



World Meteorological Organization

Weather • Climate • Water

Session 1: Flood forecasting

Giacomo Teruggi - WMO

Second Workshop on Transboundary Flood Risk Management
Geneva, 19-20 March 2015

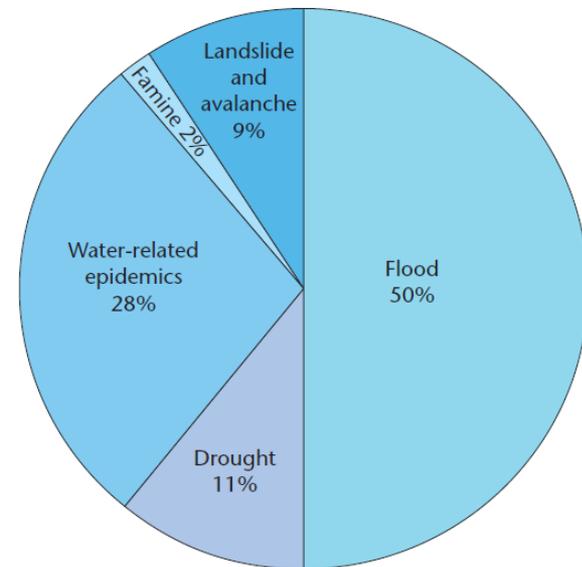
Why is flood forecasting important?

“There are two types of levees, those that have been overtopped by floodwaters, and those that will be”

- William Hammon Hall, first State Engineer of California, 1880 circa

- Human pressure and increased urbanization have led the majority of the world population to live in flood-prone areas

- Exposure to floods can only be reduced, but should be integrated by preparedness
- Preparedness requires to know when (and possibly how) a flood is going to occur

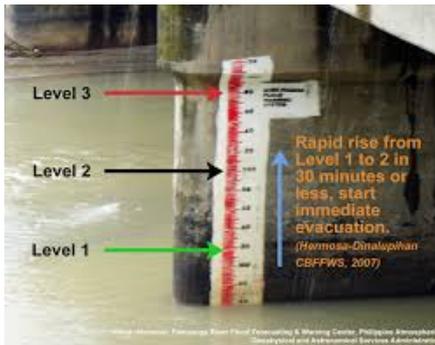


Types of water-related natural disasters, 1990–2001

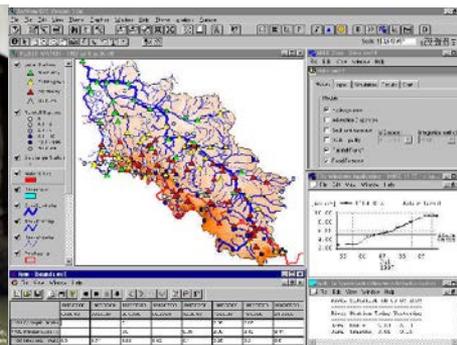


Planning a flood forecasting system: preliminary considerations

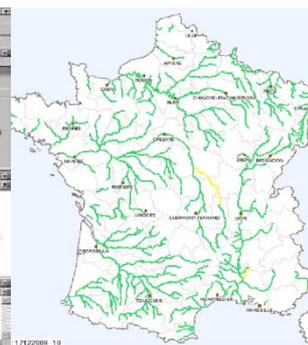
- Need to understand:
 - the hydro-morphological characteristics of the basin topography, geology and soils, and the degree of structural development;
 - the main physical processes occurring during hydro meteorological events; and
 - the type of service that is required and that can be achieved technically and economically



Threshold based flood alert (qualitative)



Flood forecasting (quantified and time-based prediction)



Vigilance mapping



Inundation forecasting (hydrodynamic modelling)



Flood Forecasting and Early Warning Systems – main components

- a) Collection of real-time data for the prediction of flood severity, including time of onset and extent and magnitude of flooding;
- b) Preparation of forecast information and warning messages, giving clear statements on what is happening, forecasts of what may happen and expected impact;
- c) Communication and dissemination of such messages, which can also include what action should be taken;
- d) Interpretation of the forecast and flood observations, in order to provide situation updates to determine possible impacts on communities and infrastructure;
- e) Response to the warnings by the agencies and communities involved;
- f) Review of the warning system and improvements to the system after flood events.

