/SOPAC), Secretariat of the Pacific Regional Environment Programme (SPREP), Australian Bureau of Meteorology and New Zealand MetOffice expressed their strong support and future engagement in the CIFDP-F implementation. The Group agreed that the implementation of CIFDP-F Phases 2 to 4 should be closely coordinated and collaborated with those Regional Partners, taking into account their ongoing and planned activities that would synergize with CIFDP-F.

2.1.4 The Group considered that, in order to ensure successful progress toward Phase 2 of CIFDP-F, it would be necessary to specify and elaborate the gaps and technical requirements that were identified during the Stakeholders Workshop. Therefore, the Group agreed to plan an expert assessment for Fiji capabilities for Coastal Inundation Forecasting (CIF), and requested the PSG members and the Secretariat to set a plan for such an assessment before April 2013, possibly in coordination with SPC/SOPAC and SPREP, in order to complete a detailed national capacity assessment report by June 2013 **(Action)**.

2.1.5 The Group took note that the meeting of Pacific Meteorological Council, as well as the Pacific Platform for Disaster Risk Management and Pacific Climate Change Round Table 2013, were planned for July 2013 in Fiji. Noting that all key Partners and potential collaborators to the CIFDP-F implementation will be attending these events, the Group agreed to plan an Interdisciplinary Forum for CIFDP-F in late June / early July, in conjunction with these events. The Group requested the responsible Secretariat member for CIFDP-F support, Dr Boram Lee, to plan for the Forum, and prepare information material before June **(Action)**.

2.1.6 The Group agreed that the user requirement report and communications plan for CIFDP-F should be completed by June 2013, based on the discussion and results of the Stakeholders Workshop **(Action)**.

## **2.2 Dominican Republic National Sub-Project (CIFDP-DR)**

2.2.1 The Group acknowledged the receipt of the signed Definitive National Agreement. Recalling that, as with most working groups and projects of WMO, the working language of CIFDP is English, the Group requested the NCT for CIFDP-DR and the Secretariat to arrange translation of the DNA **(Action)**. The Group also requested of the NCT that, while the project implementation at the national level should be made in the working language of the nation, all documents and correspondence regarding the consultation, advice and review by PSG should be provided in English. The Group requested the responsible Secretariat member for the support of CIFDP-DR, Mr Edgard Cabrera, to provide necessary assistance in this regard **(Action)**.

2.2.2 The Group reviewed the progress in CIFDP-DR against the requirements for the Phase 1 completion, which is detailed in the [CIFDP Implementation Plan \(JCOMM Technical Report No.64\)](#). The Group requested the NCT to submit to the PSG; 1) the Terms of Reference of the National Coordination Team, with the individual members specifically identified; 2) a detailed project plan, including a revised version of the National Capacity Assessment which responds to the preliminary review and comments previously provided to the NCT by the PSG; and 3) a summary of the end user requirements, taking into account the analysis of the end user questionnaire responses; by June 2013 **(Action)**.

2.2.3 With regard to the development of proposals to external donors, for the CIFDP-DR implementation for Phases 2 to 4, the Group took note of, and agreed to, the intention to submit such a proposal to the World Bank. Noting that assurance of financial resources is an

essential requirement for initiating Phase 2, the Group advised that such a proposal should include clear objectives, milestones, timeline and detailed financial plans. The Group requested the NCT to advise the PSG when such funding has been confirmed **(Action)**.

2.2.4 The Group noted that completion of each Phase of the Project would benefit the Dominican Republic, through the provision of valuable assessments and feedback, and would assist in the development of .integrated forecasting and warning services. In proceeding to Phase 2 of the sub-project, the Group emphasized that the CIFDP is essentially a technical development project for operational forecasting, and in this light, it strongly encouraged the National Meteorological and Hydrological Service (NMHS; ONAMET in Dominican Republic) to consider the leading roles of all technical agencies involved in this effort.

2.2.5 The Group decided to issue a letter to the NCT for CIFDP-DR, informing of the decisions and requests of the PSG with regard to the review Phase 1 **(Decision & Action)**. The Group requested the Secretariat, for only this occasion, to translate this letter to Spanish **(Action)**.

### **2.3 Bangladesh National Sub-Project (CIFDP-B)**

2.3.1 The Group acknowledged the receipt of the signed Definitive National Agreement, by the Bangladesh Meteorological Department (BMD), Department of Disaster Management (DDM), Cyclone Preparedness Programme (CPP) and Regional Integrated Multi-Hazard Early Warning System (RIMES). The Group took note of the request by the Government of Bangladesh to WMO to participate in this Agreement as Coordinating Agency, and requested the responsible Secretariat member, Dr Boram Lee, to facilitate the process as soon as possible **(Action)**.

2.3.2 The Group reviewed the progress in CIFDP-B against the requirements for the Phase 1 completion, which is detailed in the [CIFDP Implementation Plan \(JCOMM Technical Report No.64\)](#). The Group expressed its satisfaction on the near completion of Phase 1 for CIFDP-B, and requested the NCT to submit the remaining requirements to the PSG by April 2013, including; 1) a revised version of the National Capacity Assessment which responds to the preliminary review and comments previously provided to the NCT by the PSG; 2) an updated detailed project plan; and, 3) a summary of the end user requirements, taking into account the analysis of the end user questionnaire responses. **(Action)**.

2.3.3 Noting that the above requirements were currently being addressed, the Group agreed that the Phase 2 for CIFDP-B could be initiated in parallel with the completion of the Phase 1 requirements **(Decision)**.

2.3.4 To initiate the Phase 2 implementation, the Group proposed to the Secretariat and the NCT for CIFDP-B a kick-off meeting, to decide on the system design of a Coastal Inundation Forecasting system (CIF system) in Bangladesh, in late April 2013. The provisional participants to this meeting would include the key PSG members for CIFDP-B implementation support, technical members of the NCT, and identified technical experts for relevant areas at national and international levels. Expected outcomes of the meeting should include:

- A system design to include interface/integration elements
- Documented information on all models under consideration
- Identified and agreed implementation method (e.g. implementation in distance / on site)

The Group requested the Secretariat and the NCT to agree on the plan by March 2013 **(Action)**.

2.3.5 The Group emphasized the need for closer involvement of BMD forecasters / operators, from the Phase 2 implementation. Considering also the need and benefit of engagement by the Regional Partners, such as RIMES and Japan Meteorological Agency (JMA) who continue to provide technical assistance to BMD, the Group requested the Secretariat and NCT to ensure the participation of these Regional Partners in the planned kick-off meeting **(Action)**.

2.3.6 The Group considered that, in order to ensure successful implementation of Phase 2, the CIFDP-B should identify (a) “system developer(s)” at the very initial stage of Phase 2. The Group agreed that a relevant decision should be made at the planned kick-off meeting **(Decision)**, taking into account the information gathered through the national capacity assessment and requirements in Phase 1.

2.3.7 The Group discussed and agreed on the outline of the CIFDP-B Phase 2 implementation, as reproduced in [Annex IV](#).

2.3.8 The Group decided to issue a letter to the NCT for CIFDP-B, informing of the decisions and requests of the PSG with regard to the review of Phase 1 and Phase 2 plans **(Decision & Action)**. The Group requested the WMO Secretariat to facilitate the procedure **(Action)**.

2.3.9 The Group agreed that the user requirement report and communications plan for CIFDP-B should be completed by August 2013, with the first draft to be reviewed by full PSG in April 2013 **(Action)**.

## **2.4 Newly Proposed National Sub-Projects**

2.4.1 The Group recalled its [Terms of Reference \(ToR\)](#), that the PSG should work with the WMO Secretariat in initiation of national sub-projects, by reviewing the initial requirements and providing advice to WMO Technical Commissions (JCOMM and CHy). To this end, the Group reviewed the proposals forwarded to the Secretariat and the Group for new Sub-projects, and made decisions as detailed in the following paragraphs.

