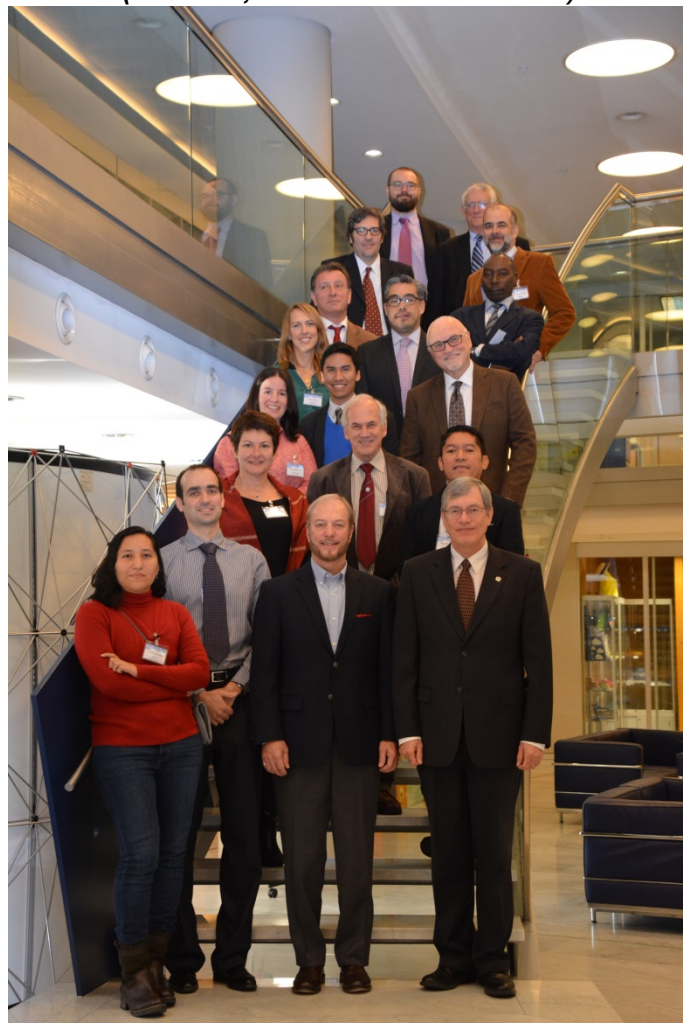


WORLD METEOROLOGICAL ORGANIZATION
WEATHER, CLIMATE AND WATER



WMO FLOOD FORECASTING INITIATIVE
ADVISORY GROUP
SECOND MEETING

FINAL REPORT
(GENEVA, 1 TO 3 DECEMBER 2015)



LIST OF ACRONYMS

APFM	Associated Programme on Flood Management
AWG-3	3 rd Session of the CHy Advisory Working Group
Cg	World Meteorological Congress
CHAMP	Coupled Hydrologic, Hydrodynamic, and Atmospheric Modelling Project
CHy	WMO Commission for Hydrology
CIFDP	Coastal Inundation Forecast Demonstration Project
E2E	End-to-End
EWS	Early Warning System
FFGS	Flash Flood Guidance System
FFI	Flood Forecasting Initiative
FFI-AG	Flood Forecasting Initiative Advisory Group
GWP	Global Water Partnership
NHSs	National Hydrological Services
NMHSs	National Meteorological and Hydrological Services
NMSs	National Meteorological Services
SAP	Strategy and Action Plan
SWFDP	Severe Weather Forecast Demonstration Project
ToR	Terms of Reference
WHYCOS	World Hydrological Cycle Observing System
WMO	World Meteorological Organization

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1. OPENING OF THE MEETING

The WMO Flood Forecasting Initiative Advisory Group (FFI-AG) held its second meeting from the 1st to the 3rd of December 2015 at WMO headquarters, Geneva. The list of participants is provided in Annex I to this report.

The president of the Commission for Hydrology (CHy) and Chair of the FFI-AG, Mr H. Lins, opened the meeting at 9:45 on the 1st of December 2015. He welcomed the participants and encouraged them to simplify the disconcerting array of activities within the initiative in order to achieve a more tractable Workplan. He also reminded everyone that that the intent of the FFI was to improve understanding and collaboration between the meteorological and hydrological communities for improving flood forecasting related practices. The chair then welcomed WMO's Climate and Water Department's new Director Johannes Cullmann and gave him the floor.

On behalf of the Secretary-General, the Director of the Climate and Water Department, Mr J. Cullmann welcomed the participants. He mentioned the existence of the Associated Programme on Flood Management (APFM) which is not only a mechanism to mitigate negative effects of flooding but it is also a component of Disaster Risk Reduction and the links between the programme and flood forecasting should be strengthened. He suggested finding the links between APFM and other initiatives, for instance, the International Flood Initiative (IFI). Mr Cullmann highlighted the role of FFI as a directing body that should sharpen the focus of other initiatives and define baselines for forecasting services and products. He also encouraged everyone to take advantage of other WMO programmes like WHYCOS and FFGS, which could serve as interface to link monitoring and forecasting. He wished everybody a good stay during the meeting and indicated that he would be looking forward to a fruitful discussion and meaningful outcomes of the meeting.

2. ADOPTION OF THE AGENDA

The FFI-AG adopted its agenda after adjusting a couple of items. Lunch was shifted to 12:30pm to allow the remote participant in Australia to take advantage of the morning sessions. Additionally, two presentations were added (FFGS in Chiapas and EWS in Kenya) to the list of FFI related activities to be presented. The final agenda is attached as Annex II.

Following the adoption of agenda, participants briefly introduced themselves. Mr Lins was pleased to see members of sister commissions (Commission for Basic Systems (CBS) and WMO-IOC Joint Technical Commission for Oceanography and Marine Meteorology (JCOMM)) attending the meeting, thus demonstrating that cooperation within commissions is being carried out.

3. INTRODUCTION TO THE WMO FLOOD FORECAST INITIATIVE

3.1 Expected Outcomes of the Meeting

The expected outputs from the meeting during its second constituent session were:

1. Agreement on the scope of work and approach to be taken by the FFI-AG, within its ToR;
2. Improve understanding of the current initiatives and activities undertaken in the framework of the WMO Flood Forecasting Initiative;
3. Agreement on specific actions to be undertaken and a Workplan associated with these actions;
4. Agreement on how the work of the FFI-AG should be undertaken including its outreach to Members, relevant Commissions, Technical Support Partners, and Development Partners (donors);
5. Conclusions and recommendations (including target audience), based on the presentations and discussions.

3.2 Background

The chair reminded the participants of the objective of the WMO Flood Forecasting Initiative (WMO-FFI), established by WMO in 2003, which is to *“Improve the capacity of meteorological and hydrological services to jointly deliver timely and more accurate products and services required in flood forecasting and warning and in collaborating with disaster managers, active in flood emergency preparedness and response”*.

In 2011, the World Meteorological Congress (Cg) passed Resolution 15 (Cg-16) establishing the WMO Flood Forecasting Initiative - Advisory Group (FFI-AG) with the objective to provide guidance and advice on the hydrological forecasting elements of a number of flood-related initiatives in progress under WMO programmes, and to provide broad-based support to improve collaboration between the meteorological and hydrological communities for improved flood forecasting related practices. The full text of Resolution 15 (Cg-16), including the Terms of Reference for the FFI-AG, is attached as Annex III.

To enable further discussion during the meeting, Mr. Lins brought to the attention of the meeting several current weaknesses within flood forecasting:

- National Meteorological and Hydrological Services do not always have the capabilities for flood forecasting;
- Meteorological information is not always usable as an input for forecasting and early warning systems;
- Available data are mostly non-standardized;
- Forecasting is not objective-driven.

4. REVIEW OF AND ADJUSTMENTS TO THE WORKPLAN 2013-2016 OF THE FFI-AG

4.1 Review criteria for the SAP (Activity 1.a)

The chair presented the review criteria for the current FFI's Strategy and Action Plan. They were the following:

1. Is the scope of the Plan appropriate for a WMO activity; i.e., does it clearly define those things that are traditionally within the WMO mission and omit those things that are not?
2. Does the Plan unambiguously state its purpose, and does it articulate a sense of what it hopes to achieve over the coming 5-10 years; i.e., what constitutes a successful initiative?
3. Are FFI priorities clearly defined, are they tractable, and do they complement the broader suite of objectives associated with related flood programmes?

