

# **Forecast**based **Financing**



# Changing the paradigm, acting faster El Niño in Peru







CROSS/RED CRESCENT of Red Cross and Red Crescent Societies

LIMATE CENTRE The Netherlands Red Cross

# WHAT IS EL NIÑO?

El Niño is a complex interaction of the tropical Pacific and the atmosphere, resulting in cyclical episodes (every four to seven years) of changes in ocean and weather patterns in many parts of the world. Often these episodes have considerable impacts occurring over several months, such as altered marine habitats, rainfall, floods, droughts and changes in storm patterns.<sup>1</sup>





### Historical impact of El Niño event in Peru<sup>3</sup>



In both the 1982-1983 and 1997-1998 El Niño, northern Peru (Tumbes, Piura and Lambayeque) suffered flooding from heavy rains, while the south of the country suffered severe droughts. In this context, the Peruvian Red Cross (PRC), the German Red Cross (GRC) and the Red Cross Red Crescent Climate Centre, designed a project which uses scientific (observations and forecasts) to implement early action in the most vulnerable areas. Forecast-based financing (FbF) is still in its pilot phase, and the latest 2015-16 El Niño was one of the first applications of the mechanism.

1 Definition taken from UNISDR | 2 Taken from http://iri.columbia.edu/enso | 3 Information recorded by INDECI.

## **FbF CONCEPT**

Some preparedness and humanitarian aid can be secured between a forecast and the impact of an event. Most hazards related to weather can be predicted. Thus, the humanitarian community can get information and know where and when to act, if a storm, flood or drought is expected.





FbF develops new processes and methodologies to prepare, deliver and respond in a more effective and efficient manner, based on national and international hydro-meteorological forecasts. It formulates defined danger levels and early actions. These actions are triggered when a forecast exceeds a danger level in a vulnerable intervention area (e.g. a specified amount of rain that make rivers and communities flood). Hence, actions can be taken before the impact of the disaster and strengthen resilience, of both communities and institutions.



Applying FbF during El Niño in 2015-2016 proved that you can establish a system that triggers the use of funds to implement preparedness actions before a predicted disaster occurs. In this way suffering and losses can be avoided, and aid funds more efficiently used. Moreover it improves resilience and community preparedness.

### What do we want to change in the Peruvian context?

Historical data from 1982-1983 and 1997-1998, show that a strong El Niño has a great impact on health, drinking water, food security and housing. FbF seeks to act before the disaster, with early action to build and enforce resilience, reducing the impact of an El Niño Event and ensuring that basic needs are available at the time that families and communities need them most.

### In which field do we take early action?



# **HOW IMPLEMENTED?**

### WHAT ARE THE KEY ASPECTS OF THE PROJECT?



Between August and September 2015, the Red Cross, local government, disaster risk management authorities (INDECI and CENEPRED), the Met Office (SENAMHI) and agencies in the health, agriculture, housing and transport sectors, jointly analysed risk scenarios, historical impact and vulnerability. As a result, relevant early actions were selected. The project also defined very specific danger levels based on thresholds of available forecasts, historical data and vulnerability in the intervention area.



# EL NIÑO 2015-2016 FBF TIMELINE







# FROM SCIENCE..

The next matrix shows forecasts of various national and international sources (EU, CFS NOAA, NOAA GFS-ENFEN-PERU, IRI-Columbia University, Eurosip- ECMWF, GloFAS), organized by time of forecast, impact and probability, according to the levels of danger to the population. The arrows indicate how forecasts could be translated into actions that could be triggered, if danger levels were exceeded.

Lead time			
	Seasonal	Monthly	Weekly
Low	• El Niño 1+2 SST* anomaly: 2°C	<ul> <li>Forecast precipitation 1 month (NOAA.CFSv2) (4-6 mm/day anomaly)</li> </ul>	
	<ul> <li>ENFEN: 10% probability of 'extraordinary'</li> </ul>		
	<ul> <li>IRI: 20% probability of top 10% precipitation</li> </ul>		
	• EUROSIP: 40-50% probability of top 20% precipitation		
Medium	<ul> <li>Niño 1+2 SST* anomaly: 2.5°C</li> <li>ENFEN: 15% probability of 'extraordinary'</li> <li>IRI: 30% probability of top 10% precipitation</li> <li>EUROSIP: 50-70% probability of top 20% precipitation</li> </ul>	• Forecast precipitation 1 month (NOAA.CFSv2) (6-10 mm/day anomaly)	<ul> <li>66% probability of exceeding the 10 year return period threshold of GloFAS* model (for Bajo Piura)</li> <li>Forecast precipitation: Percentile 85 of ECMWF and GFS –NOAA (&gt; 20mm/day absolute values (Piura and Lambayeque)</li> </ul>
High	<ul> <li>El Niño 1+2 SST anomaly: 3°C</li> <li>ENFEN: 20% probability of 'extraordinary'</li> <li>IRI: 40% probability of top 10% precipitation</li> <li>EUROSIP: 70-100% probability of top 20% precipitation</li> <li>*SST: Sea Surface Temperature</li> </ul>	• Forecast precipitation 1 month (NOAA.CFSv2) (10 or + mm/day anomaly)	<ul> <li>68% probability of exceeding the 10 year return period threshold of GloFAS* model (for Bajo Piura)</li> <li>Forecast precipitation: Percentile 93 of ECMWF and GFS –NOAA (&gt; 30mm/day absolute values) (Piura and Lambayeque</li> </ul>