### Shanghai (CIFDP-S)

2.4.2 The Group received with satisfaction a brief report of the Shanghai Meteorological Bureau (SMB), delivered by the Secretariat, on the progress in planning for a CIFDP Sub-Project for Shanghai. A brief summary of this report is reproduced in [Annex V](#).

2.4.3 The Group recalled the successful implementation of the Shanghai Multi-hazard Early Warnings System pilot project, which would provide the firm basis for the implementation of CIFDP-S, and congratulated SMB on its exemplary initiative of a Sub-Project. The Group endorsed the establishment of CIFDP-S as a Sub-Project **(Decision)**, and agreed that the CIFDP-S would achieve tangible results in the near future, based on SMB’s commitment and participation of other related national authorities such as the Hydrography Department Shanghai Maritime Safety Administration, Shanghai Water Authority & Shanghai Municipal Oceanic Bureau, and Shanghai Emergency Response Centre.

2.4.4 The Group took note of SMB’s request to the Secretariat and the PSG, regarding technical advice and coordination support. The Group agreed to include it in its work plan, and requested the Secretariat to take all necessary measures to facilitate the

communication and support for CIFDP-S initiation and implementation (**Action**). Meanwhile, the Group noted the budgetary limitations of the WMO Secretariat, and proposed to explore feasibilities to mobilize national resources to support necessary activities of the PSG (**Action**).

#### Indonesia (CIFDP-I)

2.4.5 The Group recalled the request of the Indonesian NMHS (Indonesian Meteorological Climatological and Geophysical Agency: BMKG) to establish a National Sub-Project for CIFDP in 2011.

2.4.6 The Group noted with satisfaction the progress in the national consultation for an Initial National Agreement (Phase 0), and an initial investigation for required technical development against the planned activities/projects of BMKG for sea-state and hydrological modelling, in the effort to identify an appropriate arrangement for the national agreement.

2.4.7 The Group agreed that a National Sub-Project for Indonesia (CIFDP-I) should be established as soon as the initial consultation and planning is accomplished (**Decision**), and requested the Secretariat to ensure necessary communication and support to facilitate the initiative, and further to initiate Phase 1 in consultation with the PSG (**Action**). Considering the limited human and budgetary resources of the WMO Secretariat, and the anticipated workload of the Group itself, the Group considered that the activities for CIFDP-I might be planned for the fourth quarter of 2013 or later.

#### South Africa (CIFDP-SA)

2.4.8 The Group noted a proposal to initiate a National Sub-Project for South Africa (CIFDP-SA), proposed by the South African Weather Service (SAWS). It considered that SAWS has been successfully leading the nearly-completed implementation of the Severe Weather Forecasting Demonstration Project (SWFDP) RA I, and that the CIFDP implementation would synergize the national application for coastal zones by using the improved forecasting and warning capabilities. The Group, therefore, agreed to continue consultation with SAWS for the future development of a project concept and plans.

### **3 REVIEW OF AND FUTURE DEVELOPMENT FOR THE PROJECT**

3.0 The Group recalled its [Terms of Reference \(ToR\)](#), which includes “regular review and update of the Project Concept and Implementation Plan”. In this regard, the Group conducted the following activities and made decisions accordingly, as described in the following paragraphs.

#### **3.1 Project concept, implementing strategy and implementation plan**

3.1.1 The Group reviewed the CIFDP Concept, which was agreed at its 3<sup>rd</sup> meeting (2-4 April 2011, Jacksonville, USA). It agreed that the Concept should provide a high level description of the Project in a compact style, including the final goal(s), benefit, and implication for commitment. The Group reviewed and updated the Concept accordingly, as the 2013 edition (**Decision**), and made it available on the CIFDP web site (<http://www.jcomm.info/CIFDP>: “Documents”).

3.1.2 The Group reviewed the [CIFDP Implementation Plan](#) (JCOMM Technical Report No.64). Noting that this publication is the reference document for CIFDP implementation, and the working document that should reflect the rapidly evolving status of the Project, the Group agreed to revise this document based on the revised Concept, Technical

Recommendation (see item 3.2), as well as the lessons learnt from the National Sub-Projects, by April 2013 **(Action)**.

3.1.3 The Group also recalled that, for all NCTs of the ongoing National Sub-Projects, a detailed project plan for each Sub-Project should be developed by each respective NCT, taking into account the specific requirements and available technologies of each country and region, and based on the updated Implementation Plan as the framework/guidelines **(Action)**.

3.1.4 Considering the importance of user requirements and socio-economic aspects in all Phases of CIFDP, the Group agreed to strengthen the PSG input to all National Sub-Project implementations in this area. For this purpose, the Group agreed to establish a more structured collaboration between the PSG and the WMO Working Group on Societal and Economic Research Applications (WG-SERA), by making a linkage with at least one SERA member for each Sub-Project implementation, in providing advice and support to the PSG **(Decision)**. The Group requested the WMO Secretariat for JCOMM and for WWRP to make the necessary arrangement for this purpose **(Action)**, see also items 4.2 and 6).

### **3.2 Technical Recommendation: Forecast System Concept for CIFDP**

3.2.1 The Group discussed the technical development (including recommendations on potentially suitable forecasting tools) for each sub-project, based on the identified conditions and requirements in each country. Based on these, the Group reviewed the Technical Recommendation for CIFDP that was agreed at its 3rd meeting (2-4 April 2011, Jacksonville, USA), and revised it with addition of a section on “integration of observations into the operational service system” (Decision). The revised document was made available on the CIFDP web site (<http://www.jcomm.info/CIFDP>: “Documents”).

3.2.2 The Group recommended that all NCTs should include a skill-score concept / validation in its Sub-Project Plan for the Coastal Inundation Forecasting (CIF) development **(Decision)**.

### **3.3 Workplans and timelines for sub-projects**

3.3.1 Based on the Concept and Implementation Plan of CIFDP, and in connection with the discussion under agenda item 2, the PSG reviewed the established implementation of ongoing Sub-Projects (CIFDP-B, CIFDP-DR and CIFDP-F), and advised the respective National Coordination Teams (NCTs) on the required update of the sub-project workplan in terms of:

- Clear direction of technical plan;
- Clear identification of participating national stakeholders and partners (e.g. regional bodies such as RSMC), and their respective roles and responsibilities;
- Timelines and milestones for sub-project implementation.

3.3.2 The Workplans for CIFDP-B and CIFDP-F, based on the PSG’s consideration on the above aspects, are available in *Annex IV* (for CIFDP-B Phase 2) and the summary report of CIFDP-FSW (<http://www.jcomm.info/CIFDP-FSW>).

### **3.4 Linkage with related programmes**

3.4.1 Taking into account the respective status for each country implementing the National Sub-Projects of CIFDP, the PSG discussed on establishing/enhancing linkages with related programmes and projects with CIFDP. The following activities were identified, while

not excluding other activities, for continuing efforts for coordination to ensure synergies in strengthening national capacities under the respective Sub-Projects:

- Storm Surge Watch Scheme (SSWS) for RA V (for CIFDP-F), RA IV (for CIFDP-DR) and for RA II (for CIFDP-B);
- WMO Severe Weather Forecasting Demonstration Project (SWFDP) for RA V (for CIFDP-F), RA II (for CIFDP-B) and RA I (for CIFDP-SA if/when realized);
- WMO Working Group on Societal and Economic Research Applications (WG-SERA, for all National Sub-Projects);
- ESA eSurge (for CIFDP-B);
- Related activities of the JCOMM Expert Team on Waves and Coastal Hazards Forecasting Systems (ETWCH), such as establishment of storm surge climatology (for all National Sub-Projects);
- EU-funded SPREP project EU-funded on Waves and Coast (WACOP, for CIFDP-F);
- Planned SPC proposal to the World Bank under the Facility for Disaster Reduction and Recovery (GFDRR) for an “operational wave forecasting for early warning systems, southern Viti Levu, Fiji” (for CIFDP-F).