The above need additional institutional arrangements to ensure transboundary cooperation



Requirements for a flood forecasting and early warning system

Data:

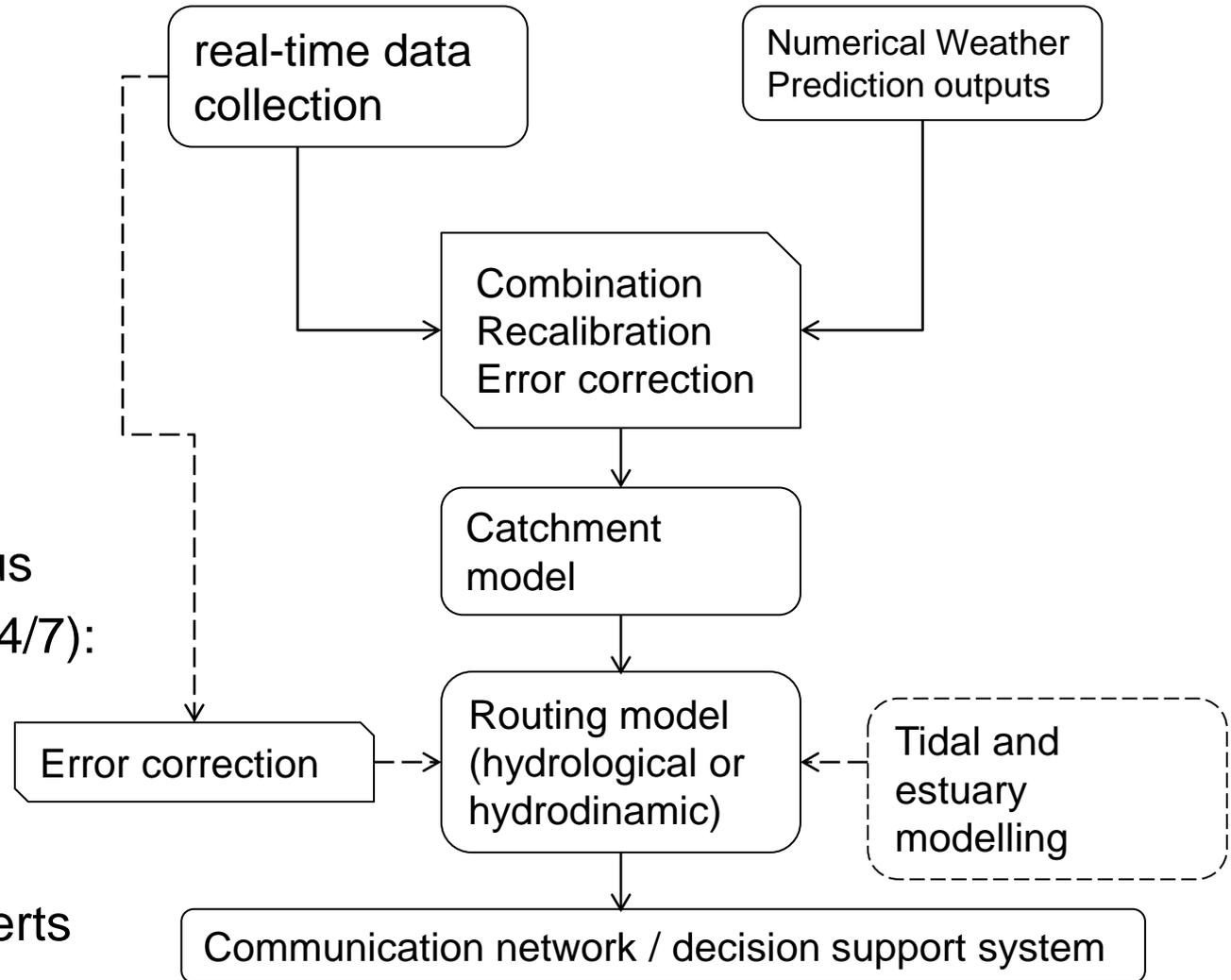
- Meteorological
- Hydrological
- Topographic
- Socio-economic

Infrastructure:

