

## Background

- High annual rainfall variability combined with an increase in aridity in this region is cause for significant threats to food security and economic growth.
- Heavy precipitations in the Sahel received international media attention in 2007, 2008, 2009, 2010, 2012, and 2013 because it resulted in hundreds of casualties and hundreds of thousands of homeless people.
- In 2012, "more than 7.7 million people had been affected by the floods, and more than 2.1 had registered as IDPs. 363 people were reported dead, almost 600,000 houses had been damaged or destroyed. Out of Nigeria's 36 states, 32 [were] affected by the floods. (OCHA, 15 Nov 2012)



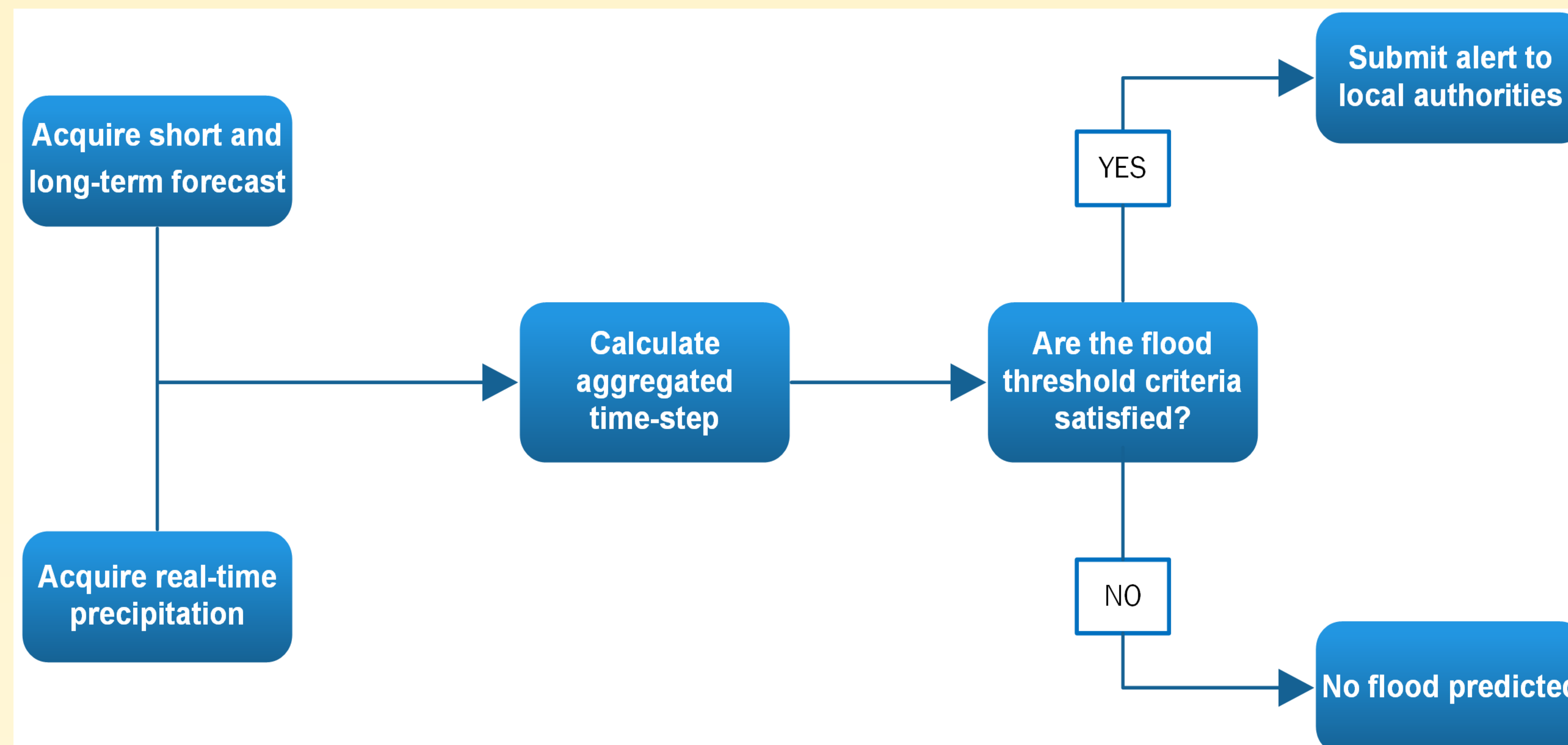
Source: Radio Netherlands Worldwide, 2012

## Objectives

- Develop a short and medium term flood forecasting model for the Niger River basin in Sahel, West Africa
- Develop a methodology to set a flood warning threshold for various countries in Sahel, Africa.
- The system must be compatible with the IT infrastructure in the region (inexistent or slow Internet connections, low quality field data, lack of highly qualified personnel)
- Collaborate with local engineers to provide emergency assistance to local citizens before disaster strikes.

