



Forecast based Financing

Experience in the Peruvian Amazon region

Flooding

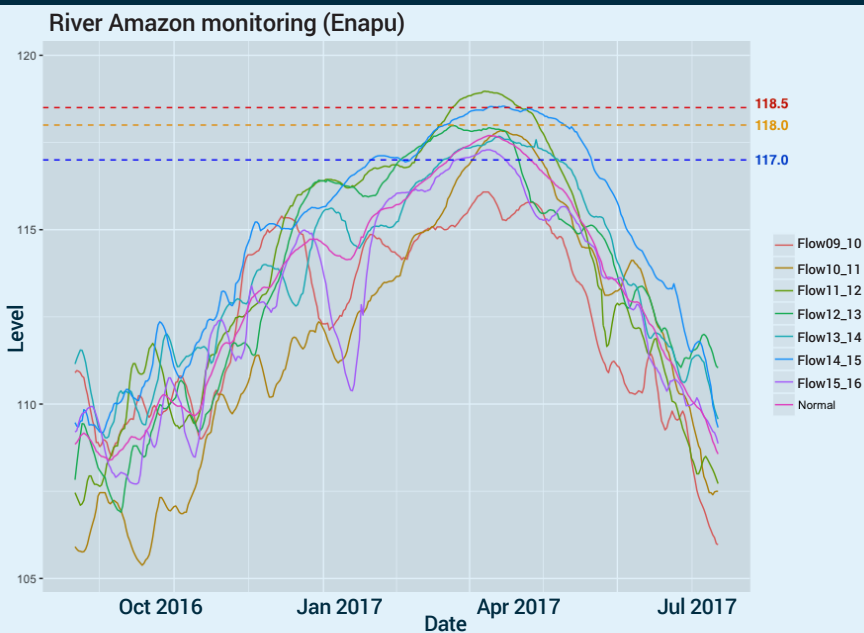


Changing the paradigm to act faster

FLOODING IN THE PERUVIAN AMAZON REGION

Every year parts of the Amazon forest flood from December to May. This flooding is caused by seasonal rains in the Peruvian Andes.

Flooding can be extreme in some years due to changes in rainfall patterns that are getting more extreme and more frequent due to climate change. This causes losses in infrastructure and livelihoods and affects people's health.




The largest recent floods came in 1999, 2012 and 2015. The highest record was 118.97m river level, in April 2012 at the Enapu station. Many communities were affected (see below); 26,000 hectares were flooded, as well as urban areas of the province Maynas.



2012


3,417
displaced
families



72,642
affected
houses


229,412
victims



2015

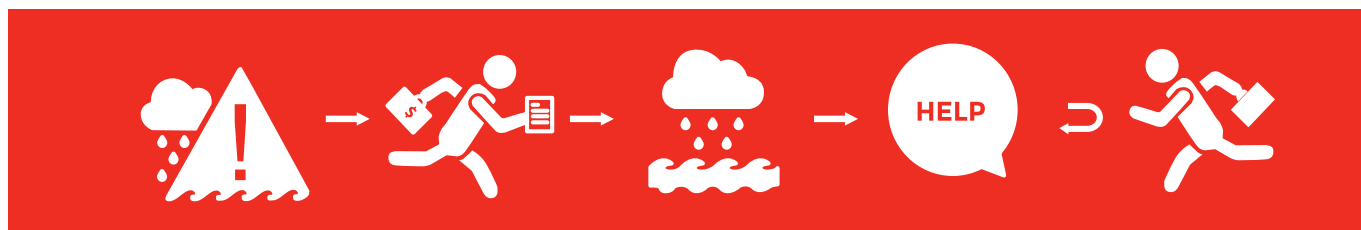
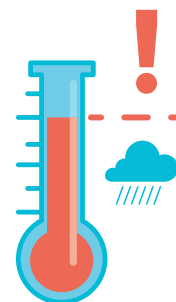

1,558
displaced
families


18,612
affected
houses


113,485
victims

THE CONCEPT OF FORECAST-BASED FINANCING

Forecast-based financing (FbF) develops new procedures and methodologies to prepare vulnerable people facing a disaster in a more efficient and effective way. Using domestic and international hydro-meteorological forecast information, it sets danger levels and pre-defines early actions. These actions are activated when a forecast exceeds a danger level in the intervention area (for example, a river flow that has caused flooding in the past). Actions can be implemented before the disaster occurs and resilience is strengthened, both at institutional and community level.