### **3.5 Communication and outreach**

3.5.1 The Group reviewed the related communication and outreach activities for CIFDP, including the project website (<http://www.jcomm.info/CIFDP>), brochure (2012 update) and presentations/briefings at scientific and technical fora, and advised on the points of future improvement and opportunities. The Group agreed on the revised contents for the web site and brochure, and requested the Secretariat to publish new editions for both documents by March 2013 **(Action)**.

3.5.2 The Group also agreed that, as each Sub-Project has been making rapid progress, a “fact sheet” should be developed to share information and experience with other countries that are interested in initiating similar activities and applying the results in their countries. For this purpose, the Group agreed to develop a template for such information, by April 2013, and requested the Secretariat to take necessary measures to publish it, together with the brochure, once the contents are agreed **(Action)**.

3.5.3 The Group requested the WMO Secretariat to organize a side meeting during the 65<sup>th</sup> WMO Executive Council (May 2013, Geneva), to provide the Members with a briefing on the CIFDP progress, and to discuss Members’ participation and contribution to National-Sub Project implementation **(Action)**.

3.5.4 The Group noted that the information developed and outcomes of Sub-Projects should be used to develop curricular material for capacity development and training modules, and agreed to include it in future discussions and work plans **(Decision)**.

## **4 MANAGEMENT ISSUES**

#### **4.1 Funding: resources for general management and sub-project implementation**

4.1.1 The Group recalled that a National Sub-Project of CIFDP should be implemented by either national resources or external funding support from donor agencies. The National Coordination Teams (NCTs), in coordination with the WMO Secretariat if required, are to identify financial and in-kind resources required for the sub-project implementation. The WMO Secretariat is responsible for supporting the PSG activities, and if required and feasible, for providing seed-funding for the initiation of a Sub-Project. The Group agreed to keep this CIFDP general financial model as a matter of principle **(Decision)**.

4.1.2 In the meantime, the Group noted with appreciation that the WMO Secretariat for JCOMM has successfully raised funding for the entire cycle of CIFDP-B (through WMO Funds-in-Trust from USAID) and for Phase 1 of CIFDP-F (through WMO Funds-in-Trust from KOICA). The Group also noted planned activities in the WMO Secretariat to support NCTs in identifying funds for CIFDP-F (Phases 2 to 4) and CIFDP-DR.

4.1.3 The Group requested all NCTs to take a more proactive role in identifying resources for the Sub-Project Implementation **(Action)**.

#### **4.2 Work of the Project Steering Group (PSG)**

4.2.1 The Group reviewed its [Terms of Reference \(ToR\)](#) and agreed to keep the current description as agreed at its 3<sup>rd</sup> meeting (2-4 April 2011, Jacksonville, USA), until the next review at the 5<sup>th</sup> meeting **(Decision)**.

4.2.2 The Group reviewed its membership. Noting that Mr Fidel Perez (hydrological modelling expert) would not be able to directly participate in the Group's activities during his academic leave, the Group agreed to suspend his membership until his return to the duties in the national agency **(Decision)**. The Group agreed to issue a letter to the WMO Secretariat on the current membership and work of the PSG **(Action)**.

4.2.3 The Group agreed to work closely with the WMO Working Group on Societal and Economic Research Applications (SERA) to address social and economic aspects in the Project implementation. With mutual agreement, SERA should identify one member to advise for each national sub-project implementation **(Decision)**, see also item 3.1).

4.2.4 The Group noted that, with the rapid development and extension of CIFDP and its Sub-Projects, the work required for the Group has significantly increased. In order to efficiently carry out the Group's work and to meet increasing demands of countries for CIFDP implementation, the Group agreed on the following principles for operation **(Decision)**:

- In coordination with the WMO Secretariat, the two co-chairs would oversee the work of the PSG, including input/guidance to all sub-projects' implementation, phased review and report to WMO bodies/meetings;
- All PSG members would carry out distributed responsibilities to support/advise Sub-Project implementation. The indicated Members of the PSG for each Sub-project, selected in consideration of the areas of expertise for Members, should take the main responsibility for consolidating technical advice, phased review and other required input to the implementation of respective Sub-Projects, for the final agreement and decision of the whole PSG. The list should remain flexible and be updated/modified

at the regular meetings of the Group, or by the agreement of all PSG Members during the intersessional period.

The Group agreed to consolidate the list of responsible PSG Members for each ongoing Sub-Project by April 2013, and to review and update it as required **(Action)**

## **5 ANY OTHER BUSINESS**

5.1 The Group noted, as a potential issue, a need to prepare a policy regarding the aspects of intellectual property of the developed CIF system, as well as the established concept / procedure. The Group requested the WMO Secretariat to investigate similar cases and models/procedure that CIFDP could adopt in the future **(Action)**.

## **6 CLOSURE OF THE SESSION**

6.1 The Group reviewed and approved the list of actions prepared by the Secretariat (reproduced as [Annex VI](#)). The final report of the meeting (this report) was compiled by the Secretariat after the meeting, and published by March 2013.

6.2 The Group agreed that the 5<sup>th</sup> meeting could be convened in conjunction with a planned session of WG-SERA in 2014 in South Africa, in order to strengthen the linkage with WG-SERA and to encourage the initiative for CIFDP-SA. The Group requested the Secretariat to explore feasibility to make such an arrangement **(Action)**.

6.3 The 4th Meeting of the WMO Coastal Inundation Forecasting Demonstration Project Steering Group (CIFDP-PSG-4) was closed at 1400 hours on Saturday 23 February 2013.

---

## LIST OF PARTICIPANTS

### Project Steering Group

Dr Linda ANDERSON-BERRY  
Bureau of Meteorology, Melbourne  
700 Collins Street  
Docklands  
GPO Box 1289  
Melbourne VIC 3001  
Australia  
Tel: +61-3-9669-4585  
Fax: +61-3-9669-4695  
Email: lab@bom.gov.au

Prof. Shishir DUBE  
Indian Institute of Technology Delhi  
Indian Institute of Technology  
Hauz Khan New Delhi  
New Delhi 110 016  
India  
Email: skdube@cas.iitd.ac.in

Dr. María Paula ETALA  
Agente Civil Superior  
Naval Hydrographic Service  
Comodoro Py 2055 15th. floor  
C1104BEA Buenos Aires  
C.A.B.A.  
Argentina  
Tel: +54-11 4317 2000 ext. 3152  
Fax: +54-11 4317 2309  
Email: etala@ara.mil.ar

Mr. S. H. M FAKHRUDDIN  
Team Leader Hydrology Department  
RIMES, Bangkok  
Regional Integrated Multi-Hazard Early  
Warning System for Africa and  
Asia  
Thailand  
Tel: +662 516 5900  
Fax: +662 516 5902  
Email: smfwater@gmail.com

Dr Donald RESIO (**Co-chair**)  
Professor  
University of North Florida  
1 UNF Drive  
Jacksonville FL 32224  
United States

Tel: +1 904 620 2695  
Email: don.resio@unf.edu

Mr Val SWAIL (**Co-chair**)  
Environment Canada  
4905 Dufferin Street  
Toronto, Ontario M3H 5T4  
Canada  
Tel: +1 (416) 739 4347  
Fax: +1 (416) 739 5700  
Email: Val.Swail@ec.gc.ca

Mr Deepak VATVANI  
Deltares  
Rotterdamse weg 185  
PO Box 177  
2600 MH Delft  
Netherlands  
Tel: +31 15 285 8582  
Email: deepak.vatvani@deltares.nl

### Invited Experts and Observers

Dr Mikhail ENTEL  
Bureau of Meteorology, Melbourne  
700 Collins Street  
Docklands  
GPO Box 1289  
Melbourne VIC 3001  
Australia  
Tel: +61-3-9669-4782  
Fax: +61-3-9662-1222  
Email: m.entel@bom.gov.au