- Safe place
- Availability of calculus

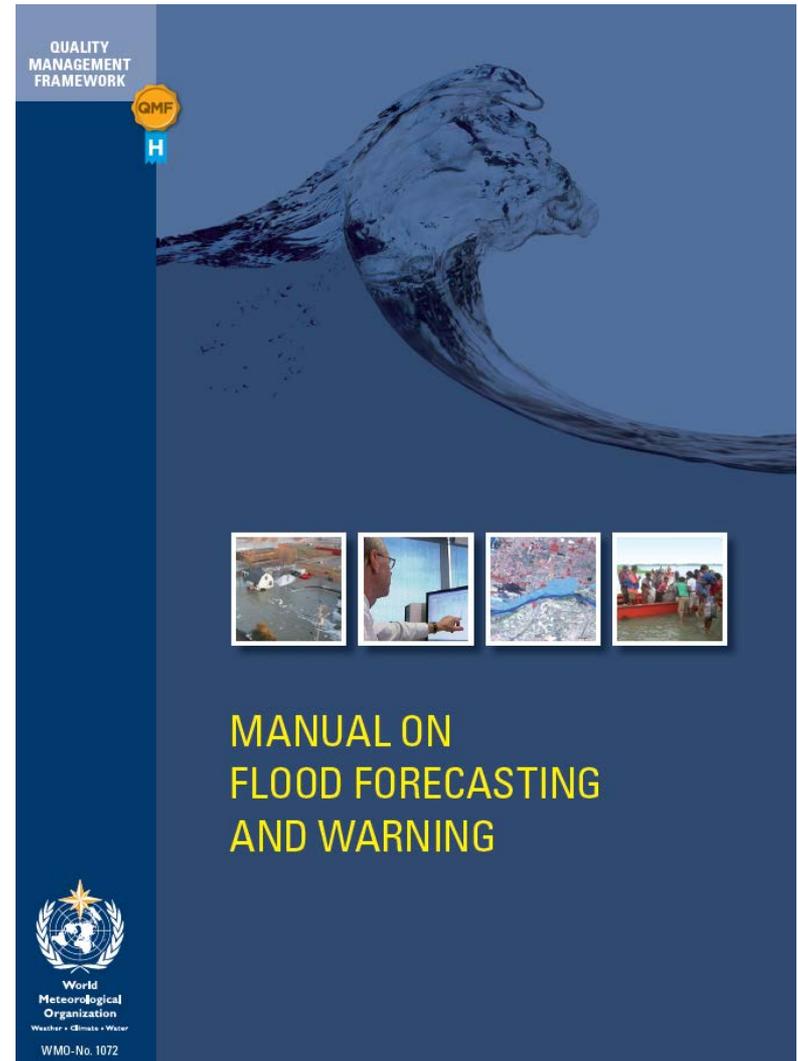
Human Resources (24/7):