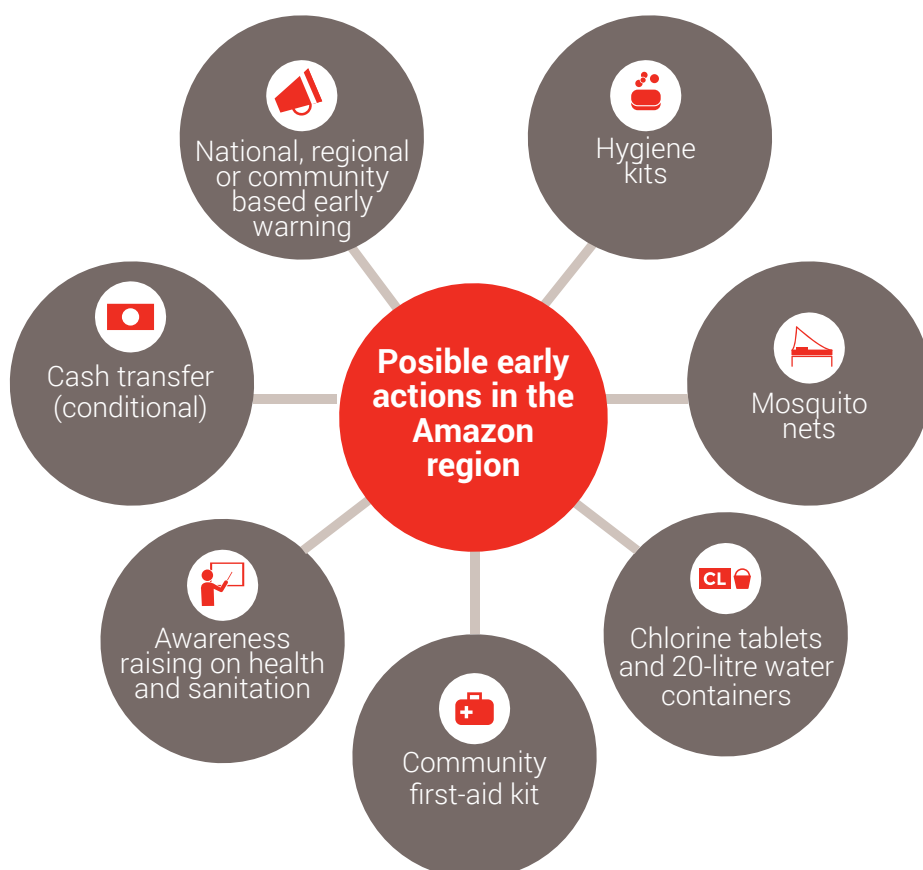
Implementation of FbF in Peru in 2015 to 2017 shows that early actions can be activated based on a forecast. Funds are automatically released when an 'activating forecast' exceeds a certain danger level. Thus early actions prepare vulnerable families, and humanitarian institutions can better face an extreme event.

Why is the FbF focused in the Amazon Region?

Flooding in the Amazon region in 2012 and 2015 reached historical levels. Extreme rainfall and river flooding caused damage in urban, peri-urban and rural areas. There was no access to drinking water or adequate sanitation; people were exposed to diarrheal disease, respiratory infections and malaria and dengue fever.

