Step 5: Create an Inventory/Menu of Forecasts

What are the potential forecast products available? What is the most appropriate forecast product we can use? What are the mandates around using various products?

In order for FbF to allocate funding when a trigger occurs, there must be a certain probability of the extreme event taking place. To safeguard this, it is crucial to select the best-suited forecasts. An analysis of forecast verification, type, reliability, lead times, and sources of data for forecasts should be presented as an inventory, to allow the working group to decide which one to use. Note that this information does not need to be analysed or calculated by the National Society, but can be obtained by working with hydro-meteorological services, research institutions, experts etc.

Key questions:

1. Which agency produces the forecast (NHMS, GloFAS, ECMWF, IRI, etc.)?
2. What kind(s) of forecast(s) are produced or how is the forecast produced? Choices include observed data (e.g. gauged precipitation), statistical forecasts (e.g. extrapolation of an upstream river flow to a downstream location, or an index based on El Niño sea-surface temperatures), and dynamic models (e.g. numerical weather-prediction systems and large-scale hydrological forecasting models).
3. What is the format of Issuance? Deterministic: Showing a single outcome without conveying potential error and uncertainty, Probabilistic: Showing the probabilities of one of more discrete outcomes or categories. Intervals: Showing an explicit upper and lower limit between which a value is expected to occur.
4. How often is the forecast produced?
5. Is the forecast generated by a computer model or produced by human estimates?
6. What is the lead time for each forecast? I.e., what is the time between forecast issuance and the shock?
7. What regions are covered by the forecast?
8. What is the skill of the forecast? How has the skill has been assessed (skill at a specific location, skill at predicting extreme events)?
9. What is the resolution in space or time?

Lead times will vary according to the forecast used: observations (e.g. rainfall has already fallen), short-range weather forecasting (12 to 72 hours), medium-range weather forecasting (above 72 hours and up to 10 days), extended-range weather forecasting (up to 30 days), monthly, every three months, and seasonal outlooks. Forecasts at different lead times tend to predict different variables (e.g. seasonal rainfall vs 3-day rainfall totals). While forecasts with shorter lead times often are more accurate, in order for early actions to be implemented a few days will be needed in most cases. This needs to be considered when selecting the forecast.

Once decision-makers make a choice of forecast, a more detailed skill assessment may be needed. Historical forecasts should be compared to historical observations and disasters to assess how often the

trigger would be reached and the probability of 'acting in vain' (see Guidelines on forecast verification).

Forecast	Sources/ Availability	Forecast type / Spatial Resolution	Lead time and "How often is it produced"	Forecast skill
River flow	SENAMHI	River flows forecast based on rainfall information of the ETA and WRF models (32 km and 22 km resolution respectively). Available at specific hydrological stations.	Daily for lead times up to 72 hours	Not verified
River flow	GLOFAS – JCR Global Model Daily bias correction by SENAMHI	River flows forecast and return periods based on probabilistic outputs of ECMWF IFS at ~10 km grid scale representation of the river, bias corrected using daily observations	Daily for lead times up to 45 days	Verified 9 days lead time 45% chance of false alarms for a forecast of exceeding the 1-in-10 year return period
River flow	Deltares Global Model	River flows forecast and return periods based in probabilistic outputs of delayed ECMWF forecasts and GFS at the level of hydrological stations	Daily for lead times up to 10 days	Not available due to lack of data for verification
River flow	GLOFAS – JCR Global Model	River flows forecast and return periods based in probabilistic outputs of ECMWF at the level of hydrological stations	Produced every season for the following 3 months	Available from GloFAS team
River level	**SENAMHI**	**Forecast trend based on the statistical model at the Enapu station - Iquitos.**	**Produced every season for the following 3 months**	**Not available due to lack of data for verification**

Table 1. Example of inventory of forecast for river floods in the Amazon.