4.2 Review of the SAP (Activity 1.b)

4.2.1 Review & Observations

Mr Y. Simonov, one of the two lead members of the Advisory Working Group of the CHy for theme area 4 (Hydrological Forecasting and Prediction) presented the results of his and J. Maina's extensive review of the SAP. Their presentation can be found on the WMO website¹, and the document can be found in Annex IV. Mr. Simonov also provided the list of currently available documentation regarding FFI:

- 2003 – Preparatory Expert Meeting on Improved Meteorological and Hydrological Forecasting for Flood Situations: WMO Action Programme on Flood Forecasting and Warning (objective and expected results); Regional workshops; collaboration with TCs: CHy, CBS, CAS, CCI, JCOMM;

¹ http://www.wmo.int/pages/prog/hwrf/flood/documents/presentations/2_FFISAP_Activity_Plan_review.pdf

- 2003-2006 – 8 regional workshops on “Improved Meteorological and Hydrological forecasting for Floods” (status of flood forecasting activities, deficiencies);
- 2006 – Synthesis Conference (key challenges for HMHSs, the SAP, implementation of the SAP);
- 2007 – Resolution 21 (Cg-XV): “Strategy for the enhancement of cooperation between NMSs and NHSs for improved flood forecasting” (to endorse the SAP);
- 2008 – Resolution 3 (CHy-XIII): “To supplement the SAP on the FFI with a detailed activity plan that will assist Members in establishing flood forecasting systems”;
- 2009 – Workshop on the SAP of the WMO FFI (consolidated Activity Plan of the SAP);
- 2011 – Resolution 15 (Cg-16): “To establish the WMO FFI Advisory Group (FFI-AG)”;
- 2013 – 1st FFI-AG meeting (Workplan (2013-2016) Version 1.0 of the FFI-AG).

Among the main findings, he called for the need to strengthen the focus of the FFI on forecasting, as the current activities are highly spread-out and to prioritize activities associated with short- to-medium term forecasting. He noted that only one third of the NHMSs have well established Flood Forecasting and Warning services, thereby stressing the importance of increasing the focus of the FFI on forecasting activities.

Mr. Simonov cited a few examples of topics addressed within the current broad activities that support or are linked with forecast activities, but should not have associated with them the highest priority of attention. These were:

- Observation and exchange of data
- Available products
- Institutional cooperation
- Capacity building
- Support to Disaster Risk Reduction
- Climate change

A recurrent problem identified was that terminology within the documents is heavy and confusing (e.g. action domains, actions, activities, core solutions, complimentary solutions, etc.). Moreover, the coverage of the Strategy and Actions Plan is too broad, rendering it difficult to implement.

There is a large amount of work outlining what could potentially be done regarding the *strengthening of observing and information systems*, but it is difficult to use if a National Service is already in operation. There are appropriate actions listed on *strengthening of institutional coordination, cooperation and integration between NMSs and NHSs*, but they are not directed to creating a Flood Forecasting service. Within this action, there are several repetitions that should be addressed. A way to do so is by grouping actions into larger groups to render them more comprehensible. Regarding *Demonstrating the value of meteorological and hydrological data, information and products*, there is a need to improve this activity by acquiring a more focused and concrete approach.

4.2.2 Discussion

Mr. Lins encouraged the participants to simplify and make more coherent activities to be done by the FFI-AG by prioritizing specific areas. The meeting agreed with the chair that the length and quantity of the documentation and activities are overwhelming. They acknowledged existing FFI documentation as useful reference material that should be consulted when appropriate. However, due to its complex terminology and lengthiness, a new Workplan and simpler documentation for all aspects of the SAP should be drafted taking into consideration the observations made in the previous section.

It was suggested that a broad but succinct mapping be performed to provide a complete overview of activities. It was thought that this effort should also help highlight those activities that would best advance short- to medium-term flood forecasting.

During the discussion, the issue was raised that many countries implement Flood Forecasting and Early Warning Systems without involving the National Hydrological and Meteorological Services and that this problem should be addressed in the Workplan. Furthermore, cooperation between meteorologists and hydrologists must be fostered, especially by involving them together early-on during the implementation of efforts to advance Early Warning Systems (EWSs) for flood forecasting.

The meeting was reminded that countries need advice and technical guidance from WMO and its partners on how to make communities sustainable in terms of flood forecasting. Likewise, assistance and guidance to donors should as well be provided given that there are several activities being funded by different entities and that these activities are disconnected from each other, sometimes lacking the technical knowledge needed to successfully implement forecasting systems.

The chair reminded the participants that the FFI-AG must formulate what the programme will do over the next three to five years and to use this opportunity to allow for direct actions to be taken by NHSs.

Several participants expressed their concern to provide guidelines, best practices, and lessons learned so that clear paths are defined towards the implementation of forecasting systems. Mr. J. Cullmann pointed out that, throughout this discussion, the FFI-AG would be able to define what is feasible and what activities should be prioritized so that he could present the outcomes directly to World Meteorological Congress and its Executive Council.

4.2.3 Conclusions

The chair expressed his gratitude to Mr. Simonov and Mr. Maina for performing an exhaustive review of the SAP and welcomed the enriching comments made by the participant.

As a result after the extensive and thorough discussion, the meeting agreed to the following proposed actions:

- Prioritize the SAP actions so that the highest priority actions reflect short- to medium-ranged flood forecasting system development. Develop a generic list of requirements/best practices of flood forecasting taking into account high priority actions.
- Prioritize the SAP actions so that the highest priority actions reflect flood forecasting system development (and not data rescue issues, flood design calculations etc.). Take into account these actions in further FFI documentation (e.g. generic list of requirements/best practices of flood forecasting).
- Ensure that all major demonstration projects and components, including but not limited to CIFDP, SWFDP, FFGS, include the requirements for effective and sustainable flood forecasting in their design and implementation (according to the aforementioned generic list of requirements).
- Avoid current terminological complexity in further FFI guidance documentation (e.g. generic list of requirements/best practices).
- Regarding the Action Plan: Develop a new FFI implementation strategy based on Demonstration projects and other FFI components implementation, guidance material development for different audiences (NMHSs, donors, NGOs etc.), development of training programmes, and effective promotion of the aforementioned items so that they are available to the target audience.
- Regarding the aforementioned promotion activities, that the WMO-GWP APFM Integrated Flood Management (IFM) HelpDesk be used to maximum advantage for this purpose.

4.3 Review of flood-related activities relevant to the WMO FFI taking the revised SAP into consideration (Activity 2.a and 2.b)

4.3.1 *Review and Discussion*

Mr. Y. Simonov presented a series of recommendations for the programmes of FFGS, CIFDP, and SWFDP. Among the main concerns was the importance of improving cooperation between meteorologists and hydrologists to harmonize activities that allow a fruitful coupling of systems, with the aim of making full use of advances in weather forecasting for use in flood forecasting. The review document is available in Annex V, and the presentation is available on the WMO website².

During the discussion, several topics were identified that could help advance early warning capabilities to be considered in the further development of FFI related activities. These included:

- Urban flood forecasting (including urban flash floods)
- Riverine flood forecasting
- Land slides
- Remote sensing
- Soil moisture
- Verification for improvement

4.3.2 *Conclusions*

The main conclusions from the discussion regarding the different activities are listed as follows:

- CHAMP: The meeting identified clear linkages on hydrology and concluded CHAMP was well aligned with FFI. It was felt that this initiative would help to illustrate the importance of coupling modelling systems to improve overall predictive capabilities.
- SWFDP: Participants recognized the importance of SWFDP for hydrology and concluded that increased communication between SWFDP and FFGS was needed. The meeting concluded that there was excellent potential for SWFDP to advance the capabilities of NHS in flood forecasting by considering hydrological requirements early-on in the design of the SWFDP applications. The meeting noted that, in the future, SWFDP should consider from the on-set the needs of flood forecasting, including products that are specifically designed to be used by the hydrological community.
- CIFDP: The FFI-AG identified the coupled modelling structure within the design of CIFDP as helping to advance the goal of FFI. The FFI-AG stressed the need of reinforcing the overland and riverine flood forecasting aspects and of strengthening the involvement of NHSs within this initiative. Although the initiative is excellent in concept and potential, omitting NHS from the local implementation table is counterproductive to attaining the goal of FFI as adopted in Resolution 15 (Cg-XVI).
- FFGS: the meeting was pleased to learn of the new functionalities outlined in the presentation prepared by the Hydrologic Research Center. The FFI-AG concluded that the proposed enhancements will be of extreme benefit in advancing forecasting capabilities and their utility. The enhancement outlined included:
 - Urban flash flood warnings;
 - Riverine discharge ensemble prediction;
 - Landslide occurrence prediction;
 - Multiple mesoscale model ingestion; and
 - Satellite inundation mapping and surface soil moisture observations to correct FFGS soil water.

