

Water and Disasters Tools and Development across the SERVIR program and lessons-learned within the Hindu Kush Himalayan region

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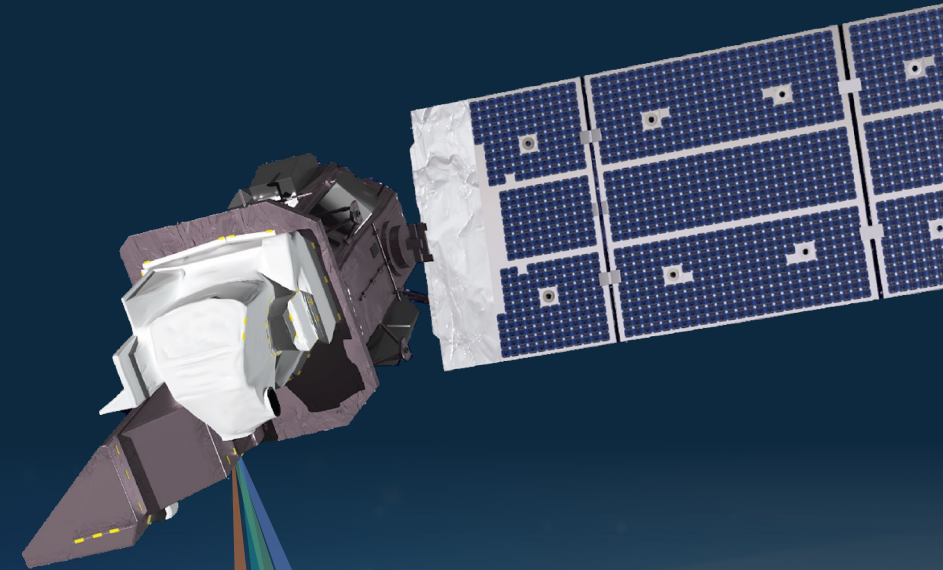
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CONNECTING SPACE TO VILLAGE



SERVIR is a joint initiative of NASA, USAID, and leading geospatial organizations in Asia, Africa, and Latin America that partners with countries and organizations to address challenges in climate change, food security, water and related disasters, land use, and air quality.

Using satellite data and geospatial technology, SERVIR co-develops innovative solutions through a network of regional hubs to improve resilience and sustainable resource management at local, national and regional scales.