The FbF project builds a bridge between scientific information and early action, firstly to use available forecasts effectively, then to take actions and make decisions to be better prepared for disasters and increase resilience to floods and heavy rain.



**PROBABILITY / IMPACT** 

9

## HUMANITARIAN EL NIÑO INTERVENTIONS

### WHY USE FORECASTS IN LAMBAYEQUE AND PIURA?

 In 1982/1983 and 1997/1998, El Niño led to severe impacts in this region, causing significant great loss of life, infrastructure and crops. The level of preparedness in communities remains low.

## GENERAL PREPAREDNESS AT THE BEGINNING OF THE SEASON

**40** volunteers trained from

Peruvian Red Cross

branches.



**2000** families Approximately



**18** vulnerability and capability assessments conducted.

**18** early warning established committees.

SOP confirmed by key actors.

## FORECAST

#### 3 MONTHS lead time

If the forecast exceeds the danger level

The following early actions will be implemented with low or medium probability:



18 community brigades will be constituted, equipped and trained.

## In case of an extreme weather forecast event with high impact

The following early actions will be implemented:





Build 1000 latrines.



Provide assistance to store seeds and food items

#### 💾 1 MONTH lead time

If the forecast exceeds the danger level

The following early actions will be implemented with medium probability forecast:



Preposition **2000** buckets and chlorine tablets

Preposition 06 15lt water tanks each.



(i) Fumigate **18** communities.



#### 7 DAYS lead time

If the forecast exceeds the danger level

The following early actions will be implemented:

Distribute **1000** buckets, chlorine tablets and hygiene kits (for 1 family during 1 month)

# CONCLUSIONS



Forecast-based financing for El Niño in Peru is a unique initiative with an innovative approach. The use by the Red Cross of probabilistic forecasts for humanitarian early action is a first in Latin America. It is worth exploring what possibilities FbF can offer for other hydrometeorological events, and whether the probability, the impact, or the intensity of event, or a combination of all three, is important to consider.



Although, scientific signs predicting El Niño are improving, the local and international scientific communities still face a challenge to achieve forecast accuracy on both the probability and intensity of the phenomenon. It also remains extremely challenging to predict how it will influence local weather patterns.



In 2015-2016, El Niño in Peru was not a strong or extreme event. It should be noted that not all El Niños are equal, and a single El Niño does not impact in all places with the same intensity. In 2016 Argentina, Paraguay, Uruguay and Brazil suffered heavy rains and flooding, while in Colombia, Venezuela and much of Central America suffered severe droughts.



Some actions were taken in vain, but most were beneficial in the long run, contributing to building the capacity for early action of the National Society and local communities. The project also improved the housing stock. Moreover, in very vulnerable rural areas, awareness raising was done in the field of health, safe drinking water, and hygiene and early warning. These are long-term benefits that increase resilience and contribute to being prepared for other events.



Droughts associated with El Niño and La Niña do not appear overnight. A combination of observation (e.g. sea-surface temperature) and forecasts with a longer lead-time provide humanitarians with several months' advance warning.



FbF interventions in Piura and Lambayeque will be measured through an impact study and analysed in an inter-agency workshop. Lessons will be identified and guidelines developed to scale up FbF in other countries and for other hazards.

#### **TECHNICAL AND COORDINATION TEAM**

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

#### **Red Cross Climate Centre**

Juan Bazo Bazo@climatecentre.org Peruvian Red Cross Marcia Puell direccion.ejecutiva@cruzroja.org.pe

.....

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

## THE MECHANISM OF FORECAST-BASED FINANCING IN EL NIÑO IN PERÚ