² http://www.wmo.int/pages/prog/hwrf/flood/documents/FFI-AG2-Activity2a_Status_report_on_FFI_components.pdf

4.4 Activities 3 to 9 of the Workplan 2013-2016

The chair called for prioritizing the activities within the Workplan, and the meeting agreed that managing the complete array of activities from 3 through 9 exceed the current capabilities of the FFI-AG. As a result, participants decided on mostly focusing on activity 5, which is “Review the relationship of the WMO FFI with other relevant international programmes, particularly from the point of view of coordination and avoidance of overlap, and propose any necessary actions”.

Mr. Giacomo Teruggi provided a presentation on the results of Activity 5.a, which is available on the WMO website³. He pointed out that there is a need to clearly define the scope of the term “international programmes” as the definition has the potential of being interpreted as being very broad. The FFI-AG concluded that emphasis should be placed on other initiatives of United Nations organizations.

It was recognized that many activities done through other such organizations do not seek guidance from WMO. There is, therefore, a need to set up a methodology on how to move forward in advancing knowledge sharing and fostering cooperation with relevant international programmes and funding entities. The aforementioned efforts using the IFM HelpDesk could greatly address this aspect.

An example of excellent international cooperation on extending the capabilities of NMHSs was cited as the European Flood Awareness System (EFAS). This initiative provides operational services that complement National Hydrological Services (NHSs) activities of the 45 European NHSs that are partners in its development and use.

The FFI-AG was also given an update on Activity 8.c by Mr. E. Poolman. Efforts have resulted in the publication WMO-No. 1153 (2015) entitled “Valuing Weather and Climate: Economic Assessment of Meteorological and Hydrological Services.”

5. UPDATE/BRIEF OVERVIEW OF CURRENT ACTIVITIES TAKING INTO CONSIDERATION FFI

Presentations were provided⁴ by some of the meeting participants regarding initiatives that are related to the FFI. These covered aspects of:

- Coupled Hydrologic, Hydrodynamic and Atmospheric Modelling Project (CHAMP) by Mr. Vincent Fortin (Canada) (remotely)
- Severe Weather Forecast Demonstration Project (SWFDP) by Mr. Ata Hussain (WMO Secretariat)
- Coastal Inundation Forecasting Demonstration Project (CIFDP) by Mr Donald Resio (USA)
- Flash Flood Guidance Systems (FFGS) by Mr. Paul Pilon (WMO Secretariat)
- WMO Project on Twinning SARFFG & SWFDP-South Africa by Mr. Eugene Poolman (South Africa)
- FFGS implementation in Chiapas, Mexico by Ms. Yendi Alvarez Chacon (Mexico)
- Early Warning Systems (EWSs) implementation in Uruguay by Ms. Jimena Alonso Pontet (Uruguay)
- Ibero-American Network for the monitoring and forecasting of hydrometeorological phenomena (PROHIMET) by Mr. Angel Luis Aldana Valverde (Spain)
- EWS implementation in Kenya by Mr. Johnson Maina (Kenya)
- Associated Programme on Flood Management (APFM) by Mr. Giacomo Teruggi (WMO Secretariat)

The presentations provided an excellent overview of what are the current activities related to the FFI, garnering many questions and prompting productive discussion. It was apparent that

³ http://www.wmo.int/pages/prog/hwrf/flood/documents/presentations/14_inventory_activities.pdf

⁴ For the URL addresses of each presentation please refer to Annex VIII

there were many avenues for possibly increasing synergies and accomplishing the overall goal of the Flood Forecasting Initiative, which is to improve collaboration between the meteorological and hydrological communities for improved flood forecasting related practices. Several links were identified within the activities, and APFM was recognized as a viable mechanism for coordination, information exchange, and cooperation for the programmes within the initiative. Additionally, it was underscored that there is a need for increasing capabilities of National Hydrological and Meteorological Services (NHMSs) for producing accurate and timely forecasts of flood events.

The FFI-AG complimented the FFGS-Chiapas efforts and its close coordination with civil protection. Regarding the presentation on EWSs in Uruguay, it was brought to the attention of the meeting that neither the NHS nor any other government agency has national responsibility for flood forecasting. In essence, a legal mandate for this activity is missing. Given the role of the university in the project, various entities are relying on the university to provide this service.

In the case of PROHIMET, it was identified as a mechanism for training countries on FFI-related activities (e.g. FFGS). PROHIMET has already organized and given a course on hydrological forecasting with on-line guided exercises.

6. REVIEW OF ADJUSTMENTS TO THE WORKPLAN

6.1 Current Workplan 2013-2016

The meeting revised the Workplan and updated the status of its activities. The revised Workplan is available under Annex VI.

6.2 New Workplan 2016-2019

Taking into consideration the discussion on the review of the SAP, the meeting agreed on four main tasks that should be addressed for the period of 2016 to 2019. This resulted in the creation of a new Workplan that will be considered a living document with regular updates as priorities change and targets are met. For a detailed explanation of activities within the four tasks, the Workplan should be consulted and is given in Annex VII.

As a summary, the four main tasks are described below:

1. Task 1: by ensuring that all major demonstration projects and components, including but not limited to CIFDP, SWFDP, FFGS, include the requirements/best practices for effective* and sustainable flood forecasting in their design and implementation.
2. Task 2: by ensuring guidance material is available for NMHSs and for donors, NGOs, and other organizations working to strengthen flood forecasting capabilities in national services.
3. Task 3: by facilitating the development of an inventory of existing training programmes and related reference materials across the entire spectrum of training needs for E2E systems for flood forecasting, identifying weaknesses/gaps, and recommending development of additional materials to overcome weaknesses/fill gaps.
4. Task 4: by ensuring access to guidance material and trainings through the IFM HelpDesk.

*Definition needed

7. ADOPTION OF THE REPORT

The meeting participants requested the Secretariat to prepare a draft report of the meeting for their review. The Secretariat will prepare a draft report before the third week of January 2016 and requested the participants to provide comments to this draft for the following two weeks upon receipt. Once comments from participants have been received, the Secretariat will complete revisions to the draft report and review it, undertaking an editorial review and consistency check of

the material contained therein. The Secretariat will publish the report and its related material on the WMO website and will give notice to the participants of the meeting.

8. CLOSURE OF THE MEETING

The session of the FFI-AG was closed at 17:35 on Thursday 3th, December 2015. Mr. P. Pilon thanked the participants for their inputs and the chair for enabling a fruitful discussion. The president of CHy thanked all of the participants, both present and the ones who joined remotely for their contributions. He also thanked WMO's Secretariat for their outstanding support and making this meeting a success. Mr. Lins also took the opportunity to wish everybody a happy and safe holiday season. A date was not set for the next meeting of the FFI-AG.