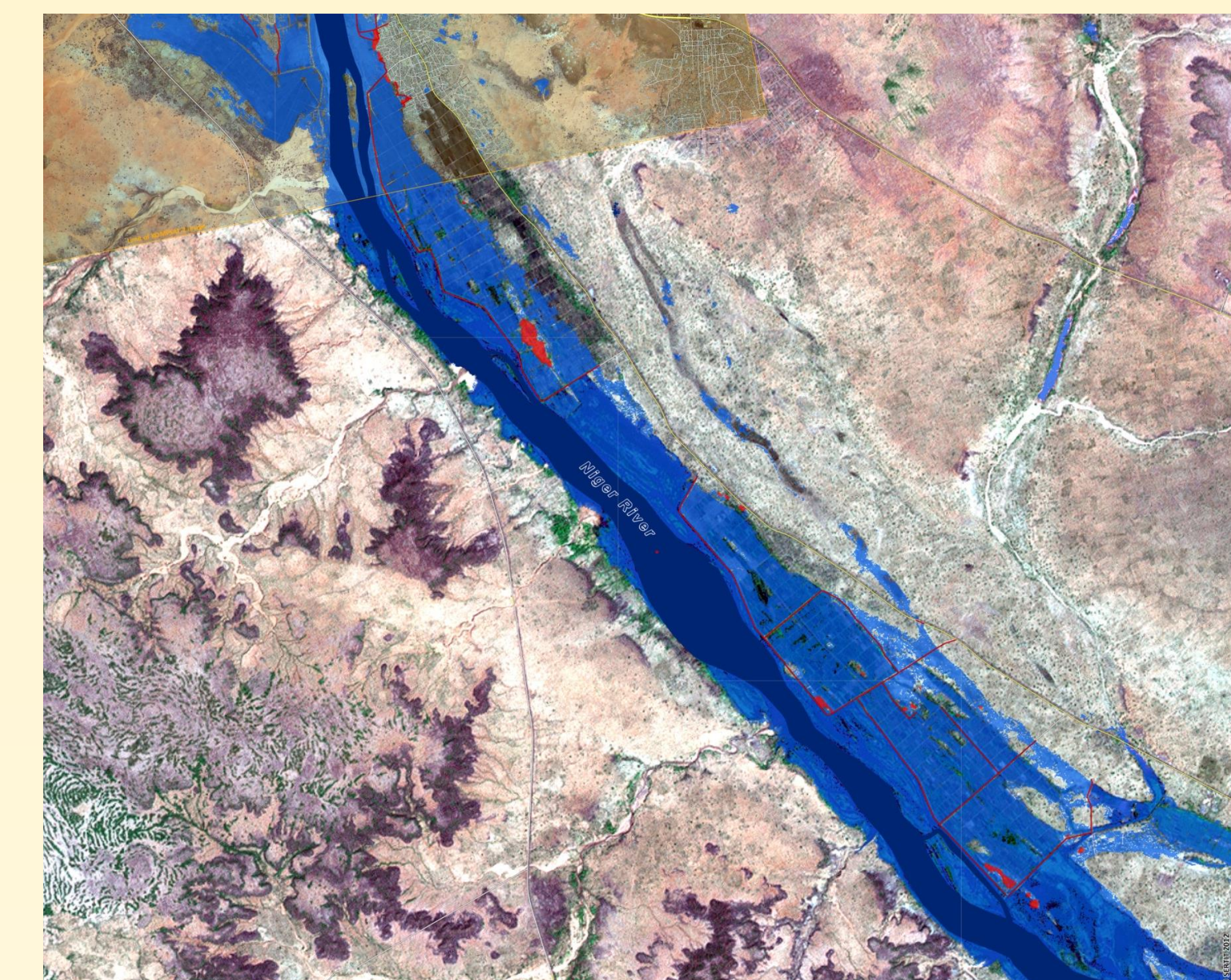
## Methodology

- Retrospective analysis of precipitations a few days before reported flood events.
- Matlab/Visual Basic programming is being used to evaluate correlations between cumulative rainfall, streamflow and flood events.



