WMO Flood Forecasting Initiative

Development of (proposal for) a Framework for the Assessment of Service Delivery Capabilties of Hydrological Services

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WMO RAVI Hydrology Forum, 24-26 Sept 2014, Warsaw, Poland

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Some background information:

- WMO Flood Forecasting Initiative
- Connection to Quality Management in Hydrology
- Connection to WMO Strategy for Service Delivery

Methodology used for the assessment

The assessment matrix and the grading scheme

Implementation issues

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Objectives

Since its establishment in 2003, the objective of the WMO-FFI has been 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.

Resolution 21 (Cg-XV): Strategy for the Enhancement of Cooperation Between National Meteorological and National Hydrological Services for Improved Flood Forecasting

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Expected results

- Improved quantitative and qualitative weather forecasting products are available in such a way that these can be directly used for flood forecasting;
- Medium-range weather forecasting and climate prediction tools can be applied to extend warning times and produce pre-warning information;
- NMHSs have improved their capacity to cooperate to jointly deliver timely and accurate flood forecasting information;
- Integrated weather, climate and hydrological forecasting information are available in a relevant format for use by civil organizations responsible for disaster preparedness and mitigation.

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The **Strategy and Action Plan (SAP**) of the WMO Flood Forecasting Initiative promotes the preparation of national implementation plans.

These have to be adapted in accordance with current national and regional flood forecasting capabilities, specific requirements and priorities.

The SAP also addresses requirements of well-established flood forecasting and warning systems for their further improvement through the development and use of new technologies.

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The development of an assessment methodology, with regard to the Service delivery capabilities of Hydrological Services, contributes in particular to ***three action domains of the SAP***:

- Improvement of Hydrological Forecasting Products and Practices
- Strengthening of Institutional Coordination, Cooperation and Integration between NMSs and NHSs
- Formulation of Technical Documentation and Guidelines related to Flood Forecasting

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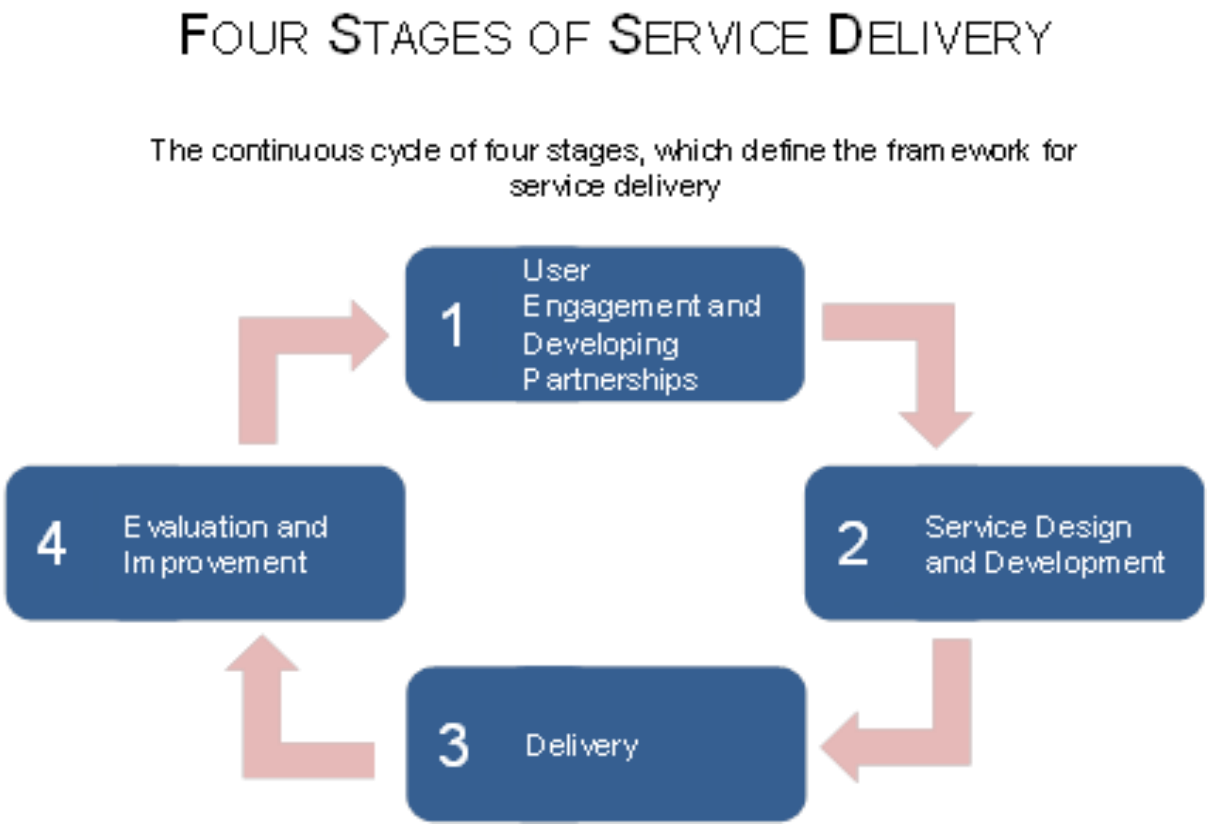
Quality Management in Hydrology
(activities aiming to improve flood forecasting services)