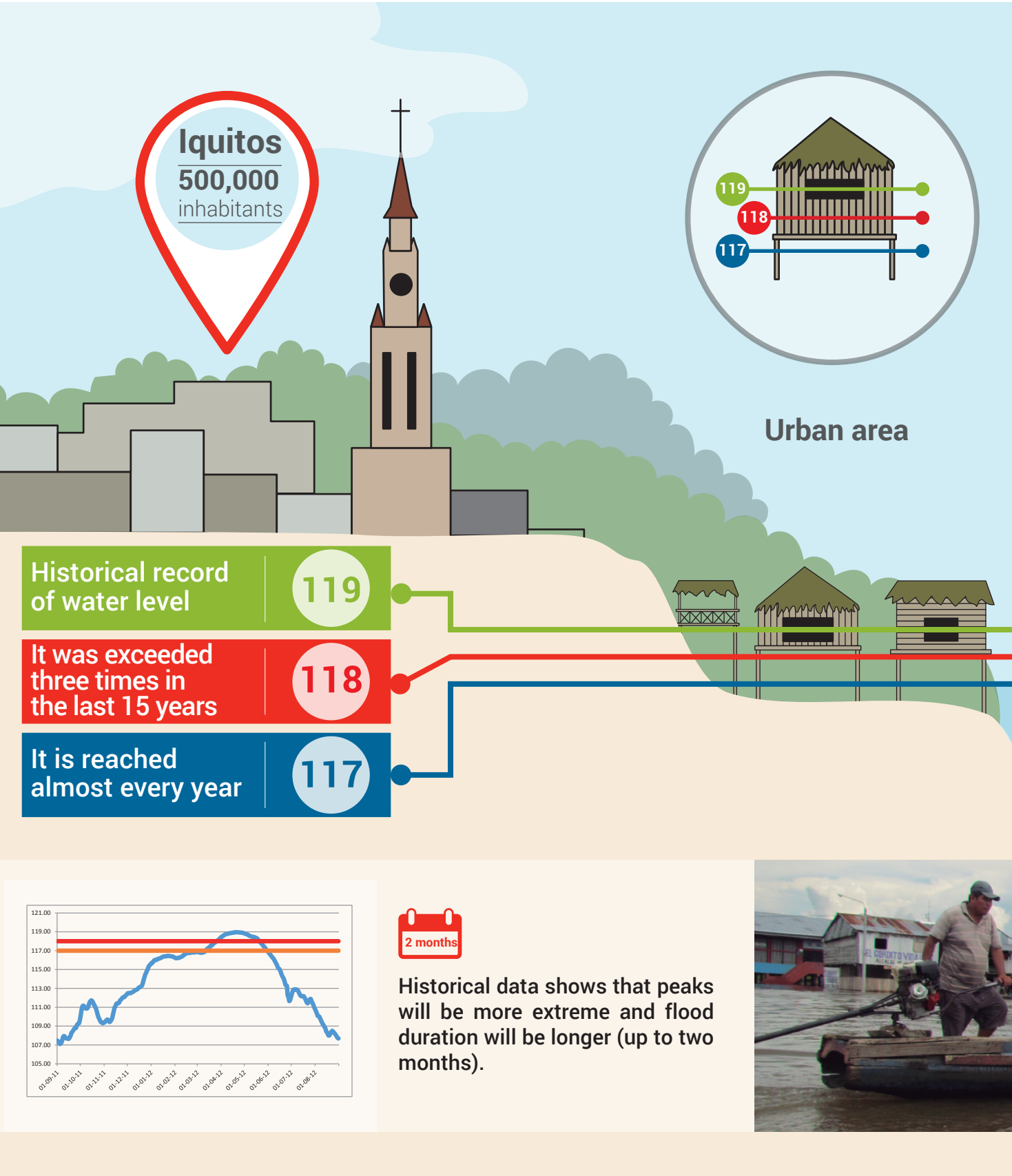
FbF also promotes the strengthening of early warning systems in the region. Thus the Red Cross can promote health and distribute kits for hygiene and safe drinking water before the disaster, when affected families need them most.

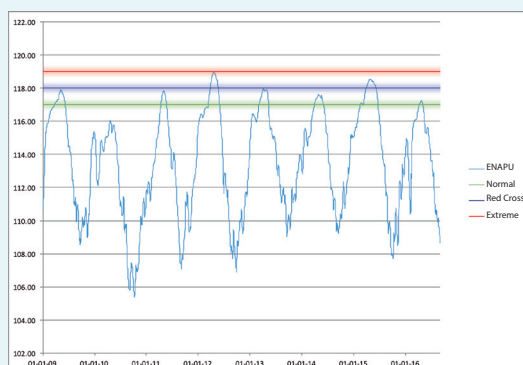
Early actions



FLOODING IN IQUITOS

Amazonian rivers have lows and highs. People in the area know how to cope. It is only in extreme events – which have been more severe, longer and more frequent over the last few years – that there has been a great impact for the local population including displacement, problems with health and sanitation, loss of livelihoods, and limited access to drinking water.