Mr Misaele FUNAKI  
Fiji Meteorological & Hydrological Services  
Korowai Road, Namaka,  
Private Mail Bag  
NADI 0351  
Fiji  
Email: Misaeli.Funaki@met.gov.fj

Mr Alipate WAIQAICELUA  
Fiji Meteorological service  
Korowai Road, Namaka,  
Private Mail Bag  
NADI 0351  
Fiji

Tel: +679 672 4888  
Fax: +679 672 0430  
Email: alipate.waqaicelua@met.gov.fj

**Secretariat**

Ms Pat CALUTAS  
Admin Assistant, Ocean Affairs  
World Meteorological Organization  
7bis, avenue de la Paix  
Case Postale 2300  
1211 Geneva  
Switzerland  
Tel: +41 (0)22 730 8473  
Fax: +41 (0)22 730 8128  
Email: pcalutas@wmo.int

Scientific Officer  
World Meteorological Organization  
7bis, avenue de la Paix  
Case Postale 2300  
1211 Geneva  
Switzerland  
Tel: +41 22 730 8273  
Fax: +41 22 730 8128  
Email: blee@wmo.int

Dr Boram LEE

---

**AGENDA**

(as agreed at CIFDP-PSG-4, 22-23 February 2013, Nadi, Fiji)

**1 OPENING**

- 1.1 Approval of the agenda
- 1.2 Organization of the meeting

**2 REVIEW PROGRESS OF NATIONAL SUB-PROJECTS**

- 2.1 Fiji sub-project (CIFDP-F)
- 2.2 Dominican Republic sub-project (CIFDP-DR)
- 2.3 Bangladesh sub-project (CIFDP-B)
- 2.4 Newly proposed national sub-projects

**3 REVIEW OF AND FUTURE DEVELOPMENT FOR THE PROJECT**

- 3.1 Project concept, implementing strategy and implementation plan
- 3.2 Technical Recommendation: Forecast System Concept for CIFDP
- 3.3 Workplans and timelines for sub-projects
- 3.4 Linkage with related programmes
- 3.5 Communication, outreach and capacity building

**4 MANAGEMENT ISSUES**

- 4.1 Funding: resources for general management and sub-project implementation
- 4.2 Work of PSG

**5 ANY OTHER BUSINESS**

**6 CLOSING**

- 6.1 Adoption of the action items and decisions of the Meeting
  - 6.2 Dates and place of the fifth PSG meeting
  - 6.3 Closure of the meeting
-

**AGREEMENT FOR  
SUPPORT FOR THE COASTAL INUNDATION FORECASTING DEMONSTRATION PROJECT  
FOR FIJI (CIFDP-F)**

(as agreed at CIFDP-FSW, 21 February 2013, Nadi, Fiji)

**Being concerned to** provide the highest quality public warnings to the coastal communities of Fiji in the event of possible inundation from oceanographic and/or hydrological phenomena, resulting from severe hydro-meteorological events, in particular, those associated with tropical cyclones;

**Noting** that consistent with the Fiji's Natural Disaster Management Act (1998), the roles and responsibilities of the agencies of the Government of Fiji are to be carried out in such a way that the agencies work in close harmony;

**This Agreement** describes the commitment of the undersigned agencies to work closely with the Fiji Meteorological Service (FMS), to assist all in the fulfilment of roles, responsibilities and missions related to coastal inundation in the context of CIFDP-F;

**Noting** that establishing an effective forecasting and warning system on coastal inundation, the goal of the CIFDP-F would greatly assist Fiji's activities of disaster mitigation;

**Noting** that CIFDP-F will be built from the combined and sustained implementation as well as contributions of the Signatories, along with substantial multilateral and multi-disciplinary cooperation and coordination;

**Acknowledging** that existing operational forecasting and warning arrangements for extreme events already provide information to coastal community, the CIFDP-F would build on the existing capacity while avoiding any duplicated efforts;

**The National Stakeholders** agree to work together in providing support to CIFDP-F by way of participating in and supporting the CIFDP-F National Coordination Team (NCT), in particular;

**Agree** that they will work together in:

- Assessing user requirements for services related to coastal inundation in Fiji, particularly for the Viti Levu;
- Exchanging data required for the CIFDP's operational services;
- Supporting the efficient and effective long term management of data used in operational forecasting, warning system validation, and research and development aimed at improving the CIFDP. Such data include:
  - Atmospheric measurements including pressure, wind, temperature, rainfall and humidity/dew point, in particular, measurements related to cyclones;
  - Sea level height , including those from tide gauges;
  - River water level height and river runoff;
  - Satellite data for ocean winds, SST, waves, SSHA, etc.;
  - Wave measurements in deep water offshore and shallow water near shore;
  - Bathymetry;
  - Watershed characteristics;

- Digital land elevation data in the coastal zone of Fiji including the Viti Levu area;
  - Astronomical tide and coastal currents;
  - Structural information;
  - Land use information;
  - Coastal inundation map;
  - Other data which, from time-to-time, the National Coordination Team deem vitally important for the CIFDP;
- Technology transfer among the service providing agencies including FMS, and the implementing agencies and beneficiaries including the National Disaster Management Office, and from donors to Signatory Parties; and
  - Training of staff engaged in operational and extension activities related to the work of the CIFDP-F;

**This Agreement** may be amended at any time at the request of one of the Signatories and that any amendment shall be made in writing and decided by consensus amongst the Signatories;

**This Agreement** shall enter into force upon signature by all parties on 1 April 2013 and shall continue to be in force for a period of five years thereafter unless all parties agree in writing that the Memorandum shall be terminated at an earlier date,

**Further**, any agency of Fiji or any other organization involved in the related activities may become a party to the Agreement by the 3/4 majority of the Agreement's initial parties.

Signed:

- Prime Minister's Office
- Ministry of Works and Transport (\* FMS)
- Ministry of Provincial Development and Disaster Management
- Ministry of Lands, Fiji Lands Information System
- Ministry of Local Government, Municipal Councils
- Ministry of Defence
- Ministry of Agriculture- Department of Land Resources Management
- Ministry of Fijian Affairs- Roko Tui's
- Ministry of Foreign Affairs, Climate Change Unit

---

**Annexes:** CIFDP-F NCT Terms of Reference  
CIFDP General Description

            
\* The underlined stakeholders/signatories are considered to be the essential participants in this Agreement, in order to proceed with the Project implementation.

**Terms of Reference for  
The National Coordination Team (NCT) for the  
Coastal Inundation Forecast Demonstration Project for Fiji  
(CIFDP-F)**

**1. Preamble**

1.1 Members of the World Meteorological Organization (WMO), working closely with the Joint WMO-IOC Technical Commission for Oceanography and Marine Meteorology (JCOMM) and in cooperation with the WMO's Technical Commission for Hydrology (CHy), have decided to develop an example of cooperative work as a strategy for building improved operational forecasts and warnings capability for coastal inundation that can be sustained by the responsible national agencies:

- Implementing well-proven, operational, open-source coastal inundation, end-to-end forecasting and warning systems;
- Supporting the exchange of data and information among stakeholders;
- Developing cross-cutting cooperation of different scientific disciplines and user communities; and,
- Building communication platforms between researchers, forecasters and disaster managers involved in coastal inundation from oceanographic and/or hydrological phenomena, resulting from severe hydrometeorological events, in particular, those associated with tropical cyclones..

1.2 These terms of reference are applicable to the elements of the CIFDP being developed to address the needs of the people of Fiji.

