

Mitigating impacts of floods

Shared activity of CGIAR Research Programs on Water, Land & Ecosystems (WLE) and Climate Change Agriculture and Food Security (CAFS)

The challenge

One-third of the world's terrain is considered flood-prone, and 82% of the global population lives on this land. Floods, which are often seen as destructive, can also be beneficial and used for irrigation, flood recession farming and fisheries. Solutions to flooding issues can, if chosen wisely, yield significant benefits for drought protection, agricultural production and the functioning of ecosystems. In Africa, alone, floodplains are used by different communities in relation to inundation and recession of floodwaters for promoting forestry, crop cultivation, fisheries and livestock husbandry – in synchrony with annual inundation patterns.

If insurers could identify the recurring patterns of floods in a particular area, they could insure farmers against extreme weather events. So, they would know what to pay out in the case of an unexpected drought or a larger-than-usual flood that affected a farmer's harvest. This information assists communities in managing land development and businesses, and home owners in making better informed financial decisions regarding the protection of their property.

Further research is needed to provide the opportunity for disaster agencies/agricultural insurances to have (a) detailed high-resolution images; (b) land use classified in urban/industrial areas and settlements that are inundated, which were derived from up-to-date flood footprint satellites images; and (c) a robust flood algorithm and accurate digital terrain models to generate an overview of flooded areas quickly and precisely to facilitate damage assessment, better estimate risk in future and to prepare protection measures.



Did you know?

Floods have costs as well as benefits:

Costs - loss of life, disruption to livelihoods, disruption of transport, damage to infrastructure, loss of crops

Benefits - fisheries, soil fertilization, groundwater recharge, soil moisture and aquatic ecosystem

Spatial distribution of costs and benefits is very uneven. Example from Lower Mekong Basin:

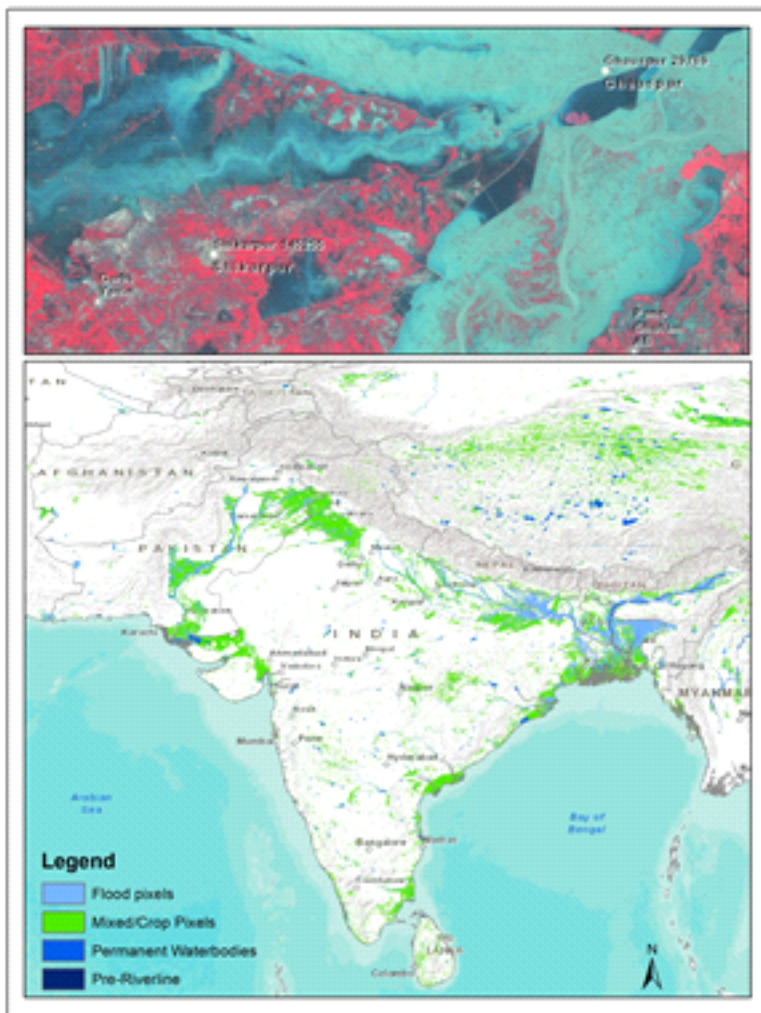
- Annual costs of floods USD 60-70 million.
- Annual benefits of floods USD 8-10 billion.

The objective

Provide regional and national decision-makers with accurate information to understand the benefits of inundation as well as the need to provide protection from the damaging impacts of floods.

Help farmers in selected areas to optimize the use of floodwaters for growing crops.

Assist insurance companies to assess/monitor risks when floods damage agricultural land.



Flooding in Pakistan 2010 captured using Landsat data (above) flood inundation mapping product for South Asia (below)

The solutions

Digital geospatial flood inundation mapping is a powerful new approach for flood response and mitigation that shows floodwater extent and depth on the land surface. Research will evaluate this new technology that is currently underway in Asia and Africa. As part of this effort, a prototype flood inundation mapping is being developed for the floods in South Asia.

The approach

A limitation of the global flood hotspots map was that it only pinpointed to the occurrence of a flood rather than showing the spatial extent of the floodwaters. As an extension of this work, the International Water Management Institute (IWMI) used remote sensing datasets for South Asia to analyze flooding patterns in this region in more detail. Based on this, IWMI will form partnerships with government agencies, disaster management centers and private insurers, so that these tools can be used in their decision-making processes. Such maps will assist these organizations in providing a consistent risk-based approach to sustainable development.

A number of products and services that are relevant to floods will be provided. Data provided by optical and radar satellites are used to generate maps of flood inundation in a short period of time. Optical satellites such as Moderate Resolution Imaging Spectroradiometer (MODIS), LANDSAT, Advanced Spaceborne Thermal Emission and Reflection Radiometer (ASTER), Indian Remote Sensing (IRS) satellite, etc., are easy to use and generally preferred to map flood-risk areas, damage and impact assessment. The advantage of radar images can be used in all weather conditions, and is highly suitable for flood mapping and ideal for flood monitoring, particularly in complex hydrologic.

Contact

Giriraj Amarnath
a.giriraj@cgiar.org
 International Water Management Institute (IWMI)
ccaafs.cgiar.org
wle.cgiar.org

Our partners

Ministry of Disaster Management and Relief; Agricultural Insurance; NGOs and specialized research institutions, such as the Hydraulic Research Centre (HRC) Sudan, Indian Council of Agricultural Research (ICAR) and Agriculture Insurance Company of India Limited (AIC).

Current donors

CGIAR Research Program on Climate Change, Agriculture and Food Security (CCAafs); International Fund for Agricultural Development (IFAD). CGIAR Research Program on Water Land and Ecosystems (WLE)



RESEARCH PROGRAM ON
 Water, Land and
 Ecosystems



RESEARCH PROGRAM ON
 Climate Change,
 Agriculture and
 Food Security



Led by