**SECOND MEETING OF THE FLOOD FORECASTING INITIATIVE ADVISORY GROUP
(Geneva, 1 – 3 December 2015)**

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WMO FLOOD FORECASTING INITIATIVE
SECOND MEETING OF THE ADVISORY GROUP
Geneva, 1 to 3 December 2015

FINAL AGENDA

Tuesday 01 December

- 09:30 Registration
- 09:45 Opening of the Meeting
- 09:55 Adoption of the Agenda
- 10:00 Introduction of participants
- 10:10 Introduction to the WMO Flood Forecasting Initiative and its framework (ToR) [H. Lins]
- 10:20 Review of and adjustments to the Workplan 2013-2016 of the FFI-AG:**
- Activity 1)** Consider and advise on the concept, objectives, expected benefits/costs, strategy, action plan and future development of the WMO FFI
- 1.a) Criteria for review of the SAP [H. Lins]
- 11:00 Break
- 11:30 1.b) Results and discussion on the revision of the Strategy and Action Plan (SAP) & the Activity Plan [Y. Simonov & J. Maina]
- 12:30 Lunch
- 13:30 1.b) Results and discussion on the revision of the SAP & Activity Plan (continued)
- 15:00 Break
- 15:30 Update/Brief overview of activities taking into consideration FFI:
- Coupled Hydrology Atmospheric Modelling and Prediction (CHAMP) and Seamless Forecasting [V. Fortin]
- 16:30 Break
- 17:00 Update/Brief overview of activities taking into consideration FFI:
- Severe Weather Forecast Demonstration Project (SWFDP) [A. Hussain]
 - Coastal Inundation Forecasting Demonstration Project (CIFDP) [D. Resio]
 - Flash Flood Guidance Systems (FFGS) [P. Pilon]
 - WMO Project on Twinning SARFFG and SWFDO-SA [E. Poolman]
- 17:45 Session adjourns

Wednesday 02 December

09:00 Brief overview of Day 1 [H. Lins]

09:10 Update/Brief overview of activities taking into consideration FFI (continued):

- Coastal Inundation Forecasting Demonstration Project (CIFDP) [D. Resio]
- Flash Flood Guidance Systems (FFGS) [P. Pilon]

11:00 Break

11:30 Update/Brief overview of activities taking into consideration FFI (continued):

- WMO Project on Twinning SARFFG and SWFDO-SA [E. Poolman]
- Flash Flood Guidance Systems application in Chiapas, Mexico [Y. Alvarez]

12:30 Lunch

13:30 Update/Brief overview of activities taking into consideration FFI (continued):

- Steps to extend the early warning system of Durazno to the cities of Artigas and Treinta y Tres in Uruguay [L. Silveira]
- Iberoamerican network for the monitoring and forecasting of hydrometeorological phenomena (PROHIMET) [L. Aldana]
- Early Warning System implementation in Kenya [J. Maina]
- Associated Programme on Flood Management (APFM) [G. Teruggi]

16:00 Break

16:30 **Review of and adjustments to the Workplan 2013-2016 of the FFI-AG (continued):**

Activity 2) Review and assess the status of the WMO FFI and progress towards its objectives, and propose strategies for any necessary remedial action

2.a) Discussion on flood-related activities relevant to the WMO FFI taking the revised SAP in consideration [Y. Simonov and J. Maina, 1 hr.]

2.b) Advice and discussion on remedial actions regarding implementation of initiatives (gap identification) [Y. Simonov and J. Maina, 1 hr.]

17:30 Session adjourns

Thursday 03 December

09:00 **Review of and adjustments to the Workplan 2013-2016 of the FFI-AG (continued):**

Activity 3) Review and assess the progress of specific WMO FFI projects upon request

3.a) & b) What reviews are underway and/or planned? Are there other reviews warranted at this time? [H. Lins]

Activity 4) Advise on standards (including, but not limited to, methodologies, techniques, technologies, and so forth) for the robust and sustainable implementation of the WMO FFI [H. Lins]

9:30

Activity 5) Review the relationship of the WMO FFI with other relevant international programmes, particularly from the point of view of coordination and avoidance of overlap, and propose any necessary actions

5.a) Inventory of existing international programmes [G. Teruggi]

5.b to d) Review inventory for overlaps, duplications, opportunities and synergies as well as recommendations on how to proceed [H. Lins & P. Pilon]

Activity 6) Identify and evaluate constraints on, and potential risks to, the future implementation and sustainability of the WMO FFI, and propose strategies to minimize those risks. Risks include, inter alia, those of a financial, technical, operational and institutional/political nature [H. Lins]

Activity 7) Consider and propose plans for effective advocacy of the WMO FFI (as appropriate), and ways and means to assure its future sustainability and appropriate expansion [H. Lins]

Activity 8) Promote awareness about raising the social and economic benefits and value of flood forecasting systems, including a community development approach [H. Lins]

11:10

Break

11:40

Review of and adjustments to the Workplan 2013-2016 of the FFI-AG (continued):

Activity 9) Review and advise on the terms of reference and composition of the WMO FFI-AG [H. Lins, 15 min.]

12:00

Review of adjustments to the Workplan (duplication, what is missing, future needs, etc.) [H. Lins]

- Proposal for future actions [Y. Simonov]

12:30

Lunch

13:30

Review of adjustments to the Workplan (continued)

14:00

Discussion on the main conclusions and recommendations from the second FFI-AG meeting for Executive Council in June 2016 and possibly the Presidents of Technical Commissions meeting in late January 2016 [H. Lins]

14:30

Lunch

15:00

Process for adoption of the Report of the FFI-AG – Session 2

17:05

Next Meeting of the FFI-AG

17:10

Final remarks

17:15

Closure

Resolution 15 (Cg-XVI)**ESTABLISHMENT OF AN ADVISORY GROUP FOR THE WMO FLOOD FORECASTING INITIATIVE**

THE CONGRESS,

Noting:

- (1) Resolution 21 (Cg-XV) – Strategy for the Enhancement of Cooperation between National Meteorological and National Hydrological Services for Improved Flood Forecasting,
- (2) The Action Plan that was developed at the request of the Commission for Hydrology (CHy) in December 2009 in support of the Strategy and Action Plan of the WMO Flood Forecasting Initiative,

Recalling:

- (1) That both Resolution 3 (CHy-XIII) – Hydrological forecasting and flood management and Resolution 21 (Cg-XV) called on the president of the Commission to establish an appropriate management mechanism in support of the WMO Flood Forecasting Initiative (FFI),
- (2) That the objective of the WMO FFI is to: “Improve the capacity of meteorological and hydrological services to jointly deliver timely and more accurate products and services required in flood forecasting and warning and in collaborating with disaster managers, active in flood emergency preparedness and response”,

Considering:

- (1) That improved hydrological forecasting, including the provision and promotion of flash floods guidance, seasonal flow prediction and coastal storm surge flood forecasting activities require close collaboration among the experts from various technical commissions,
- (2) The need to improve flood early warning system capabilities,
- (3) The need to make use of seasonal climate outlooks being produced on an operational basis and being strengthened through the Global Framework for Climate Services,
- (4) That an overarching Technical Group is required to provide guidance and advice on the hydrological forecasting elements of these initiatives,
- (5) That such an Advisory Group will provide broad-based support to improve collaboration between the meteorological and hydrological communities for improved flood forecasting practices,

Decides:

- (1) To define the scope of the WMO Flood Forecasting Initiative to include all the hydrological forecasting activities, such as those related to flash floods and riverine floods, including seasonal forecasts and coastal flooding due to storm surges;
- (2) To establish the WMO Flood Forecasting Initiative Advisory Group (FFI-AG) with terms of reference as per the annex to this resolution;

Requests the Secretary-General, as appropriate and within the available budgetary resources, to take all necessary actions to support the establishment of the WMO FFI-AG and its activities;

Requests the president of the Commission for Hydrology to report periodically to the Executive Council on the progress of the activities of the WMO FFI-AG;

Invites Members:

- (1) To actively support the tasks of the Advisory Group, including by facilitating the participation of dedicated experts in sessions of the Group;
- (2) To ensure that National Meteorological Services and National Hydrological Services work in close collaboration in the provision of critical inputs to the Group;
- (3) To promote recommendations of the Group on a national basis;
- (4) To contribute to the Voluntary Cooperation Programme Fund and the Hydrology and Water Resources Trust Fund in support of the implementation of activities recommended by the Group.

Annex to Resolution 15 (Cg-XVI)

FLOOD FORECASTING INITIATIVE ADVISORY GROUP TERMS OF REFERENCE AND COMPOSITION

Developed in 2003, the WMO Flood Forecasting Initiative (FFI) is based on an analysis of the weaknesses of current forecasting systems, with a view to enhancing the ability of National Meteorological and Hydrological Services (NMHSs) to cooperate in an effective manner to provide improved flood forecasting services.