CONNECTING SPACE TO VILLAGE



Agriculture &
Food Security



Water & Water-
Related
Disasters



Land Cover, Land Use
Change &
Ecosystems



Weather &
Climate



USAID
FROM THE AMERICAN PEOPLE



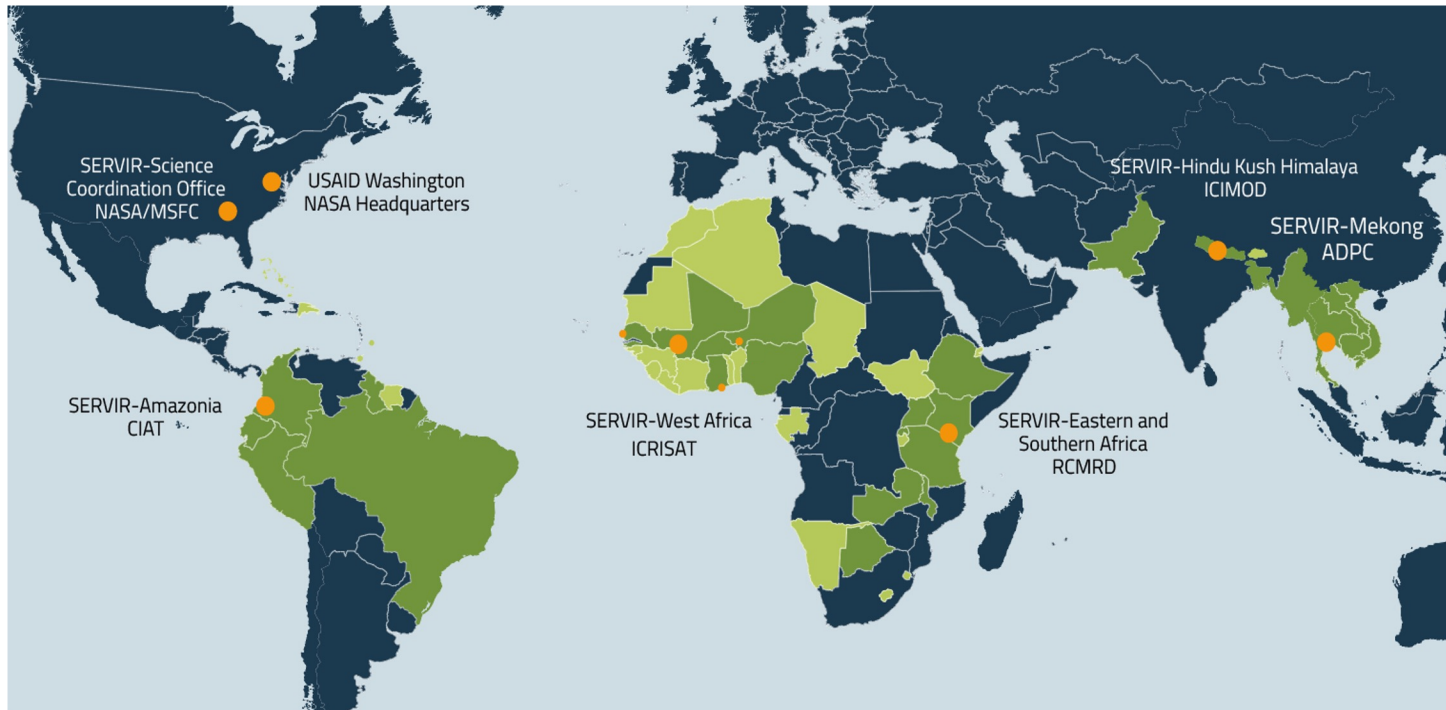
SERVIR



Water and water-related disaster services

Improving Resilience and Reducing Risk of Extreme Hydrological Events ²

**Satellite-Based Water Quality Monitoring Service
Regional Stream Flow Monitoring and Forecasting Service ^{1,2,3,#}**



Enhancing Flood Early Warning Services in the Hindu Kush Himalaya ^{2,3}

**Improving the Mekong River Commission's Regional Flood Forecasting ^{2,3}
Supporting Better Riverine and Flash Flood Forecasting for the Lower Mekong ^{2,3}
[in dev] Enhancing landslide mapping and regional cooperation in the Lower Mekong ³**

**Monitoring Ephemeral Water Bodies in Ferlo, Senegal ²
Development and Management of Groundwater Analysis and Information System in Niger ^{2,3}
[in dev] Improvement of Flash Flood Risk Management in West Africa and the Sahel**