118.5 river level

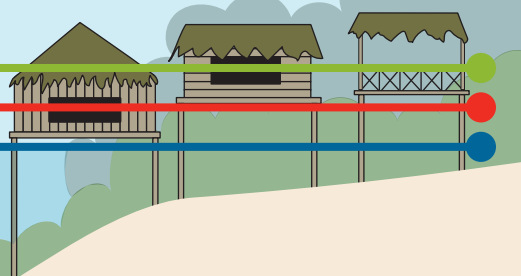
Is already an extreme hazard for the population. It means most houses in the communities and lower Iquitos neighborhoods flood from 5 to 75 cm for several weeks.

Periphery or
semi-urban area

Nanay river



Itaya river

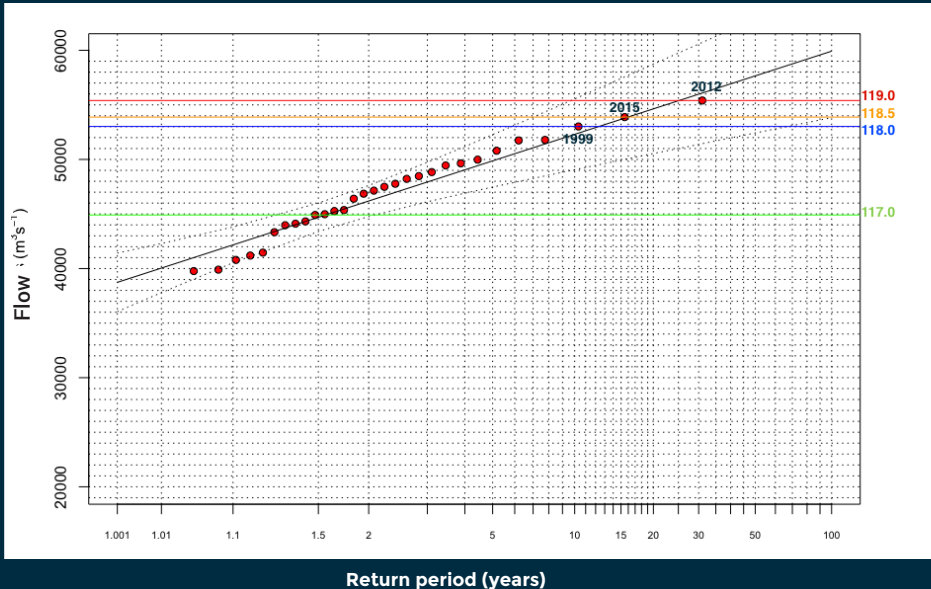


There are many vulnerable 'informal' houses in the area that are prone to flooding.

DANGER LEVEL DEFINITION

The return period was calculated to determine the Amazon river danger level using historical information at the Tamshiyacu station in Iquitos using 30 years' worth of data. Impact information from the Civil Defense Institute (SINPAD) was analyzed for the three most extreme events affecting Punchana and Belén districts, close to Iquitos.

Maximum annual flow, Amazon river 1987-2016 (Tamshiyacu Station)



EXAMPLES OF DANGER LEVEL

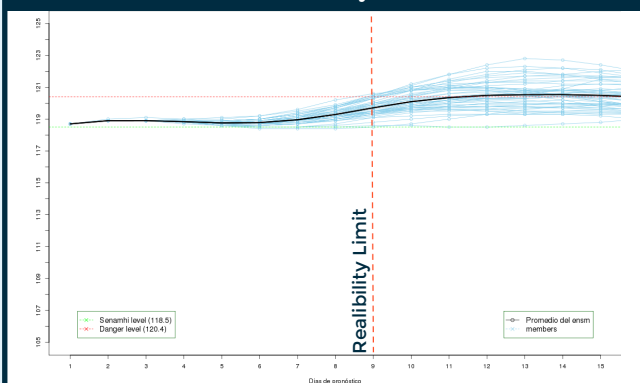
District	Height in metres (masl)
Punchana	118.5
Belén	118.5

FORECAST

The Global Flood Awareness System (GLOFAS)¹ assembles a probabilistic forecast (using 51 members) at 15 days with a 9-day reliability. This forecast goes through an automatic correction process with data observed during the day at the Tamshiyacu station. The forecast is issued by SENAMHI-Loreto on a daily basis and is disseminated to the FbF team for the corresponding analysis and linked to an early alert system.