1.3 The NCT is comprised of the following National Stakeholders, while its membership is open to other Agencies as necessary and as agreed following the paragraph 1.5:

[Technical Partners]

Fiji Meteorological Service, Hydrology Unit.  
National Disaster Management Office  
Fiji Navy, Hydrographic Unit.  
SPC/SOPAC  
University of South Pacific  
SPREP  
Fiji National University

[Beneficiaries]

Ministry of Works and Transport  
Ministry of Provincial Development and Disaster Management  
Ministry of Lands, Fiji Lands Information System  
Ministry of Local Government, Municipal Councils  
Ministry of Defence  
Ministry of Agriculture- Department of Land Resources Management  
Ministry of Fijian Affairs- Roko Tui's

Ministry of Foreign Affairs, Climate Change Unit  
Ministry of Information, Media outlets  
Ministry of Tourism  
Ministry of Fisheries and Forests  
Department of Environment  
Department of Energy  
Divisional Commissioners/Divisional Planning Officers  
Department of Mineral Resources- Seismology Unit  
Fiji Police Force  
Fiji Electricity Authority (FEA)  
Telecom Fiji Ltd.  
Land Transport Authority  
Fiji Ports Corporation Ltd.  
Maritime Safety Authority  
Airport Fiji Ltd.  
Red Cross

1.4 Each member agency/institution participating in the NCT will appoint a focal point who holds responsibility related to and capability to contribute to the CIFDP-F.

1.5 Additional stakeholders may be invited by majority of those stakeholders attending a meeting at which a quorum (60% of the Team) is present.

## **2. Scope of work**

2.1 The NCT will work with the Fiji Meteorological Service (FMS), the agency responsible for the implementation of operational systems to provide warning for coastal inundation, to develop and implement the Project with the guidance of and close collaboration with the CIFDP Project Steering Group (PSG), to:

- Identify and continuously review the requirements of users and stakeholders in Fiji for advice and warnings related to coastal inundation;
- Promote technology development and transfer, through the provision of tools for risk assessment, services from coastal inundation forecasting and warning services; as well as the provision of training material specifically developed based on the progress in Project implementation;
- Assist in resolving information exchange and management issues among national stakeholders in the CIFDP-F implementation, in view of establishing a long-term framework for information sharing;
- Encourage and support specialized training programmes, which would enhance the capabilities of FMS and other service providing agencies to produce and provide coastal inundation forecasting and warning services including the dissemination aspects.

2.2 The NCT will assist in the development of an operational coastal inundation forecasting and warning system, to be operated and maintained by FMS, once the CIFDP-F is successfully completed. In doing so, the NCT will guide the implementation of a communication platform that will improve interactions of FMS with national stakeholders (including Government Agencies, media, NGO's, etc.) for

better understanding of user requirements, effective communication of the advisory and warning messages, and user feedback.

- 2.3 The NCT and PSG will meet at regular intervals as required by the demands of the project (possibly six-monthly initially).
  - 2.4 The NCT will work with the PSG to develop proposals for donor support for CIFDP-F activities.
  - 2.5 The NCT is open and transparent in its functioning, making available to all stakeholders a report of each meeting held, including a summary of the decisions taken, a list of current stakeholders, and a list of the meeting's participants.
  - 2.6 The NCT will work with the PSG to prepare and issue the final report on the CIFDP-F, in coordination with the WMO Secretariat, and prepare recommendations to be transmitted to the relevant programmes and projects.
-

## **Coastal Inundation Forecast Demonstration Project (CIFDP)**

Coastal inundations are an increasing threat to the lives and livelihoods of people, living in low-lying, highly-populated coastal areas. According to the World Bank Report 2005, at least 2.6 million people have drowned in coastal inundation, particularly caused by storm surges, over the last 200 years.

### **Overarching Objectives:**

The purpose of the WMO Coastal Inundation Forecasting Demonstration Project (CIFDP) is to meet challenges of coastal communities' safety and to support sustainable development through enhancing coastal inundation forecasting and warning systems at the regional scale.

### **Benefit for CIFDP-implementing countries:**

Upon completion of national sub-projects of CIFDP, countries will implement an operational system for integrated coastal inundation forecasting and warning, providing objective basis for coastal disaster (flooding) management; contributing to saving lives, reducing loss of livelihood and property, and enhancing resilience and sustainability in coastal communities.

Upon completion of each Phase of the Project, countries will be provided with valuable input to the assessment and awareness of the issues of coastal inundation management within its governments. It would also assist the countries to advance steps toward the integrated forecasting and warning services.

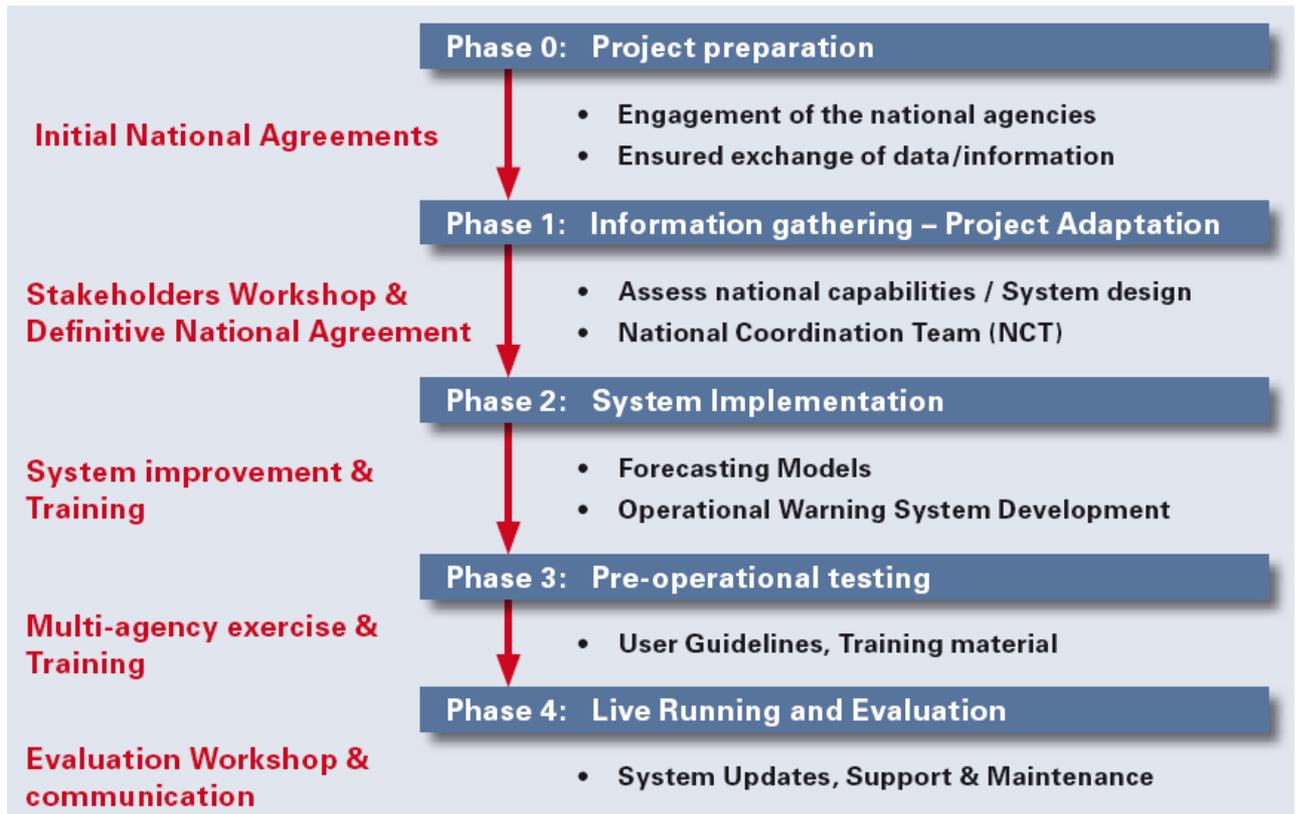
### **CIFDP general financial model:**

A national Sub-Project of CIFDP is generally implemented by either national resources or external funding support from donor agencies. The National Coordination Team (NCT), led by national operational agencies for coastal inundation forecasting, would be responsible for the implementation of a Coastal Inundation Forecasting (CIF) system. The NCT works with WMO, the implementing and coordinating agency of CIFDP, and the CIFDP Steering Group (PSG) to identify financial and in-kind resources required for the sub-project implementation.