## Preliminary Results

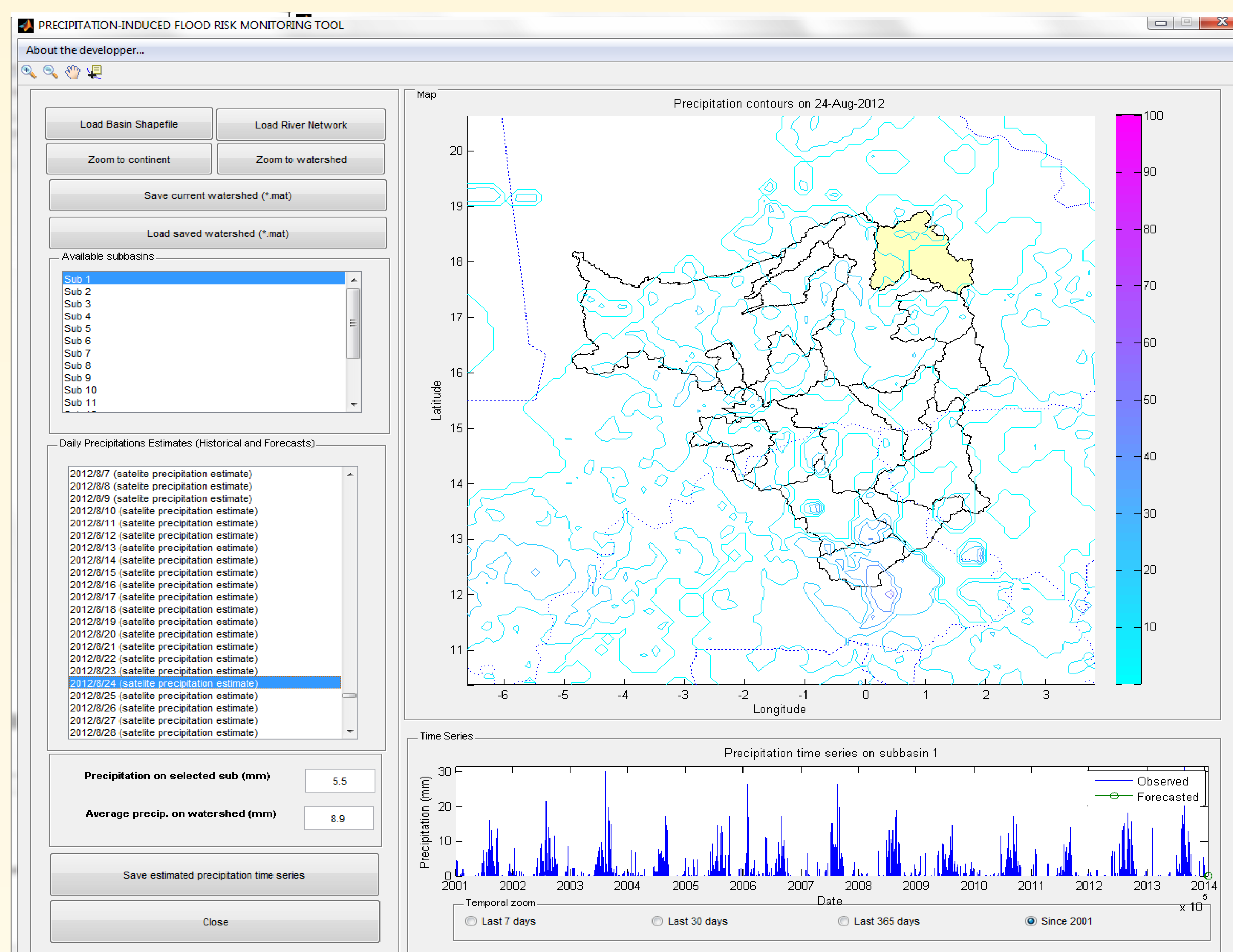
- Encouraging results that may lead to an operational flood forecasting system for 17 countries in Africa
- Current focus of the research is the determination of the threshold required to issue a flood warning
- Variables included in analysis
  - Soil conditions
  - Correlation between total rainfall and streamflow
  - Area of catchment areas in relation to total precipitation.



Taken August 29, 2012 (Source: Seriti, 2012)

## Real-time Flood Monitoring Tool

Allows engineers in 17 African countries to monitor heavy precipitations on any watershed of their choice



## Results

- Methodology for threshold analysis is updated.
- Correlation between historical precipitation and recorded flood events
- High level programming of analysis ready to be implemented when more flood event data is available.

## Future Directions

- Monitor future floods more accurately to aid in developing accurate flood thresholds.
- Criteria includes severity and speed of rising water levels.
  - Account for control measures of excess water to accurately depict effect of precipitation on stream levels.
  - Evaluate accuracy of forecasts using various indicators.
  - Develop and maintain good relations with chains of command in local African regions.