The Fifteenth World Meteorological Congress in 2007 endorsed the Strategy and Action Plan for the Enhancement of Cooperation between National Meteorological and National Hydrological Services for Improved Flood Forecasting. At its thirteenth session in 2008, the Commission for Hydrology (CHy) recognized a range of other initiatives associated with the FFI, such as the Flash Flood Guidance System (Resolution 3 (CHy-XIII) – Hydrological forecasting and flood management). Subsequently the Coastal Inundation Forecasting Demonstration Project (CIFDP) was initiated jointly by CHy and the Joint WMO/IOC Technical Commission for Oceanography and Marine Meteorology (JCOMM). Seasonal hydrological flow forecasting based on regional climate outlooks has also been initiated by CHy and the Commission for Climatology.

Both Resolution 3 (CHy-XIII) – Hydrological forecasting and flood management and Resolution 21 (Cg-XV) – Strategy for the Enhancement of Cooperation between National Meteorological and National Hydrological Services for Improved Flood Forecasting called on the president of CHy to establish an appropriate management mechanism in connection with these initiatives. Considering the cross-cutting nature of the guidance required for providing technical oversight, it is proposed to establish an overarching Advisory Group for the Flood Forecasting Initiative (FFI-AG) to advise on the hydrological forecasting elements of these initiatives.

Terms of reference

The WMO Flood Forecasting Initiative Advisory Group (WMO FFI-AG) shall:

1. Consider and advise on the concept, objectives, expected benefits/costs, strategy, action plan and future development of the WMO FFI;
2. Review and assess the status of the WMO FFI and progress towards its objectives, and propose strategies for any necessary remedial action;
3. Review and assess the progress of specific WMO FFI projects upon request;
4. Advise on standards (including, but not limited to, methodologies, techniques, technologies, and so forth) for the robust and sustainable implementation of the WMO FFI;
5. Review the relationship of the WMO FFI with other relevant international programmes, particularly from the point of view of coordination and avoidance of overlap, and propose any necessary actions;
6. Identify and evaluate constraints on, and potential risks to, the future implementation and sustainability of the WMO FFI, and propose strategies to minimize those risks. Risks include, inter alia, those of a financial, technical, operational and institutional/political nature;
7. Consider and propose plans for effective advocacy of the WMO FFI (as appropriate), and ways and means to assure its future sustainability and appropriate expansion;
8. Promote awareness about raising the social and economic benefits and value of flood forecasting systems, including a community development approach;

9. Review and advise on its terms of reference and composition.

Composition

The WMO FFI Advisory Group shall be composed of:

1. The president of the WMO Commission for Hydrology (chair);
2. One representative with flood forecasting experience from CHy, and representatives of other WMO Technical Commissions as and when needed;
3. One representative from each active financial partner involved in the WMO FFI projects.

Observers

1. Representatives from WMO FFI operational projects invited on an ad hoc basis;
2. Representatives from relevant WMO Programmes as required;
3. Regional Hydrological Advisers and/or representatives of regional association working groups on hydrology;
4. Representatives of potential financial partners that could contribute to the WMO FFI.

The Director of the Climate and Water Department of the WMO Secretariat shall act as secretary to the WMO FFI-AG.

Resolution on the web (please see page 200 of Cg(16) Abridged final report with resolutions, WMO-No. 1077):

https://googledrive.com/host/0BwdvoC9AeWjUazhkNTdXR XUzOEU/wmo_1077_en.pdf

Activity 1.b - According to the proposed criteria, review the SAP and subsequently the Activity Plan. Assess the validity of the concept, objective, and the SAP; and advise on adjustments, where necessary.

Basic information

FFI SAP Scope and action domains

The FFI SAP is designed to meet following objectives "to produce more accurate, timely and reliable forecasts and warnings of weather, climate, water and related services to the public, governments and other users" (corresponds with overall FFI objective).

The FFI SAP concentrates on the first three expected results of the WMO FFI:

- improved quantitative and qualitative weather forecasting products, that are available for flood forecasting;
- medium-range weather forecasting and climate predictions applied to extend warning times;
- NMHSs have improved their capacity to cooperate to jointly deliver timely and accurate flood forecasting information.

The SAP proposed actions are grouped according to so called Action Domains (areas with proposed actions for implementing main objective of the SAP) – there are seven core and three complimentary Action Domains (*FFI SAP - WMO, 2006*).

FFI SAP Implementation

Proposed FFI SAP implementation includes the following items:

- development of a long-term programme capabilities of NMHSs (with respect to their capacities and needs);
- formulation of detailed action plans for each organization (national and regional level);
- preparation of a cooperation and technical assistance framework (through a Flood Forecasting and Warning International Support Committee - FFWISC);
- identification and sharing of relevant national and international experience;
- preparation and initiation of selected demonstration projects;
- promotion of the development of regional joint flood forecasting projects;
- mobilization of funds under the WMO framework.

Review of the Strategy and Action Plan (SAP)

The review was done according to developed Review Criteria for the FFI Strategy and Action Plan (prepared by Dr. H. Lins), which briefly states that overview should examine the SAP according to: its scope (limits of domain), validity of action proposed (doable in the following 5-10 years), technical approaches chosen, completeness and clarity.

Proposals, based on the SAP review:

1. SAP actions timeframe (in terms of forecast lead time) is unlimited - from nowcasting to climate outlooks and climate risk assessment. Such approach is effective as it motivates NMHSs to develop and implement seamless forecasting systems of flood and flood-related events. The most devastating and hazardous flood events, that carry threat for people and property of the regions, can be effectively forecasted in shorter time ranges (e.g. first days, or more – depending on QPF effectiveness, scale of the basin and etc.). Thus, it is recommended to prioritize the SAP actions, taking in mind higher priority for the short and medium range forecasting and lower priority for seasonal predictions and climate outlooks. It is advised to develop of generic and living list of requirements for the E2E flood forecasting systems, taking in consideration high priority actions and recommendations from the SAP (recommendations on short and medium range forecasting in this case).
2. The SAP coverage is very broad and covers all possible water-related activities. There are too many SAP Action Domains and these contain too many actions, resulting in a SAP that

is hardly achievable if trying to implement them at once. Numerous actions touch almost all water, weather and climate related domains (after reading the actions it looks like FFI is an umbrella over all other WMO programmes and initiatives). There are 11 action domains in the SAP (see *FFI SAP - WMO, 2006*). Each of the proposed Action Domain in the SAP contains an average of 15 actions to be taken to complete the mission of the domain. All problems of operational hydrometeorology are gathered and are to be solved in the FFI SAP. It is recommended to prioritize the proposed actions in the manner that the most important actions (high priority) are related to establishing the E2E flood forecasting system, then lower priority actions deal with other hydrological issues (e.g. data rescue, network design assessment, modeling design flows). It is advised to develop of generic and living list of requirements for the E2E flood forecasting systems, taking in consideration high priority actions and recommendations from the SAP.

3. Implementation strategy of the SAP appears to only be successfully accomplished through Demonstration Projects, such as CIFDP, and flood forecasting-related projects, such as GFFGS. However, it is not clear that such projects have explicitly considered the actions outlined in the SAP in their design and implementation. Proposed action is to ensure that all major demonstrations projects and components, including but not limited to CIFDP, SWFDP, FFGS, include the requirements for effective and sustainable flood forecasting in their design and implementation.
4. The SAP approach and its documentation are too lengthy and complex, resulting in its not being transparent nor it's being broadly adopted. Given the lengthy and complex nature of the SAP documents, it is difficult to evaluate its validity and implementation status. The current structure is the following: SAP - Action Domains - Actions, SAP Activity Plan - Activities, FFI-AG Workplan - Activities. It is recommended to avoid such terminological complexity in the further FFI guidance documentation (e.g. generic list of requirements/best practices).

Review of the Activity Plan

The WMO Technical Commission for Hydrology (CHy) in 2008 decided "To supplement the Strategy and Action Plan on the Flood Forecasting Initiative with a detailed activity plan that will assist Members in establishing flood forecasting system". It contains proposed activities for every SAP action - implementation means, need for a particular action in each particular WMO region, capacity of a WMO region, and possible limitations.

Proposals, based on the Activity Plan review:

1. It is not obvious that Country Members, WMO Secretariat, FFI Demonstration Project developers use the Activity Plan in their operations. The Activity Plan makes it even more difficult to track the SAP actions implementation. There is no person (or body) who controls the Activity Plan progress.
Proposed action includes development new FFI implementation strategy based on the Demonstration projects and other FFI components implementation, guidance material development for different audiences (NMHSs, donors, NGOs etc.), development of training programs and effectively promote them so that they are available for the target audience (via IFM HelpDesk).