- Hydrologists
- Meteorologists
- IT experts
- Communication experts



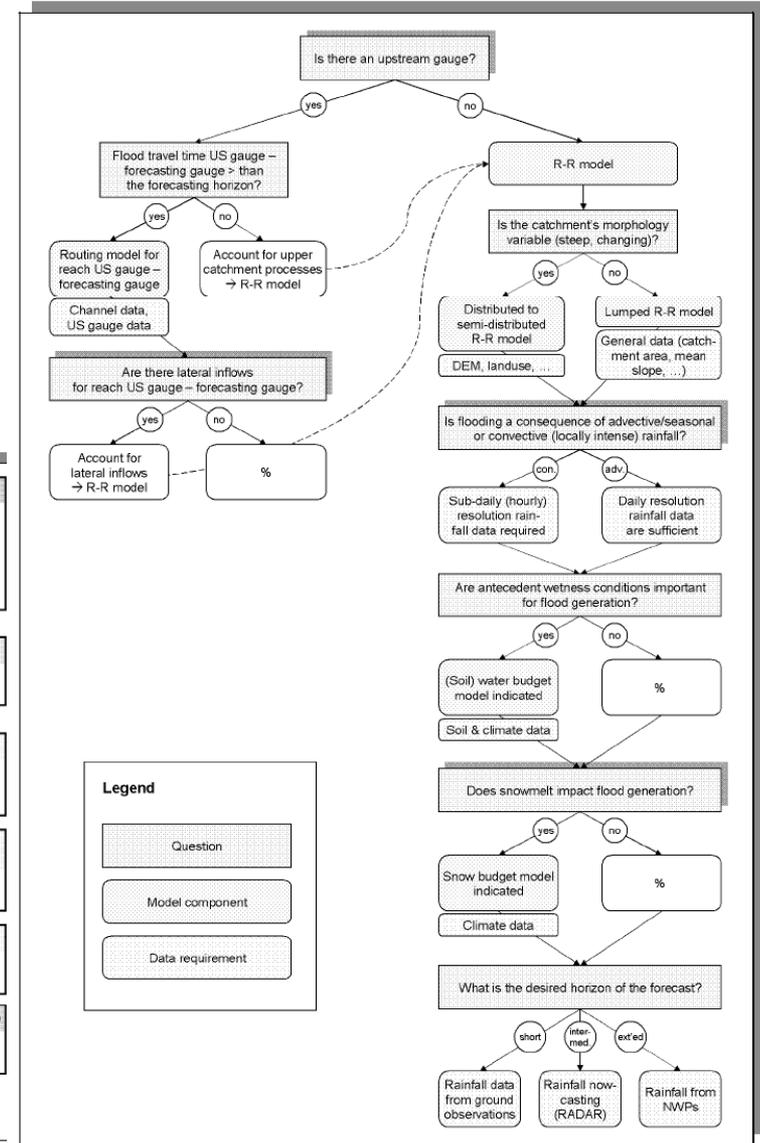
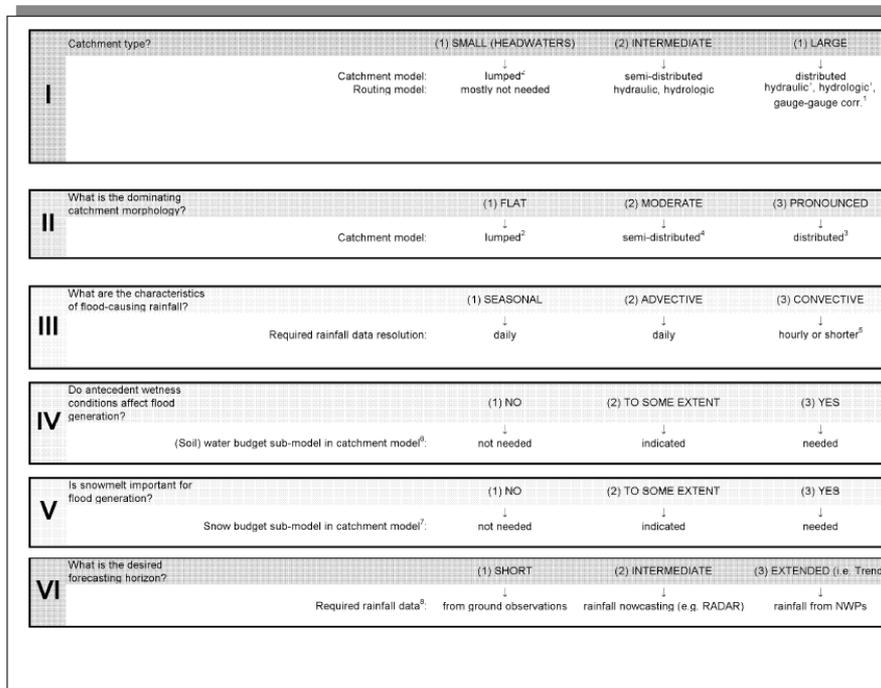
Manual on Flood Forecasting and Early Warning

- NOT a step-by-step “menu” to create a flood forecasting and warning service
- Presents examples of practices and technologies to reflect different levels of development, ranges of needs, capacities, etc
- Examines the constituent parts of flood forecasting and warning, the wide ranging science involved, tools, practicalities and organisation required
- Exemplifies also how warnings can operate in different societal frameworks



Development of a decision-aiding tool for the selection of flood forecasting models

- Based on an intercomparison of 18 operational flood forecasting models
- Outcome of a WMO international workshop held in Koblenz in 2011



Thank you for your attention