Upon the completion of a national sub-project, operation and maintenance of the CIF system would be the responsibility of national operational agencies with mandate of coastal inundation warnings.

### **Scope and Implementation:**

The main focus of the CIFDP will be to **facilitate the development of efficient forecasting and warning systems for coastal inundation** based on robust science and observations:



For more detailed information, please refer to:

CIFDP Implementation Plan (JCOMM Technical Report No.64), and

Project web site: <http://www.jcomm.info/CIFDP>.

---

**DIRECTION & OUTLINE FOR CIFDP-B PHASE 2**  
(as agreed at CIFDP-PSG-4, 22-23 February 2013)

***Phase 2: System Implementation***

The CIFDP is primarily a technical implementation of an integrated forecasting system. Therefore the main focus from this phase will be addressing technical issues, while keeping updated the users' needs from the initial stage of the Sub-Project planning.

In principle, system implementation in Phase 2 is the responsibility of the National Coordination Team (NCT) comprising national agencies and the system developers. Designated members of the CIFDP Steering Group (PSG) will be involved at relevant moments in the implementation process, and the whole PSG will be regularly updated on the progress of the work.

For the particular case of CIFDP-B, the WMO Secretariat will directly be involved in the planning, coordination and implementation of the operational system in terms of; 1) indentifying the system developers; 2) managing the financial resources from USAID for CIFDP-B that resides in the WMO Secretariat; and 3) monitoring and evaluating the progress of CIFDP-B phase 2, in coordination with the PSG.

***Milestones, responsibilities and expected outcome for CIFDP-B Phase 2***

**Milestone: Implementation Kick-off**

Purpose: to confirm the system implementation approach and the forecasting system setup as defined in the updated Implementation Plan. Based on the final requirements, technical specifications will be updated and detailed (i.e. describing concretely the links to data, software, models, hardware, and communication platforms).

Proposed dates and venue: 23-25 April 2013. Bangladesh

Provisional Participants:

- PSG (co-chairs and designated members for CIFDP-B)
- WMO Secretariat
- Key technical developers involved in/related to the "candidate models and service systems" (RIMES, JMA expert, IMD/RSMC expert, regional expert on wave/surge modelling including INCOIS, etc.)
- Expert on user consultation .
- Key experts involved in relevant ongoing projects (eSurge, EU Coastal Warning project)
- BMD forecasters and CIFDP-B focal points
- Key NCT members representing national stakeholders (to be coordinated by BMD)

Expected Outcome:

- Summary report of the meeting, including the documented summary, pros/cons of "considered" models and tools

- Bangladesh Coastal Inundation Forecasting System specification (including agreed selection of models and approach for development)
  - Selection of forecasting modelling system needed for required coastal inundation simulation in Bangladesh (e.g. meteorological input including hurricane/tropical cyclone and rainfall, ocean modelling including storm surges, hydrological and hydraulic modelling). It is essential that model interconnectivity, inter-changeability, and flexibility for later integration of advanced/upgraded modules into the forecasting system be maintained during the development of the initial system.
- User requirement document (updated) and communication plan
- Updated CIFDP-B Project Plan

Responsibilities:

- WMO Secretariat, for organization of the meeting and financial support for international participation
- PSG, for review of planning process and preparation/review of the system design, and finalizing the system specification
- PSG and expert on user consultation, for finalizing user requirements and communication plan
- BMD, for ensuring the involvement of forecasters and focal points
- NCT (led by BMD) , for local organization of the meeting, and for coordination of the participation of the key NCT members representing national stakeholders

**Outcome: Model and System Development**

Objectives: to carry out what was decided for the CIF system specification (and the updated CIFDP-B Project Plan)

Provisional period: 1 year to 18 months, from May 2013.

Operating mode:

- Following the updated CIFDP Project Plan, the system developers (to be selected and agreed through the kick-off meeting ) will play the key role in the actual development, with support of the WMO Secretariat and in consultation with the PSG.
- The NCT will be participating in the process at all time, to ensure that the developed system will be tested and demonstrated by/within the national operating system at all stages and steps.

Key elements to achieve:

- (Pre-)Operational Forecasting System
  - The prototype of national forecasting system/process for operational use, integrating the various forecasting models (if possible, through configuration of an existing open forecasting system, and testing )
  - formalized communication platforms for data management and project coordination
  - Plans/material for technology transfer and on-the-job training
  - outlined process for validation and assessment
- Hardware setup

- A hardware platform corresponding to the operational requirements for the developed (pre-) operating system. It should be available at an early stage of Phase 2 to allow operation and testing of initial versions of the forecasting system.
- As required, on-the-job and some formal training of system managers

Responsibilities:

- System developers for overall system implementation in time and providing sufficient information to the PSG to allow adequate technical review
- NCT, particularly BMD, for support of system developers and testing for each step
- WMO Secretariat for coordination and support for system developers
- PSG for technical advice and review

**Outcome: End-user Products**

Objectives: to collect feedback both from system operators (forecasters) and users of the CIF information, as part of the Sub-Project implementation results and to evaluate the overall accuracy of the forecast system in terms of meeting stakeholder requirements.

Provisional period: 1 year to 18 months, from May 2013.

Operating mode:

- Based on the user requirement document and communication plan (after the implementation kick-off meeting), the system developers and expert(s) on user consultation will work together to regularly collect and document feedback through the established dialogue mechanism, in consultation with the NCT.
- The NCT (particularly BMD) will continuously work with the system developers and the expert on user consultation in coordinating feedback from forecasters as well as from users at all stages and steps. This will include feedback and documentation focused on the evaluation of the system capabilities and accuracies relative to user requirements.

Key development objectives:

- Tools for user feedback
  - Web-based and other efficient forecasting capabilities and related communication procedures
  - Clear mechanisms for regular feedback from and to forecasters
  - Clear mechanisms for regular collection and documentation of user feedback
- User Products
  - Documented feedback from forecasters
  - Documented feedback from users
- coastal inundation scenarios
  - based on historical events, to be used for system testing.
- Input/addition/edition to user requirement document and communication plan for CIFDP-B

Responsibilities:

- System developers for overall development, user feedback tools, and building scenarios

- NCT, particularly BMD, for collecting operators' / user feedback
- Expert on user consultation for collecting and documenting user feedback
- WMO Secretariat for coordination and support for system developers
- PSG for technical advice and review

### **Milestone: Training for system operators**

Purpose: to ensure that the responsible national agency(ies) will be able to operate and maintain the developed forecasting systems at the completion of the project, and to provide basis for more extensive formal training in Phase 3.

Proposed dates and venue: August 2014 (or at least 2 months before the System Testing), for 5 days, in Bangladesh

Scope of training:

- Focused training for (future) system operators

Provisional Participants:

- System Developers and recommended experts (trainers)
- WMO Secretariat
- BMD forecasters/operators and CIFDP-B focal points
- Operators of key NCT members/institutions (to be coordinated by BMD)
- System operators of the neighbouring countries (as potential users) and operators of other CIFDP National Sub-Projects

Expected Outcomes/Products:

- (before the training) Documented training guidelines for the developed CIF system, as the basis of the formal CIF system user guidelines (in Phase 3)
- **Training workshop for system operators/forecasters**, and summary reports
- Documented feedback from trainees
  - Advice on amendment/follow-up to the system design

Responsibilities:

- System developers, in coordination with PSG, for documenting user guidelines and training material
- System developers for conducting appropriate training for system operators / professionals
- NCT, particularly BMD, for ensuring the participation of forecasters/system operators to participate in the training, who will continue their duties through the Phase 3.
- WMO Secretariat, with BMD, for coordination and support for training

### **Milestone: System Exercise**

Purpose: operational testing of prototype versions of the CIF system from an early stage in the implementation phase. The testing, at this stage, will be performed as "dual-phase" exercise; 1) pre-test as a demonstration; 2) post feedback demonstration. The test is focused on identifying system operability and potential problems, by system developers and forecasters/operators.