Agreement on the review findings

1. Prioritize the SAP actions and proposals.
2. Create generic and living list of requirements/best practices to be taken from the SAP (taking into account its top priority actions).
3. Make sure terminology and structure of the further FFI documents are simple and transparent.
4. Ensure all major FFI components (demonstration projects, flood related projects) include requirements/best practices for effective and sustainable flood forecasting in their design and implementation. This can be done by developing the generic list of such requirements

and then following these requirements in each of FFI demonstration projects (via projects steering groups).

5. The Activity Plan is to be considered as ineffective document, use it in the further FFI documentation development.

Activity 2.a - Provide an initial status report of past and on-going activities and how well they met or are meeting the objective of the FFI. It should be done considering the findings of the review of the SAP, under item 1 above. This will include assessing the performance of the FFI and its component programs and activities, such as the APFM (flood forecasting aspect), GFFGS, CIFDP; ascertaining conformance with the FFI objective and the identification of missing elements.

GFFGS

GFFGS is one of the core components of FFI - it has been successfully implemented in different regions and under implementation and planning in more regions. Detailed information of the project status could be found in the developer's website (<http://www.hrc-lab.org/projects/index.php>) and WMO Commission for Hydrology FFI related web page (<http://www.wmo.int/pages/prog/hwrf/FFI-index.php>). GFFGS is one of the main components of the FFI, oriented on flood forecasting in very short time perspective (up to 6 hours), and thus covers flood forecasting and warnings of flash floods. Following upgrades of the GFFGS can improve GFFGS in terms of its agreement with the FFI SAP requirements:

- create “hydrological requirements” in weather forecast products, to further account for them in SWFDP subprojects implementation strategy;
- participation of CHy AWG members in SWFDP board;
- possibility to assimilate outputs from several NWP models to perform ensemble flash floods forecasting;
- upgrading graphical presentation of forecast - allow background data presentation in the GFFGS user interface (include major cities, gauges location, river network and other layers);
- make steps to upgrading GFFGS to operational distributed flood forecasting system with river routing component, which will allow to increase flood forecast lead time (up to several days or more – depending on river basin size) and make possible flood forecasting for big streams (main river of a basin).

CIFDP

CIFDP is a joint demonstration project of JCOMM and CHy, which aims to cover topics that are related to decreasing flood related risks in coastal areas from storm surges, tides, waves and river flows. CIFDP structure has three ongoing subprojects: Caribbean (CIFDP-C), Bangladesh (CIFDP-B), and Indonesia (CIFDP-I). These subprojects slightly differ from one another in terms of technical components (different modelling approaches, different degrees of river modelling, different processes covered/described), but together they meet the goal of the CIFDP. Detailed descriptions of the projects can be found on the JCOMM website (<http://www.jcomm.info/>).

Proposed action on CIFDP that could impact the results of the subprojects is given below and basically is directed to the need to provide more adequate inclusion of hydrology within the modelling system and its design, and the resulting need for more hydrological support to be provided to the CIFDP to accomplish this, in particular:

- prepare guidance material on how to unite two systems - sea modelling and river modelling - get examples, assess functional needs – what functionality is really needed; pragmatic approaches to do so given different data availability conditions (may serve as a basis for further WMO guidance - in the moment there is no WMO documents on that problem);
- hydrological component should be explicitly described in project proposal (for future projects), or for next phases of existing projects, and explicitly include needs of NHSs for flood forecasting;
- create template for NHS to assess its capacity in terms of hydrologic observation, modeling and forecasting in coastal areas (in domain of ocean model implementation);
- prepare cases for NHSs to increase their awareness and possible involvement in the CIFDP subprojects;

- identify system developers/donors for hydrological component of the CIFDP development and implementation;

As different subprojects have slightly different approaches, a brief description and recommendations for each ongoing CIFDP subproject is presented below.

CIFDP-C

The project is in its first development stage. The developer of the system is NOAA National Hurricane Center together with NOAA NCEP experts (surge, tide and waves). Donor of the subproject is USAID. River hydrology is not incorporated in the moment in the modeling system, but the system is designed to provide sea level data in biggest rivers control points not far from the shore (control points will be indicated by NHS (INDRHI) - till April 2016).

Proposed actions include:

- achieve information from INDRHI about: rivers with hydraulic models implemented, model details, capacity information, interest in this actions by creating questionnaire template (may be used in the future for further sub-projects); send the template to system developers (J. Rhome) for the consideration and collaboration with Dominican Republic NMS and NHS - ONAMET and INDRHI, respectively;
- based on received information, upgrade/revise modelling domain - possibly for accounting for river hydraulic model endpoints (so that modelling domain touches river modelling endpoints - control points);
- as the FFGS system is implemented and operational and based on INDRHI riverine modeling requirements, which will need to be established, it is important that INDRHI receive sea level forecasts from ONAMET so it can reflect these in its modeling efforts to estimate possible effects on coastal watersheds and rivers impacted by tidal surge;

CIFDP-F

The project right now under further planning (phase 1 was implemented) and waiting for possible donors (may be considered in February 2016, expected donor is KOICA – Korean International Cooperation Agency). The domain is divided into two parts - south Fiji and north Fiji. The south part of Fiji has a need for only wave modelling, while north Fiji needs both surge and river modelling. For the planning of the river modelling component, it is necessary that the project developers become acquainted with hydrological conditions and hydrological user requirements in the region. The system developers are the Secretariat for the Pacific Community and BoM.

CIFDP-B

Bangladesh is definitely the area where river-ocean interaction plays an important role in overall coastal flooding conditions. Right now it is in its 2nd phase - the modelling system is in its pre-operational state, which focuses on multi-agency simulation exercise and technical capacity building events. The model developer is Mr F. Fakhruddin and his team. The modelling framework consists of a storm surge model and a land surface model that are joined in FEWS system for producing overall output. The river modelling component is developed for Ganges and Brahmaputra rivers - however it has not been requested by NHS of Bangladesh nor includes its involvement as there is strong miscommunication between NMS and NHS in the country. Proposals on the project development include:

- get more information about existing modeling system details (from F. Fakhruddin) for further investigation and possible guidance material;
- get historical river flow data from Bangladesh NHS, perform hindcast of an extreme event to demonstrate the added value if used within a single system;
- show added value if NMS and NHS cooperate in coastal flood forecasting to possibly bring NHS of Bangladesh into the project.

CIFDP-I

The most developed domain in terms of any component of the system (river hydrology, ocean components). The system has been developing for the last 30 years - begun in 1980-s by Dutch hydrologists (Delft team). Model developer - Deltares. Proposal on the project development:

- gather information on used models and data;
- possible background for guidance material;
- make sure parts of the system are integrated into single modelling system.

SWFDP

SWFDP is one of the most important components of the FFI as it provides forcing to other FFI projects and subprojects like GFFGS. In order for future, as well as existing, SWFDP projects to be designed in accordance with GFFGS and flood forecasting needs, SWFDP should develop “hydrological requirements” for its projects:

- develop list of requirements for the hydrological needs of the SWFDP to be taken into consideration by developers (e.g., high resolution QPF in mountainous areas, basic forecasted weather elements that are necessary to provide, ensemble QPF, etc);
- participation of CHy AWG member in SWFDP board;

Workplan (2013-2016) Version 1.0 – October 7-9, 2013 (updated on December 3, 2015)

Version 1 of this Workplan was developed from the Scope of Work as prepared at the First Session of the Flood Forecasting Initiative – Advisory Group (FFI-AG), held on October 7-9, 2013, in Geneva, Switzerland. The Activities were updated at the Second Session of the FFI-AG and relate to the Terms of Reference for the FFI-AG as documented in the Annex to Resolution 15 (Cg-XVI). The expected deadlines of individual tasks are agreed upon by the FFI-AG and the person(s) responsible for it. The Workplan will be overtaken by the new FFI-AG Workplan (2016-2019) Version 1.0-December 3, 2015.