The eight principles of the QMF, e.g.:

1. Customer-focused organization
2. Leadership
3. Involvement of people
4. Process approach
5. System approach to management
6. Continual improvement
7. Factual approach to decision-making
8. Mutually beneficial supplier relationships

WMO Strategy for Service Delivery



Development steps of the methodology

- A ***benchmark method*** has been established for all Action Domains (documented in the SAP) relevant for the forecasting service. Likewise a ***grading scheme for the assessment***, using a catalogue of assessment criteria and weighting factors for Action Domains has been established.

- Templates still need to be created that allow matching of benchmark criteria with assessment results and provide a forward looking perspective towards the projected institutional and technical capabilities of a given flood forecasting service.

- The assessment method and assessment process has been documented in a report. The instruction manual for evaluators has been outlined in its contents but must be finalized in a stand-alone document, which will allow teams of evaluators to perform assessments of flood forecasting efficiency.

- Training materials on the Strength-Weakness-Opportunities-Threats analysis need to be tailored to the requirements of NHSs. This would build on already existing materials that can be utilized for this purpose.

Development steps of the methodology

Further on, the following tasks need to be performed to put the assessment methodology into practice:

- Provide a limited set of case studies
- Test methodology in selected services
- Where necessary, amend methodology and associated procedures
- Evaluate against a set of minimum objective criteria

The assessment matrix and the grading scheme

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	Number of topics	Max rating	Sub-total	% of total
Institutional			162	50.9
End-user requirements (demand-driven, supply of information (supply-driven)	11	33		
Organizational framework	10	30		
Cooperation and coordination (such as: between institutions and also transboundary…)	8	24		
Management of information	10	30		
Skill levels, capacity building	11	33		
Tacit knowledge (institutional memory and also empirical knowledge of long-term experienced staff)	3	9		
Empowerment of distributed entities (regional centers or such as community-based systems…)	1	3		
Infrastructural issues/Technical			123	38,7
Data acquisition (observations, network adequacy….)	7	21		
Data management	9	27		
Models both hydrological, hydraulic (adequacy of models)	8	24		
Communication	4	12		
Dissemination of information (adequacy, timeliness…)	10	30		
Performance (technical)	3	9		
Economic issues			6	1,9
Budget allocated to FF services	2	6		
Sustainability of services			27	8,5
Ensuring continuous, long-term operation and function of FF services	9	27		
TOTAL	106 topics		318	

Grading Scheme for the Assessment of the Efficiency of Flood Forecasting Services

Methodology

Assumptions:

- ✓ Grading (scoring) is undertaken on a numbering basis on a scale 0 to 3.
- ✓ Institutional issues and technical issues are considered equally important.
- ✓ No relative weights are assigned.