Proposed dates: October 2014

Expected Outcome:

- (before testing period) Simulation and hindcast of several characteristic historical events (e.g. tropical cyclones, storm surges, floods)
- (before testing period) documented plan/procedure for testing, with necessary guidelines/manual for system operation
- **System testing**, and summary report of the testing results
- (after testing period) an acceptance testing plan for testing in Phase 3, for further validation and improvement of the forecasting system (during the tropical cyclone season)

Responsibilities:

- System developers for conducting tests and test documentation (summary report and testing plan for Phase 3)
- NCT, particularly BMD, for conducting tests and providing feedback to system developers
- WMO Secretariat for coordination of and support for system developers
- PSG for technical advice and review

### **Milestone: Review Phase 2 and approval**

Purpose: to review achievements during Phase 2, and to decide whether the CIFDP-B Phase 3 can proceed. Discussions among NCT members, PSG and other identified experts will form the basis for the decision on specific plans and requirements.

Proposed dates: December 2014, Bangladesh

Expected Outcomes/Products:

- (before review) Report on Phase 2 implementation including test results, by NCT and system developers
- PSG review and decision on Phase 2 implementation, including recommendations and requirements
- Updated Sub-Project Plan, including; 1) Acceptance testing plan; 2) Plan for the operational system set-up; 3) updated communication plan (dissemination of project results to wider audience); and, 4) Human resource development and training plan.

Responsibilities:

- NCT and System developers for reporting (Phase 2 implementation , updated Sub-Project Plan)
- PSG for review and documenting the recommendations/requirements
- WMO Secretariat and PSG for organizing review (online or offline)

**General Direction**

**(from the agreement at the Stakeholders Workshop, November 2011)**

- The direction of the project will evolve along with the progress of the project.
  - Both institutional agreements (Definitive National Agreement through MoU) and technical development should be carried out in parallel, and be initiated as soon as possible.
  - The project should start and be implemented from what we have in the Country / Region, while ensuring the possibility/flexibility to plug-in updated/modified modules for each component along with the technical development.
  - A small dedicated team of technical experts should be identified by each Technical Partners within the NCT, to carry out the technical development on:
    - improvement/creation of dataset;
    - Identification of the best-suited models for Bangladesh;
    - Improvement of (operational) model characteristics and mode of operation
    - validation/historical dataset building.
  - For each model/module development, the NCT/Technical Team should make sure to document the “procedure / best practice” for operation (e.g. optimum run time / resolution / operation cycle).
  - General coordination of the work by NCT will be led by BMD in agreement within the NCT.
  - Throughout the project implementation, the NCT will ensure the user perspectives through the Stakeholders (defined in the ToR of NCT).
-

**SUMMARY ON THE PROGRESS OF CIFDP-S (SHANGHAI) PLANNING**  
(Submitted by Shanghai Meteorological Bureau, February 2013)

***The WMO-CIFDP-S's major objectives are:***

- 1) to enhance abilities of forecasters to issue timely and accurate watches, warnings, forecasts and decision supports for coastal inundation, combining extreme waves, surges and river flooding events,
- 2) to demonstrate performance of the most advanced coastal inundation forecasting techniques in the world,
- 3) to assess the WMO-CIFDP's impacts on enhancing the coastal inundation forecast service as well as its social and economic benefits,
- 4) to promote implementation of the most up-to-date forecast technique for coastal inundation in other affected Members of WMO, and
- 5) specifically, to enable SMB to provide enhanced coastal inundation forecast service, to enhance the communication and cooperation between relevant government departments, to improve the related decision making by Shanghai government and to maintain an effective end-to-end early warning system for the users and communities, leading to appropriate responses.

***The WMO-CIFDP-S's organizational framework:***

In the framework of CIFDP organization, SMB in cooperation with target stakeholders (Hydrography Department Shanghai Maritime Safety Administration, Shanghai Water Authority & Shanghai Municipal Oceanic Bureau, Shanghai Emergency Response Centre) will establish a National Coordination Team (NCT) through national commitment to lead the CIFDP implementation, with the guidance by the Project Steering Group (PSG).

***The WMO-CIFDP-S's implementation strategy:***

The WMO-CIFDP-S implementation consists of six components: database, atmospheric models, storm surge forecast sub-system, hydrological forecast sub-system, decision support sub-system, products and dissemination platform. SMB has mature base on atmospheric models so the emphasis will be put on storm surge forecast sub-system and hydrological forecast sub-system. The details can be found in the proposal.

**Implementation Plan:**

	<b>January - March</b>	<b>April – May</b>	<b>June - August</b>	<b>September - December</b>
<b>2013</b>	Proposal; Concept document (draft)	National commitment; Invitations to participate in CIFDP	Target stakeholder/user communities requirements identification; Establishment of NCT	Information gathering; Development of database
<b>2014</b>	Atmospheric, wave, storm surge and river models development	Storm surge forecast sub-system, hydrological forecast sub-system development	Decision support sub-system development	Production and dissemination platform development
			Project Plan Update and Project Phase Review	
<b>2015</b>	Interim Review Meeting; System test and pre-operational testing; Verification of forecast products in 2014; Development of the forecast errors dataset; Development of forecast integration techniques and reliability products		Provide real time coastal inundation forecast products and forecast reliability products to forecasters and end users during this year;	
	Develop Training Material and Capacity Building			
<b>2016</b>	Interim Review Meeting; Verification of coastal inundation forecast products and assessment of forecast reliability products in 2015	Follow-up training; Survey to assess impact of CIFDP		Final Review Meeting and Evaluation Workshop Publication of Guidelines
	System Updates, Support & Maintenance			

**LIST OF ACTIONS AND DECISIONS**

Ref.	Actions / Decision	By whom	With whom	By when
<b>Fiji National Sub-Project (CIFDP-F)</b>				
2.1.2	To finalize the DNA with all signatures by essential participants (among national stakeholders)	NCT led by FMS		1 April 2013
2.1.4	To consider and plan for an expert assessment on Fiji capabilities for CIF	WMO Sec.(B.Lee)	Core PSG for CIFDP-F	ASAP/not later than 30/03/13
2.1.5	To plan for interdisciplinary forum in June-July, possibly in conjunction with the Pacific Meteorological Council (1-5 July 2013), and the Pacific Platform for Disaster Risk Management & Pacific Climate Change Round Table 2013 (8-12 July 2013) - To consider coordinating with the development of regional DRR & Climate strategy	WMO Sec. (B.Lee, with DRA)	Core PSG for CIFDP-F, FMS, SPREP, BOM	ASAP/not later than 30/03/13
2.1.6	To complete user requirement report and communications plan	L.Anderson-Berry	NCT, WMO Sec.	1 <sup>st</sup> draft by 25/04/13, final report by 27/06/13
<b>Dominican Republic National Sub-Project (CIFDP-DR)</b>				
2.2.1	to ensure communication with the PSG be made in English, regarding the requirements for Phased Review as well as for issues requiring PSG advice	NCT	WMO Sec.(E.Cabrera)	Immediate and continuous
2.2.2	To complete requirements for Phase 1, including; 1) revision for national capacity assessment report (update from 2011 version); 2) finalized NCT ToR and membership; and, 3) detailed project plan.	NCT		ASAP/not later than 30/06/13
2.2.3	To inform PSG when funds for CIFDP-DR implementation become available	NCT	WMO Sec.(E.Cabrera)	
2.2.5	To issue a PSG letter to NCT informing the review results for CIFDP-DR Phase 1, and associated decisions and requests by PSG - Acknowledge and accept DNA - Require missing requirements including revised national capacity assessment report, ToR and membership for NCT	PSG co-chairs	All PSG members	ASAP/not later than 08/03/13