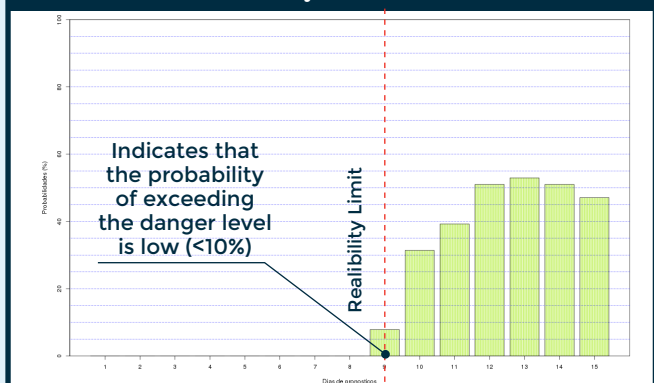
EXAMPLE OF PROBABILISTIC FORECAST, ON 03.20.2017

Amazon river water level forecast
Tamshiyacu



PROBABILISTIC FORECAST

Danger level probability
Tamshiyacu Red Cross



OCCURRENCE PROBABILITY

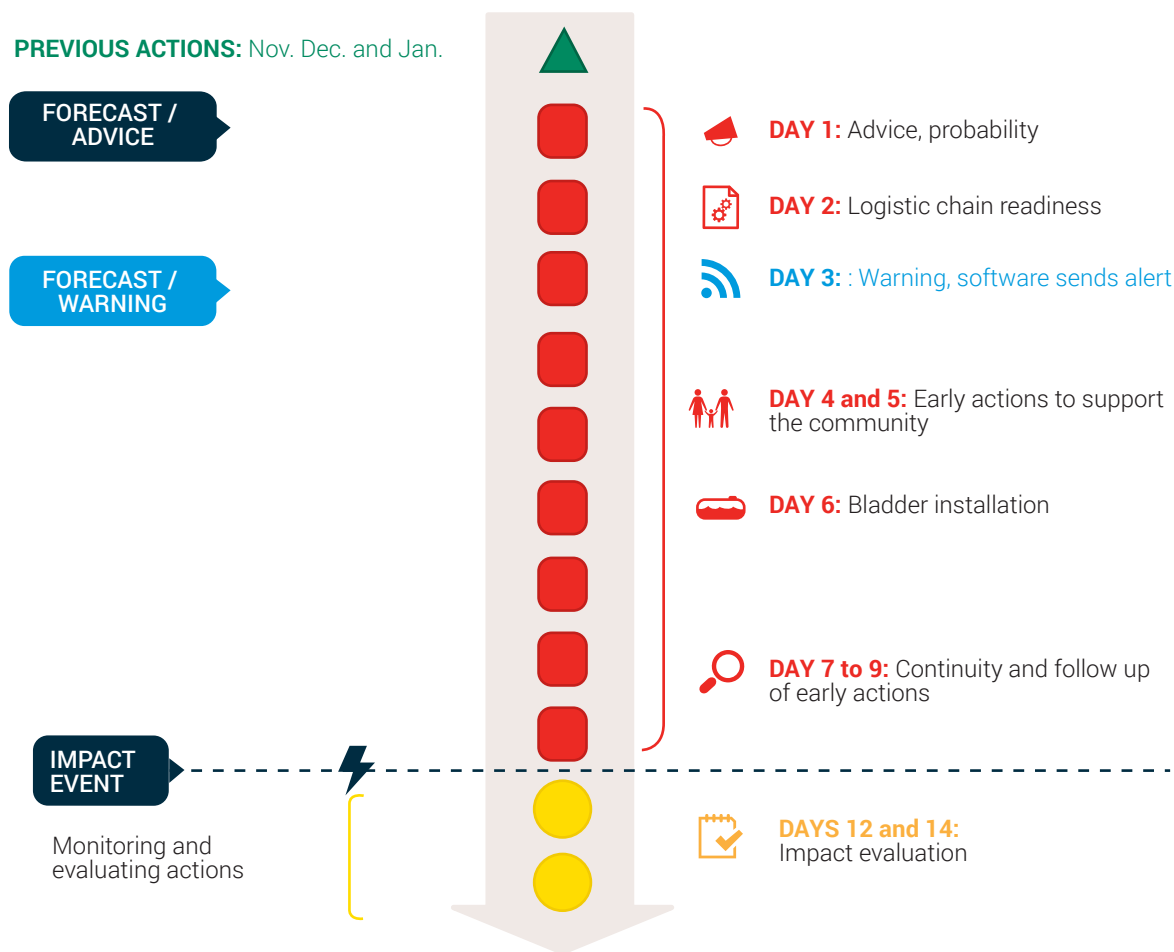
¹<http://globalfloods.jrc.ec.europa.eu>

EARLY ACTION PROTOCOL

Once forecasts exceed the danger level, agreed early actions or standard operational procedures (SOP) will be activated. The forecast offers some time for early actions of not more than up to nine days. The protocol also specifies a plan to ensure budget, arrangements for distributions, and a list of contacts.

How does the FbF mechanism work?

On the first of the nine-day GLoFAS window, the government (national and local authorities and organizations), Red Cross branches and volunteers are warned. On Day 2, the Red Cross prepares its logistics and intervention teams. On Day 3, they also alert the community and community leaders, who can activate their early warning system. On Day 4 and 5, the Red Cross implements early actions (kit distribution and health promotion) to support the community. On Day 6, the Red Cross installs water bladders at places that are pre-established with INDECI and the municipality. On Day 7 to 9, the Red Cross continues its actions and follows up. After the event a forecast validation and an Impact Assessment is carried out. In the meanwhile the Red Cross volunteers provide follow-up to the early actions during a 1 day community visit.



- Previous actions:** Planning, human resource management, logistic processes, capacity development, SOP.
- Early actions:** Action protocol at nine days – Loreto FbF.
- Monitoring actions:** Event validation, kit use monitoring, and impact and early action evaluation
- PROBABILISTIC WARNING** → Probability at nine days of extreme flooding, state of alert
- FORECAST** → Once the danger level is exceeded, a warning is issued through software, 118.5 meters in 7 days.