Meaning of numbers:

0:	Not existing or not available
1:	Minimum available or existent to perform flood forecasting services on a very rudimentary level,
2:	Available or existing to perform flood forecasting services on a satisfactory level,
3:	Fully existing or available.,

Out of 100% total score, efficiency of FF services is ranked as follows in accordance with the Categorization of National Meteorological and Hydrological Services (NMHSs)

Achievement of	
0 <= Score < 40	Level I
41 <= Score < 70	Level II
71 <= Score <= 100	Level III

Categorization of National Meteorological and Hydrological Services (NMHSs)

(based on 86 countries, status 12/2006)

Level I - ***Flood forecasting and warning services are limited or not operational***, and a significant upgrading and strengthening of the basic data collection and transmission networks is required.
In these cases there is insufficient network coverage and data exchange to enable a sufficient amount of data for hydrological forecasting. Generally, there is very limited coordination between NMSs and NHSs, as well as weak dissemination of warnings to users. Some countries issue only qualitative weather forecasts and only a simple warning system for the main river water levels is operational when these reach critical values. This system is usually based on simple statistical methods and forecasts, if available, are disseminated by phone calls or radio.

Level II - ***The basic infrastructures for flood forecasting and warning services are in place***.
However, upgraded data management procedures and improved methodologies and models for flood forecasting are required. In most cases, there is little experience in operational practice of advanced hydrological simulation and forecasting models. Regression or other simple models are generally used to forecast the peak of the water wave and approximate time of transit. In many cases, the level of coordination between NMSs and NHSs still needs to be strengthened.

Level III – ***These have well-established flood forecasting and warning services with high quality products and opportunities for further improvement through the use of new technology.***
The systems normally combine products and information from both meteorological and hydrological services. Different tools and methods are used to produce the flood forecasts and warnings (e.g. NWP, QPF, radar, satellite images, hydrological and statistical models and other approaches). Warnings generally are communicated through various media to Government and Civil Protection Agencies, industry and the public.

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Implementation Issues: Applying the Assessment Methodology in Practice

***Note**: all assessments are to be undertaken exclusively on a voluntary, demand based request*.

1. **Setting-up of an Assessment Team**
2. **Preparatory Phase**
3. **Assessment Phase**
4. **Post assessment activities**

Implementation Issues: Applying the Assessment Methodology in Practice

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1. Setting-up of an Assessment Team
2. Preparatory Phase
3. **Assessment Phase**

Phase I: General discussion with the concerned service and working through the benchmark criteria including scoring.

Phase II: Interviews conducted along the lines set out in the benchmarking criteria and grading table.

Phase III: A SWOT analysis will be prepared based on the observations of the assessment team and members of the hydrological service.

Phase IV: Preparation of an interim report and discussion of this report with concerned staff of the flood forecasting service to identify areas of performance improvement and possible ways to address these.

Outline of a SWOT analysis and Options for Improvements of Flood Forecasting Services

The SWOT analysis, undertaken on the basis of the scores achieved and structured as following:

Strengths
High-scoring benchmark criteria and observations from internal staff

Weaknesses
Low-scoring benchmark criteria and observations from internal staff

Opportunities
External opportunities that could affect the organisation and service eg. Through WMO and donor initiatives

Threats (Risks) – Implicit to the organization
External threats that could affect the organisation and service eg. Insufficient budget, budget cuts etc

The Strengths, Weaknesses, Threats and Opportunities are then analysed to develop a prioritised set of tactics.
The tactics should improve weaknesses, build on strengths, utilise opportunities and mitigate the threats.
These tactics will form the basis of recommendations.

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Implementation Issues: Applying the Assessment Methodology in Practice

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1. Setting-up of an Assessment Team
2. Preparatory Phase
3. Assessment Phase
4. **Post assessment activities**

Established, by the service, of an in-house Task Team to work on actions in response to the results and recommendations of the assessment exercise.
It could include the preparation of a Service development plan for the NHS.

THANK YOU FOR YOUR ATTENTION!