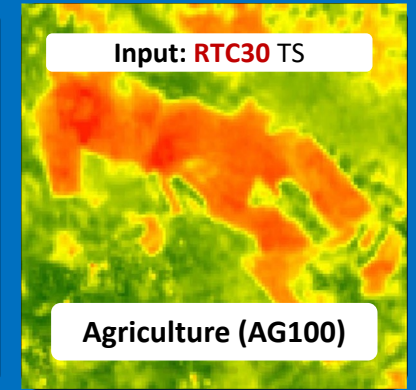
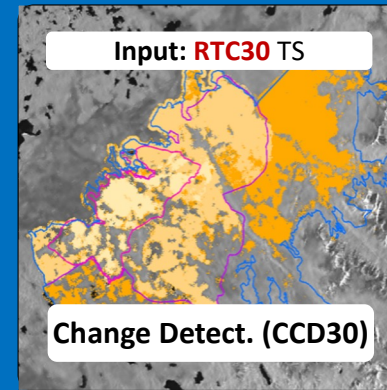
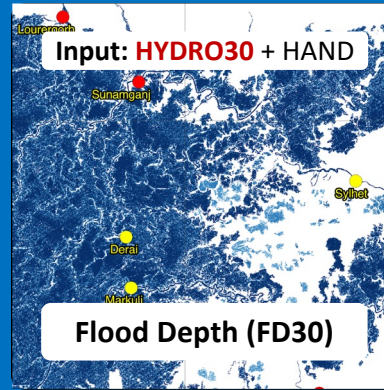
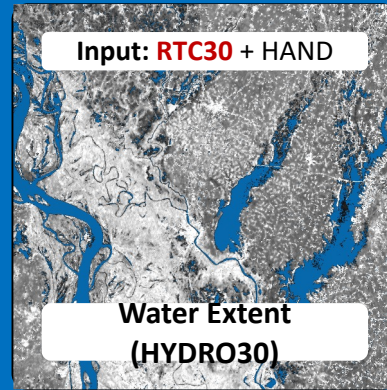
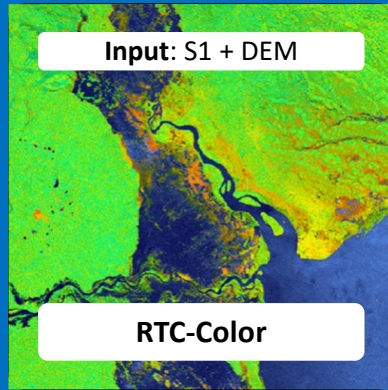
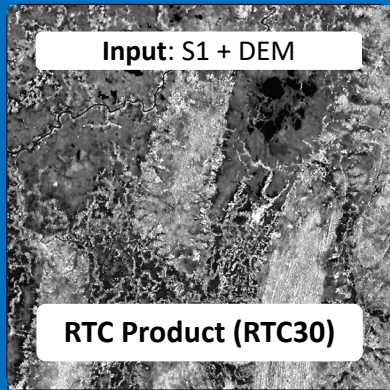
Co-developed with SERVIR Applied Sciences Team (AST),
Round #:

¹ AST-1; ² AST-2; ³ AST-3; * inactive;

Split in process to distinguish water permitting from flood forecasting decisions and actions

HydroSAR is a NASA-Funded Project to Develop Products, Tools & Services to Support Monitoring Hydrological Hazards

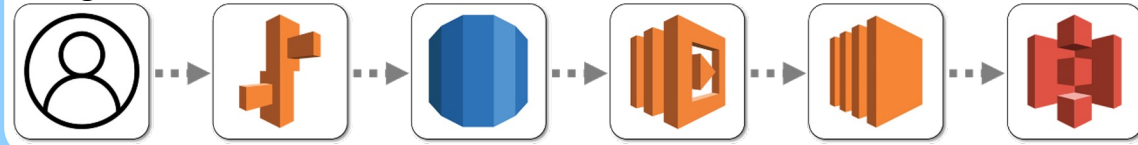
SAR-based value-added products



Cloud-based Computing and Web Tools

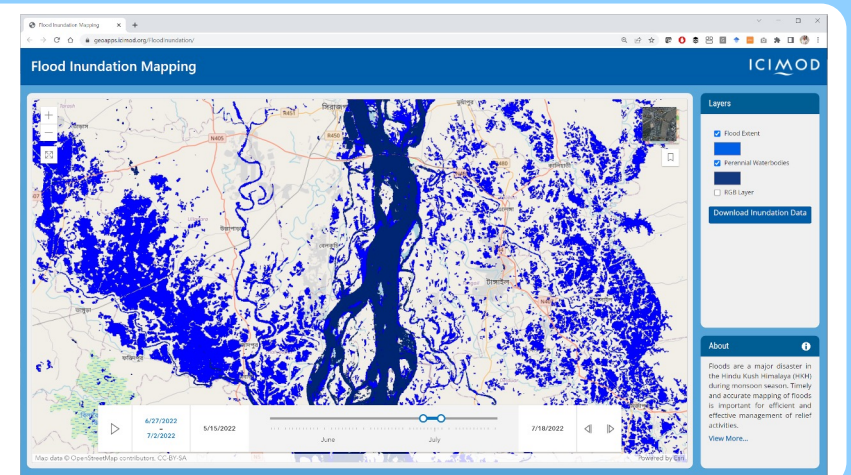
Automatic Cloud-based Production Pipelines

