Anticipatory Action Trigger Mechanism Report

Drought in Niger

OCHA | centre for humdata

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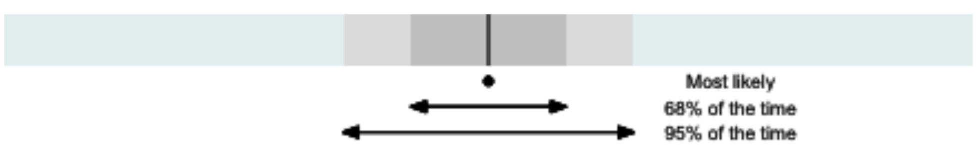
Key Messages

- ACTIVATION
  There is a 71 - 86% chance that an activation will occur in a given year.
- SHOCK DETECTION
  At least some activities are expected to be implemented ahead of 89 - 100% of shocks.
- FALSE ALARMS
  The risk of activating in the absence of a severe shock stands at 48 - 70% of activations.
- NO REGRETS BIAS
  The mechanism is optimised to reduce the risk of failing to activate when there is a shock, at the cost of having false alarms. Mitigation is recommended to minimise the negative impact of a false alarm due to its moderate to high likelihood.

About Metric Estimates

The estimates in this report are shown as ranges called confidence intervals. The confidence intervals reflect the probabilistic nature of the estimates as well as the impact of data limitations (small or incomplete datasets, errors or imprecision in measurements, divergences between data sources, etc.) on the accuracy of estimates. They can inform decision-making by illustrating the most likely performance levels and by providing bounds for the possible albeit unlikely extremes.

- The **central value** is the most likely performance;
- Most often the trigger will perform within the **darker inner range** (68% of the time);
- There is high confidence that the trigger will perform within the **full coloured (grey or blue) range** (95% of the time).



Colour Coding

In the visualizations **blue** represents activation likelihood, **green** represents desired outcomes (valid non-activations/activations) and **red** represents undesired outcomes or errors.

Trigger Mechanism Snapshot

This table summarises the trigger mechanism and its performance in signaling severe shocks. It presents estimates of the likelihood that the threshold would be met in a given year as well as how often the trigger is expected to correctly recommend an activation or non-activation.

	Trigger 1	Trigger 2	Trigger 3
Description			
Type	Predictive	Predictive	Observational
Monitored Area	National	National	National
Activation Timepoints	Jan, Feb, Mar	Apr, May, Jun	Aug
Target Period	Jul-Sep	Jul-Sep	Jun-Jul
Lead Time	6-4 months	3-1 months	N/A
Data Source	IRI flexible seasonal forecast	IRI flexible seasonal forecast	ENACTS or CHIRP
Historical Data Coverage	1991 - 2020	1991 - 2020	1991 - 2020
Monitored by	IRI	IRI	IRI
Programming and Funding			
Activity Package	Package 1	Package 2	Package 2
Probability of being met in a given year	39 46 **57** 68 75	43 50 **61** 71 79	18 29 **36** 43 54
Funding Amount	$5.25m	$9.5m	$9.5m
Expected Cost	$2.99m	$5.8m	$3.42m
Performance			
All Activations (%)	Valid: 31 43 **56** 69 80 False alarms: 69 57 **44** 31 20	Valid: 18 29 **41** 53 65 False alarms: 82 71 **59** 47 35	Valid: 10 25 **40** 56 71 False alarms: 90 75 **60** 44 29
All Shocks (%)	Detections: 75 89 **100** Misses: 25 11 **0**	Detections: 50 64 **78** 91 100 Misses: 50 36 **22** 9 0	Detections: 11 27 **44** 62 78 Misses: 89 73 **56** 38 22

Notes
Expected cost computed using most likely probability of activation (central value). Triggers 1 and 2 can reach their threshold and activate independently from one another. Trigger 3 can only be met if Trigger 2 was not met. See Annex for performance metrics per timepoint. Trigger performance assessed by comparing recommended activations with historical bad years (i.e., years with a shock). 'Bad years' were identified through convergence of evidence from data on cereal deficit, millet production, food insecurity, fodder needs, and farmer surveys.

Activation Scenarios

This section examines the likelihood of activation in a given year under various scenarios. The estimates are presented as confidence intervals to illustrate their inherent uncertainty. The graphs show how likely it is that a scenario will occur (darker inner band, 68% of years) as well as the highest and lowest probability that a scenario is to occur (full coloured band, 95% of years).

Activations	
Yearly Disbursements[1]	At least one: 64 71 **79** 86 93 None: 36 29 **21** 14 7
Disbursement Scenario Breakdown	
Full[2]	29 36 **46** 57 64
Package 1 only[3]	0 4 **11** 18 25
Package 2 only[4]	7 14 **21** 29 39

Notes
[1] Any: At least one trigger is met. None: No trigger is met.
[2] A full activation occurs when Triggers 1 and 2 are met, or when Triggers 1 and 3 are met, and both packages are disbursed.
[3] Package 1 is activated when Trigger 1 is met.
[4] Package 2 is activated when Trigger 2 or Trigger 3 is met. Historically Package 2 disbursement (19 instances) was triggered by the predictive trigger (Trigger 2) 89% of the time and by the observational trigger (Trigger 3) 11% of the time.