- Event impact: river water height at 118.5m or higher.

CONCLUSIONS



- ✓ The river level is monitored in Loreto through observations. The use of hydro-meteorological events can provide a window of opportunity to activate protocols and early actions (implement an early warning system).



- ✓ Through the GloFAS model, FbF has a probabilistic forecast calibrated by SENAMHI-Loreto with high reliability at nine days.



- ✓ Amazonian reality experience and knowledge will enable the FbF to do research for longer term forecasts to be able to have a longer period for preparedness.



- ✓ Rainfall and river-level observations at start of the river watershed could give a longer term complementary signal. However, it is still difficult to determine cause and effect for the lower rainforest, considering the water contribution of various rivers to the Ucayali, Marañón, Amazonas and Huallaga rivers.



- ✓ It is necessary to continue evaluating the danger levels in the field on an annual basis to know if it is related to a severe impact.



- ✓ A contingency plan in Loreto, and particularly in Maynas/Iquitos, has to be annually reviewed with the participation of all actors and has to be appropriately shared. This can improve communication and coordination and decrease risk for the population.



- ✓ The FbF project previously strengthened the Red Cross branches, community brigades and INDECI and Regional Civil Defense focal points to ensure a quick deployment when protocols are activated. Reality shows that the Red Cross has the capacity to activate its early actions within 24 hours.



- ✓ One of the preliminary lessons learned from the 2016 and 2017, FbF is to focus on extreme events, on a larger scale (provincial, regional and national).

TECHNICAL, SCIENTIFIC AND COORDINATION TEAM

German Red Cross
Mathieu Destrooper
m.destrooper@drkamericas.de

Red Cross Red Crescent Climate Center
Juan Bazo
Bazo@climatecentre.org

Peruvian Red Cross
Juan Carlos Melgar
eni001@cruzroja.org.pe