Activity 1 - Consider and advise on the concept, objectives, expected benefits/costs, strategy, action plan and future development of the WMO FFI

Task	Expert(s)	Estimated Start Date	Tentative Completion Date
(a) Establish criteria for the review of the SAP considering, among other things: its scope (limits of domain – what we do and don't do); perceived priorities; technological adequacy (appropriateness, suitability); approaches (actions) to be taken.	H. Lins	14/10/2013	Done
(b) According to the proposed criteria, review the SAP (WMO, 2006) and subsequently the Activity Plan (WMO, 2010) which is Annex 6 in the report of the Workshop on the Strategy and Action Plan of the WMO FFI. Assess the validity of the concept, objective, and Strategy and Action Plan (SAP); and advise on adjustments, where necessary. Document changes that need to be made, considering, for example, whether some domains and actions have been achieved by others, such as international organizations, and implications thereof.	J. Maina & Y. Simonov	15/11/2013	Done at FFI-AG-2
(c) Based on the review, the FFI-AG affirms or decides on the process to revise and update the SAP (July 2014) that has to be completed by the end of 2014, for consideration of the CHy AWG.	FFI-AG	30/5/2014	Parked (still there, no immediate action)
(d) Pursue a regionally-based implementation of the SAP, working closely with countries, ensuring that mechanisms of cooperation amongst NMSs, NHTs and Disaster Management Agencies are adequately reflected therein.	FFI-AG		Parked (still there, no immediate action)
(e) Establish a mechanism and methodology for assessing the added value of the WMO FFI.	E. Poolman	14/10/2013	Done (WMO No.1153)
(f) Develop guidance material to assist interested parties in developing prospective WMO FFI components or projects. The guidance material should also include the need to establish a methodology for assessing the added value before commencing an initiative to demonstrate if it is a wise expenditure of resources.	WMO Secretariat	3/10/2014	Reformulated and included in Workplan2

*: Note this item is linked to Activities 4 (a) and 6 (a)

Activity 2 - Review and assess the status of the WMO FFI and progress towards its objectives, and propose strategies for any necessary remedial action

Task	Expert(s)	Estimated Start Date	Tentative Completion Date
(a) Provide an initial status report of past and on-going activities and how well they met or are meeting the objective of the FFI. It should be done considering the findings of the review of the SAP, under item 1 above. This will include assessing the performance of the FFI and its component	J. Maina & Y. Simonov	30/5/2014	Done

programmes and activities, such as the APFM (flood forecasting aspect), GFFGS, CIFDP; ascertaining conformance with the FFI objective and the identification of missing elements.

(b) When necessary, advise on remedial actions regarding the implementation of the SAP and its component programmes and activities.	J. Maina & Y. Simonov	14/10/2013	Done
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Activity 3 – Review and assess the progress of specific WMO FFI projects upon request

Task	Expert(s)	Estimated Start Date	Tentative Completion Date
(a) The review represents a detailed evaluation of specific WMO FFI projects to be undertaken by members of the FFI-AG or identified experts. Requesters could include CHy, other WMO constituent bodies, donors, WMO Secretariat, component managers, or the FFI-AG itself.	TBD*		Reformulated and included in Workplan2
(b) Criteria for the review need to be established by the requesting organization or body with guidance from the FFI-AG and should reflect the objectives of the project.	Requesting body & FFI-AG		To be undertaken when review is requested.
(c) The Secretariat will prepare a list of completed and on-going components and projects under the guidance of the FFI-AG and post same on the FFI-AG website, which will be regularly reviewed and updated.	G. Arduino	15/11/2013	Reformulated and included in Workplan2

*: To Be Determined (TBD)

Activity 4 - Advise on standards (including, but not limited to, methodologies, techniques, technologies, and so forth) for the robust and sustainable implementation of the WMO FFI

Task	Expert(s)	Estimated Start Date	Tentative Completion Date
(a) Advice on standards should be viewed broadly and should include:			Reformulated and included in Workplan2
<ul style="list-style-type: none"> Reviews, such as mentioned under item 3 (a) above; 	P. Pilon		
<ul style="list-style-type: none"> Identification of deficiencies in the implementation of components and projects under the guidance of the FFI-AG; 	J. Maina & Y. Simonov		
<ul style="list-style-type: none"> Consideration of new components or project proposals.* 	FFI-AG		
<ul style="list-style-type: none"> Practices and procedures used within CHy and other Technical Commissions, for example, with CAS on advances in NWP QPF/QPE, with CIMO for instrumentation, CBS on linkages with operational weather forecasting, and so forth, taking into the consideration the needs of participating countries. 	P. Pilon		

*: Note link with development of guidance material Activity 1 (f).

Activity 5 - Review the relationship of the WMO FFI with other relevant international programmes, particularly from the point of view of coordination and avoidance of overlap, and propose any necessary actions

Task	Expert(s)	Estimated Start Date	Tentative Completion Date
(a) Secretariat shall prepare an inventory (name, brief description, current role of FFI) of the existing international programmes (WMO and non-WMO) and highlight coordination/interaction mechanisms, providing recommendations to the FFI-AG on the improvements to those mechanisms. Draft recommendations to be considered by the FFI-AG.	G. Arduino		Done
(b) Should functional overlaps and unnecessary duplication be identified, draft recommendations should be provided to the FFI-AG on how to address them.	WMO Secretariat		Done
(c) The FFI-AG, with the assistance of the WMO Secretariat, will identify opportunities for possible synergies with other relevant international programmes (WMO and non-WMO) to further the implementation of the WMO FFI objective.	FFI-AG & WMO Secretariat		Reformulated and included in Workplan2
(d) Where mechanisms for coordination with international programmes (WMO and non-WMO) do not exist, provide advice on necessary actions to CHy.	WMO Secretariat		Reformulated and included in Workplan2

Activity 6 - Identify and evaluate constraints on, and potential risks to, the future implementation and sustainability of the WMO FFI, and propose strategies to minimize those risks. Risks include, inter alia, those of a financial, technical, operational and institutional/political nature

Task	Expert(s)	Estimated Start Date	Tentative Completion Date
(a) Through the established mechanisms of component and project monitoring by the WMO Secretariat and on the established methodologies of risk management (such as ISO 31000:2009), the FFI-AG, with assistance from the Secretariat, will assess potential risks to the future implementation and sustainability of the WMO FFI by:	FFI-AG & WMO Secretariat		Reformulated and included in Workplan2
<ul style="list-style-type: none"> Ensuring the guidance material addresses sustainability in the design of a component or project ; 	WMO Secretariat		
<ul style="list-style-type: none"> Identifying risks for existing components and projects based on feedback received from them; 	WMO Secretariat		
<ul style="list-style-type: none"> Identifying issues and weaknesses that need to be addressed; 	WMO Secretariat		
<ul style="list-style-type: none"> Identifying areas-of-success in certain components and projects that may help overcome risks identified in others. 	WMO Secretariat		

*: Note link with Activity 1 (f).

Activity 7 – Consider and propose plans for effective advocacy of the WMO FFI (as appropriate), and ways and means to assure its future sustainability and appropriate expansion

Task	Expert(s)	Estimated Start Date	Tentative Completion Date
<p>(a) Develop an outreach strategy for promoting the development of sustainable components and projects to fulfill the objective of the WMO FFI, (October 2014) which could include:</p> <ul style="list-style-type: none"> o Initiating a high-level dialogue with governments, donors and non-governmental organizations. o Engagement of the media. o Use workshops to promote the benefits of implementing projects to national services and disaster management agencies, and to highlight the importance of sustainability. <ul style="list-style-type: none"> ▪ Workshops could illustrate the advantages of improved cooperation and working arrangements between NMSs and NHSS. ▪ Workshops could also further promote the implementation of the SAP towards improving the service capabilities of NMHSs. 	D. Jayasuriya, J. Maina & R. Ceron Pineda	14/10/2013	Reformulated and included in Workplan2
<p>(b) Actively identify high-priority locations requiring focused attention, building sustainable solutions with concerned government agencies, organizations and donors. Take advantage of the Regional Working Groups on Hydrology.</p>	H. Lins & RHAs		Reformulated and included in Workplan2

Activity 8 – Promote awareness about raising the social and economic benefits and value of flood forecasting systems, including a community development approach