2.2.5	To translate the above letter into Spanish, and issue the letter by PSG co-chairs	WMO Sec. (E.Cabrera)	PSG (P.Etala)	ASAP/not later than 18/03/13
<b>Bangladesh National Sub-Project (CIFDP-B)</b>				
2.3.1	To facilitate completion of DNA by WMO signature	WMO Sec. (B.Lee)		ASAP/not later than 30/03/13
2.3.2	To complete requirements for Phase 1 - revision for national capacity assessment report (per PSG comments)	NCT (led by RIMES)		ASAP/not later than 30/04/13
2.3.3	To initiate CIFDP-B Phase-2			ASAP/not later than 30/03/13
2.3.4	To plan for the Phase 2 kick-off / System Design meeting for 23-25 April 2013, pending agreement by BMD and potential system developers <ul style="list-style-type: none"> <li>- system design to include interface/integration elements</li> <li>- documentation/presentation (on pros&amp;cons) to be made on all models under consideration</li> <li>- to identify implementation method (e.g. implementation in distance / on site)</li> </ul>	WMO Sec. (B.Lee)	BMD, core PSG for CIFDP-B	ASAP/not later than 15/03/13
2.3.5	To ensure closer involvement of BMD forecasters/operators in CIFDP-B Phase 2 implementation, and of experts from RIMES and JMA	NCT for CIFDP-B	PSG, WMO Sec. (B.Lee)	1 <sup>st</sup> draft by 25/04/13, final by 01/08/13
2.3.6	To identify a key system developer for CIFDP-B implementation, at the kick-off meeting			30/04/13
2.3.8	To issue a PSG letter to NCT informing the review results for CIFDP-B Phase 1, and associated decisions and requests by PSG <ul style="list-style-type: none"> <li>- Request small revision for national capacity assessment report</li> <li>- membership for NCT (c.f. to clarify cooperation with FF&amp;WC, for data sharing)</li> </ul>	PSG co-chairs	All PSG members	ASAP/not later than 15/03/13
2.3.9	To complete user requirement report and communications plan	L.Anderson-Berry	NCT, system developers	1 <sup>st</sup> draft by 25/04/13, final by 01/08/13
<b>Development for other National Sub-Projects</b>				
2.4.3	To endorse the establishment of CIFDP-S (Shanghai) as a Sub-Project			

2.4.4	To provide required support and advice for CIFDP-S implementation	PSG.	WMO Sec.(B.Lee)	ASAP/not later than 30/03/13
2.4.4	To inquire Shanghai for possible options for resource mobilization for PSG support	WMO Sec. (B.Lee)	CIFDP-S NCT	ASAP/not later than 30/03/13
2.4.7	To endorse the establishment of CIFDP-I (Indonesia), upon the successful completion of national arrangement			
2.4.7	To communicate with Indonesia to follow-up the planning for Phase 0, and to plan for Phase 1 / Stakeholders Workshop (possibly in late 2013 or early 2014)	WMO Sec.(B.Lee)	CIFDP-I NCT	ASAP/not later than 30/04/13
<b>General CIFDP development</b>				
3.1.1	To revise and publish (online) CIFDP concept, as agreed at CIFDP-PSG-4	WMO Sec.		15/03/13
3.1.2	To revise and publish (online) CIFDP Implementation Plan (JCOMM TR No.64) as agreed at CIFDP-PSG-4, as 2013 edition - To move / incorporate text from the previous "Concept" & CIFDP-B Phase 2 plan - To include "CIFDP financial model" - To revise training components in phase 2 and after	PSG co-chairs	WMO Sec. (B.Lee)	30/04/13
3.1.3	To develop and update a detailed project plan for each Sub-Project	All NCTs		ASAP and ongoing
3.1.4 4.2.3	To establish a structured collaboration between PSG and WG-SERA for each National Sub-Project implementation, to address user/socio-economic issues	WMO Sec. (B.Lee, with WWRP Sec.),	L.Anderson-Berry	Immediate
3.2.1	To revise and publish (online) Technical Recommendation for a future Coastal Inundation Forecasting (CIF) system, as 2013 edition	WMO Sec.(B.Lee)		15/03/13
3.2.2	To ensure skill-score concept / validation be included in the CIF development	All NCT, system developers	PSG	Continuous
3.5.1	To prepare revised CIFDP Brochure with agreed text, and publish (online / offline)	WMO Sec. (B.Lee)	PSG (to provide confirmed text)	40.03/13
3.5.2	To develop a template for a "fact sheet" for a National Sub-project, to be an addition/appendix to Brochure	WMO Sec. (B.Lee)		30/04/2013
3.5.3	To arrange a side meeting at WMO EC-65 (May 2013) on progress of CIFDP National Sub-Projects	WMO Sec.		ASAP/by EC-65

<b>3.5.4</b>	To consider developing material for training / capacity development, by using the outcome and lessons from the CIFDP implementation			
<b>General management</b>				
<b>4.1.1</b>	To keep the general financial model for CIFDP implementation - to be implemented by national resources / external funding - WMO Sec. to provide seed funding only, upon request			
<b>4.1.3</b>	To take proactive role in identifying resources for Sub-Project implementation	All NCTs		ASAP and ongoing
<b>4.2.1</b>	To keep the current ToR for PSG, until review/revision at CIFDP-PSG-5			
<b>4.2.2</b>	To suspend PSG membership for F.Perez during his academic leave, and to re-invite him upon his return to the national duties			
<b>4.2.2</b>	To issue a letter to WMO (to Directors WDS and CLW) on overall membership (up-to-date) and operating principles	PSG co-chairs		30/03/13
<b>4.2.4</b>	To finalize and apply operating principles for the work of PSG (distributed responsibilities in supporting National Sub-Project Implementation)	PSG	WMO Sec. (B.Lee)	30/04/13
<b>5.1</b>	To make inquiry on aspects of intellectual property of the developed CIF system	WMO Sec. (with WMO LC)		ASAP/not later than 30/04/13
<b>6.2</b>	To communicate with South Africa on the initiation of CIFDP-SA (possibly in connection with the 2014 SERA meeting and 2014 CIFDP-PSG meeting)	WMO Sec.	SAWS	ASAP/not later than 30/04/13

**ACRONYMS AND OTHER ABBREVIATIONS**

BMKG	Indonesian Meteorological Climatological and Geophysical Agency
BMD	Bangladesh Meteorological Department
CHy	WMO Commission for Hydrology
CIF	Coastal Inundation Forecasting
CIFDP	WMO Coastal Inundation Forecasting Demonstration Project
DNA	(CIFDP) Definitive National Agreement
ETWCH	(JCOMM) Expert Team on Waves and Coastal Hazards Forecast Systems
ESA	European Space Agency
EU	European Union
FMS	Fiji Meteorological Service
JCOMM	Joint WMO-IOC Technical Commission for Oceanography and Marine Meteorology
JMA	Japan Meteorological Agency
KOICA	Korea International Cooperation Agency
NCT	(CIFDP) National Coordination Team
PSG	(CIFDP) Project Steering Group
RA	(WMO) Regional Association
RSMCs	Regional Specialized Meteorological Centres
SAWS	South African Weather Service
SMB	Shanghai Meteorological Bureau
SOPAC	(SPC) Applied Geoscience and Technology Division
SPC	Secretariat of the Pacific Community
SPREP	Pacific Regional Environment Programme
SSWS	(WMO) Storm Surge Watch Scheme
SWFDP	(WMO) Severe Weather Forecasting Demonstration Project
ToR	Terms of Reference
WG-SERA	(WMO) Working Group on Societal and Economic Research Applications
WWRP	World Weather Research Programme

---