Technical Team

The Département de la statistique du Niger, the Direction de la météorologie nationale du Niger, IRI Columbia University, the World Food Programme, and the Food and Agriculture Orgnization have provided data and/or analytical support. A total of 9 historical occurrences of severe shocks were documented and used to develop the trigger mechanism. Historical data and analysis are available through IRI's Maproom tool. The triggers were developed by IRI in close collaboration with DMN, WFP Niger, and the Centre for Humanitarian Data with valuable input from participating agencies and OCHA.

Monitoring Process

Between January and June inclusively, the FIT team at IRI updates the forecast (Triggers 1 and 2) and the decision tool within Maproom by the 22nd of each month. Within 24 hours of the update, the IRI team notifies the AA team, the Niger Humanitarian Coordinator, and the Chief of CERF by email whether or not the trigger is met. By 7 August the Direction de la météorologie nationale du Niger will collate the rainfall measurements from the stations specified in the framework for the period 1 June - 31 July, and share them with the IRI FIT team. By 10 August the IRI FIT team will confirm the number of stations for which complete data is available; select ENACTS (80% or more available) or CHIRP (less than 80% available) accordingly; compute the SPI values and update Maproom. The IRI FIT team will then notify the AA team, the Niger Humanitarian Coordinator, and the Chief of CERF by email whether or not the trigger is met. In case of an activation, additional meteorological data will be shared by the DMN, the IRI FIT team, and/or Centre for Humanitarian Data to inform response targeting.

Learning Opportunities

This table summarises the decisions, assumptions, and open questions that arose during trigger development. They are documented for transparency and to inform the learning agenda.

Decision	Rationale	Assumption	Open Question
The trigger is designed at the national level.	Drought anywhere in the country should be able to trigger AA response.	The desert area will not cause the trigger to be met as it is always dry	Should a mask be applied over the desert area? Can the desert area reach very low levels of precipitation compared to its average and cause the trigger to be met?
The trigger is designed at the national level.	Drought anywhere in the country should be able to trigger AA response.	Smaller areas affected by drought can be detected by a national trigger.	Since the predictive trigger averages the forecast over the whole country, is it capable of detecting subnational droughts?
The trigger threshold is set at the national level.	A simpler trigger is clearer for all stakeholders to understand and easier to monitor.	The pluviometric differences between the country's climatic zones do not compromise the relevance of the threshold or the performance of the trigger.	Should distinct thresholds be set per climatic zone?
The observational trigger is based on early-season rainfall patterns.	Insufficient rainfall early in the season has significant impact on agricultural sector.	A delayed or slow start to the rainy season causes damage to crops even if the season ends up receiving normal amounts of rainfall. Therefore rainfall anomalies over June - July are an appropriate indicator on which to base the trigger.	Were the precipitation anomalies between 1 June and 31 July a reliable signal to act on?
The observational trigger is based on early-season rainfall patterns.	Insufficient rainfall early in the season has significant impact on agricultural sector.	Early August strikes a reasonable balance between giving time for the rainy season to begin and acting early enough to implement effective anticipatory actions.	Were the needed data available on time? Did the trigger provide enough lead time for activities to be implemented when effective?
A dataset that combines stallite and station data is more representative and better suited for AA than station-only data.	Station data by design reflect pluviometric patterns at the specific location where the station is located. Satellite data captures larger areas and can be adjusted with station data to improve their accuracy.	Hybrid datasets are more presentative and accurate than station-only or satellite-only datasets.	Are hybrid datasets more presentation and accurate than station-only or satellite-only datasets? Do hybrid datasets introduce biases compared to station-only or satellite-only datasets?
If at least 20% of station data is missing, satellite-only data will be used to evaluate the observational trigger.	Logistical challenges might delay the collection and transfer of station data, which are required to generate the ENACTS dataset. Using satellite-only data offers a backup not to prevent an activation if needed and under the scenario of incomplete station data.	The threshold of 20% is an adequate threshold. A secondary data source will prevent the inability to determine whether or not the framework should be activated due to a lack of data.	Should a back-up data source be planned for all triggers? Was the 20% threshold in this case an adequate threshold? Is a satellite-only dataset an adequate replacement dataset for a hybrid data source?

Annex

This table reports the performance metrics per activation timepoint for the triggers that have more than one opportunities for activation.

	January	February	March
Prob. being met (%)	18 25 **36** 43 54	18 25 **36** 46 54	18 29 **36** 43 54
All Activations (%)	Valid: 17 33 **50** 67 83 False alarms: 83 67 **50** 33 17	Valid: 50 67 **80** 92 100 False alarms: 50 33 **20** 8 0	Valid: 17 33 **50** 67 83 False alarms: 83 67 **50** 33 17
All Shocks (%)	Detections: 20 38 **56** 73 89 Misses: 80 62 **44** 27 11	Detections: 62 78 **89** 100 Misses: 38 22 **11** 0	Detections: 20 38 **56** 71 88 Misses: 80 62 **44** 29 12

	April	May	June
Prob. being met (%)	18 25 **36** 46 54	18 25 **36** 46 54	18 29 **36** 46 54
All Activations (%)	Valid: 17 33 **50** 67 82 False alarms: 83 67 **50** 33 18	Valid: 17 33 **50** 67 83 False alarms: 83 67 **50** 33 17	Valid: 17 33 **50** 67 82 False alarms: 83 67 **50** 33 18
All Shocks (%)	Detections: 20 38 **56** 73 88 Misses: 80 62 **44** 27 12	Detections: 20 38 **56** 73 89 Misses: 80 62 **44** 27 11	Detections: 20 38 **56** 73 88 Misses: 80 62 **44** 27 12