Task	Expert(s)	Estimated Start Date	Tentative Completion Date
<p>(a) Ascertain what others have done in similar disciplines to promote awareness of social and economic benefits by undertaking a review of literature and through professional contacts.</p>	W.Grabs & APFM	14/10/2013	Reformulated and included in Workplan2
<p>(b) Review community development approaches that successfully address flood risk for potential inclusion in the promotional approaches to be undertaken in the WMO FFI.</p>	W.Grabs & APFM		Reformulated and included in Workplan2
<p>(c) Link closely with the CAS Working Group on Social and Economic Research and Applications (SERA) in support of the two items above.</p>	E. Poolman		Done

Activity 9 – Review and advise on its terms of reference and composition

Task	Expert(s)	Estimated Start Date	Tentative Completion Date
<p>(a) The FFI-AG will operate exclusively as per Resolution 15 (Cg-16).</p>	FFI-AG		Reformulated and included in Workplan2
<p>(b) The FFI-AG will continuously review and advise CHy on the adequacy of its Terms of Reference and composition and will make proposals for revision, as necessary.</p>	FFI-AG		Reformulated and included in Workplan2
<p>(c) Over time, the composition of the FFI-AG will change, with the mandated functions remaining. The FFI-AG recognized the need for some level of membership continuity through intersessional periods.</p>	FFI-AG		Reformulated and included in Workplan2

Workplan (2016-2019) Version 1.0 – December 3, 2015

This Workplan was developed at the Second Session of the Flood Forecasting Initiative – Advisory Group (FFI-AG), held December 1-3, 2015, Geneva, Switzerland. The activities relate to the Terms of Reference for the FFI-AG as documented in the Annex to Resolution 15 (Cg-XVI) and to the changes agreed upon during discussions on activity 1.b and 2.a. of the FFI-AG Workplan (2013-2016) Version 1.0. The expected deadlines of individual tasks are agreed upon by the FFI-AG and the person(s) responsible for it. The Workplan will be periodically updated as the status of the implementation of Tasks change.

Preamble:

The Flood Forecasting Initiative (FFI) is a framework to promote the enhancement of flood forecasting capabilities of National Meteorological and Hydrological Services (NMHSs).

- Task 1:** by ensuring that all major demo projects and components, including but not limited to CIFDP, SWFDP, FFGS, include the requirements/best practices for effective* and sustainable flood forecasting in their design and implementation;
- Task 2:** by ensuring guidance material is available for NMHSs and for donors, NGOs, and other organizations working to strengthen flood forecasting capabilities in national services;
- Task 3:** by facilitating the development of an inventory of existing training programmes and related reference materials across the entire spectrum of training needs for E2E systems for flood forecasting, identifying weaknesses/gaps, and recommending development of additional materials to overcome weaknesses/fill gaps;
- Task 4:** by ensuring access to guidance material and training through the IFM HelpDesk.

Task 1 – Items

by ensuring that all major demonstration projects and components, including but not limited to CIFDP, SWFDP, FFGS, include the requirements/best practices⁵ for effective and sustainable flood forecasting in their design and implementation.

1. President and members of the FFI-AG to report on progress and collaborative actions to appropriate bodies on FFI-AG advice
2. FFI-AG to advise CHy on continuing the efforts associated with assessing efficiency (effectiveness) of service delivery capabilities of hydrological services (link to existing report Nov 2013) including the quality of data and maintenance of observation networks – H. Lins by 3rd Session of the CHy Advisory Working Group (AWG-3) (Feb 2016)⁶
3. Advise the President of CHy that the Vice-Chair of the CIFDP Steering Committee be taken from CHy – accomplished December 2015
4. Take similar action for the SWFDP (President CHy to coordinate with President CBS on CHy representation on the SWFDP Steering Group) – H. Lins by end Jan 2016

Task 2 – Items

by ensuring guidance material⁷ is available for NMHSs and for donors, NGOs, and other organizations working to strengthen flood forecasting capabilities in national services

1. Recommend to CHy that it establish a team to develop assessment guidelines for End-to-End Early Warning Systems (E2E EWS) for flood forecasting (outcome of the task 1 item 3), based in part on the WMO Manual on FF&W – CHy (through AWG); by Feb 2016

⁵ Refer to Task 2 item 1.a

⁶ A.L. Aldana volunteered

⁷ recognizing that different audiences need different services (guideline documents for each stakeholder - NMHSs, donors, general public)

- a) Development of generic and living list of requirements/best practices (e.g. open source codes, free and open exchange of hydrometeorological data) to be taken from the existing materials – CHy (Y. Simonov) by CHy XV (Dec 2016)
- b) Develop an inventory on what is available and what is missing in WMO and outside WMO to set up an E2E EWS for flood forecasting – Secretariat by CHy XV (subsequent to Dec 2016)
- c) Based on inventory and report of November 2013, develop assessment guidelines that point to technical reference material to strengthen weaknesses – ongoing iterative process through 2018

Task 3 – Items

by facilitating the development of an inventory of existing training programmes and related reference materials across the entire spectrum of training needs for E2E EWS for flood forecasting, including the identification of weaknesses/gaps, and recommending development of additional materials to overcome weaknesses/fill gaps.

1. Develop an inventory on what is available and what is missing in terms of training programmes – Secretariat by CHy XV (Dec 2016)
2. Based on inventory, develop prioritized list of training materials that should be developed – Secretariat by CHy XV (Dec 2016)
3. Identify relevant training programmes and reference materials within WMO as well as non-WMO programmes related to FF&W – Secretariat by CHy XV (Dec 2016)

Task 4 – Items

by ensuring access to guidance material and training through the IFM HelpDesk

1. Request the APFM TSU to undertake an inventory of the existing guidance material and/or training material and/or expertise through its Support Base already available through the HelpDesk on FF&W – March 2016
2. Request the APFM TSU to design an appropriate interface to offer assistance (Get Help and Help Yourself) in the field of FF&W and solicit feedback from selected FFI-AG members (including link with CHy team under task 2.1) – June 2016

List of presentations and their URL address:

- Coupled Hydrologic, Hydrodynamic and Atmospheric Modeling Project (CHAMP) by Mr. Vincent Fortin (Canada)
http://www.wmo.int/pages/prog/hwrp/flood/documents/presentations/3_2015_FFI-AG_CHAMP_v25112015.pdf
- Severe Weather Forecast Demonstration Project (SWFDP) by Mr. Ata Hussain (WMO Secretariat)
http://www.wmo.int/pages/prog/hwrp/flood/documents/presentations/4_SWFDP_FFI-AGMeetingDecember2015.pdf
- Coastal Inundation Forecasting Demonstration Project (CIFDP) by Mr Donald Resio (USA)
http://www.wmo.int/pages/prog/hwrp/flood/documents/presentations/5_CIFDP-presentation-FFI-AG_v2.pdf
- Flash Flood Guidance Systems (FFGS) by Mr. Paul Pilon (WMO Secretariat)
http://www.wmo.int/pages/prog/hwrp/flood/documents/presentations/6_HRC_FLASHFLOODGUIDANCEPROGRAM_20151130.pptx
- WMO Project on Twinning SARFFG & SWFDP-South Africa by Mr. Eugene Poolman (South Africa)
http://www.wmo.int/pages/prog/hwrp/flood/documents/presentations/7_20151109%20Poolman_SWFDP-SARFFG_Twinning.pdf
- FFGS implementation in Chiapas, Mexico by Ms. Yendi Alvarez Chacon (Mexico)
http://www.wmo.int/pages/prog/hwrp/flood/documents/presentations/8_Flood_Forecasting_YendiA.pdf
- Early Warning Systems (EWS) implementation in Uruguay by Ms. Jimena Alonso Pontet (Uruguay)
http://www.wmo.int/pages/prog/hwrp/flood/documents/presentations/9_EWS_Uruguay_Alonso_v3.pdf
- Ibero-American Network for the monitoring and forecasting of hydrometeorological phenomena (PROHIMET) by Mr. Angel Luis Aldana Valverde (Spain)
http://www.wmo.int/pages/prog/hwrp/flood/documents/presentations/10_2015-12-PROHIMET.pdf
- EWS implementation in Kenya by Mr. Johnson Maina (Kenya)
http://www.wmo.int/pages/prog/hwrp/flood/documents/presentations/11_KENYA_FLOOD_EWS_UGNov2015.pdf
- Associated Programme on Flood Management (APFM) by Mr. Giacomo Teruggi (WMO Secretariat)
http://www.wmo.int/pages/prog/hwrp/flood/documents/presentations/12_APFM_FFI2015.pdf