Exercising mature algorithm large scale using cloud-based workflows



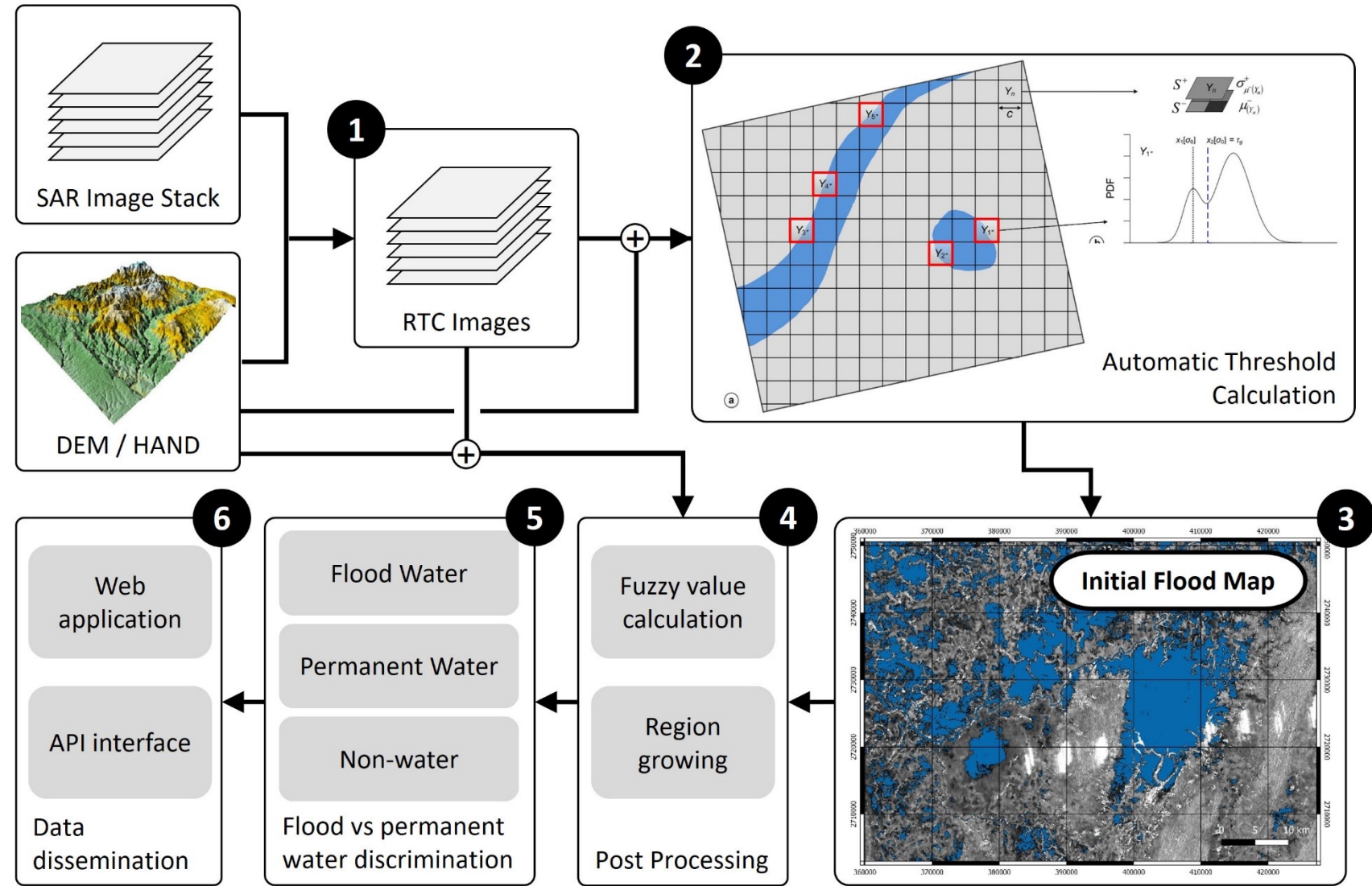
ICIMOD
Web
Resources

Interface and RDS
Services



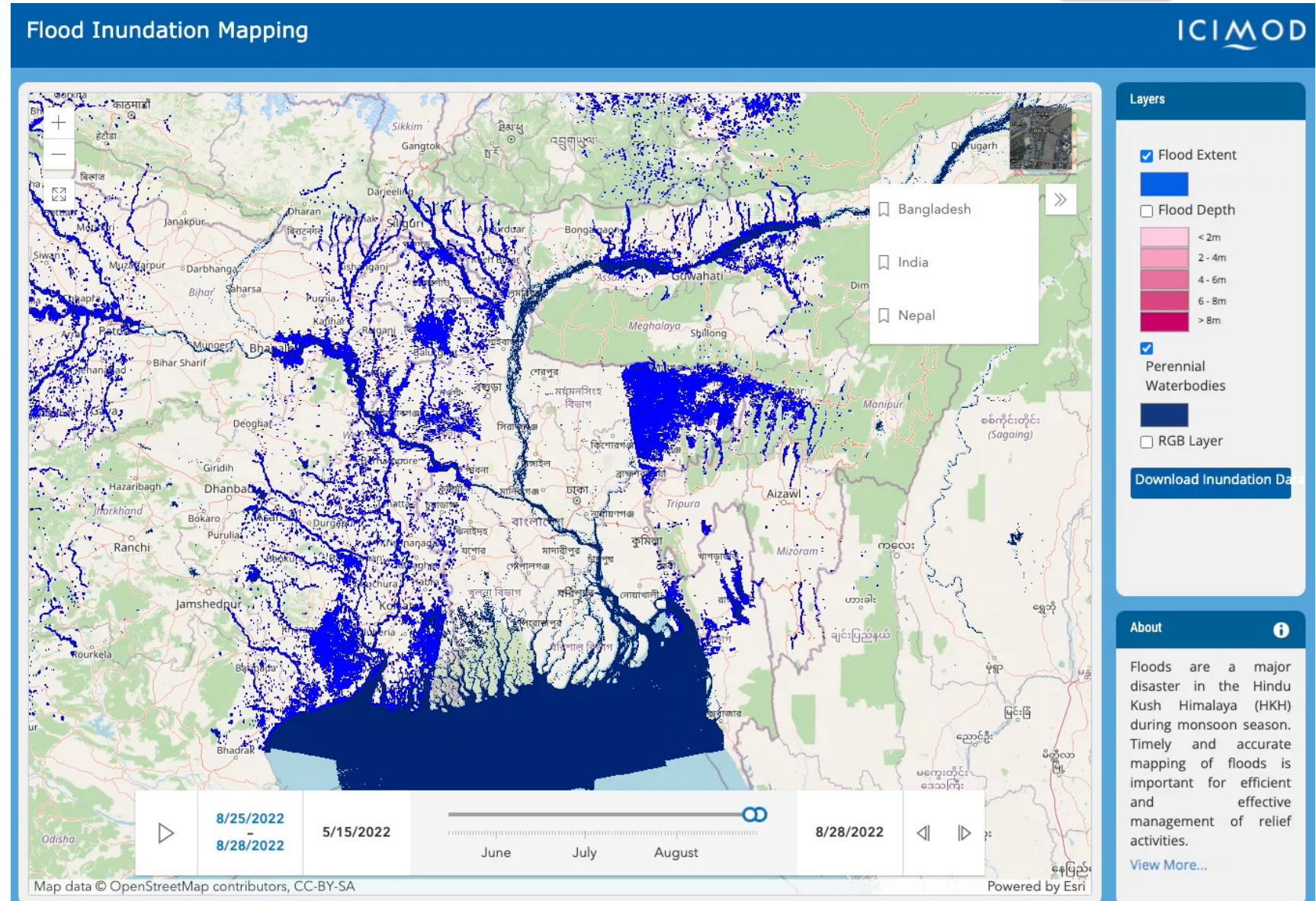
HydroSAR water mapping approach composed of 6 steps:

1. Image Geocoding and Calibration (RTC Processing)
2. Automatic and adaptive threshold calculation
3. Initial flood map creating
4. Post-processing to remove false alarms
5. Discrimination of permanent and flood-related water
6. Data dissemination



Product Availability in Region

- ▶ Data served through AWS bucket
- ▶ ICIMOD ingests and developed their own ESRI Service
- ▶ Data is served out as:
 - ▶ Web-based app,
 - ▶ Rest-end point services for ingest into DSS,
 - ▶ Downloadable geotiffs for additional analysis

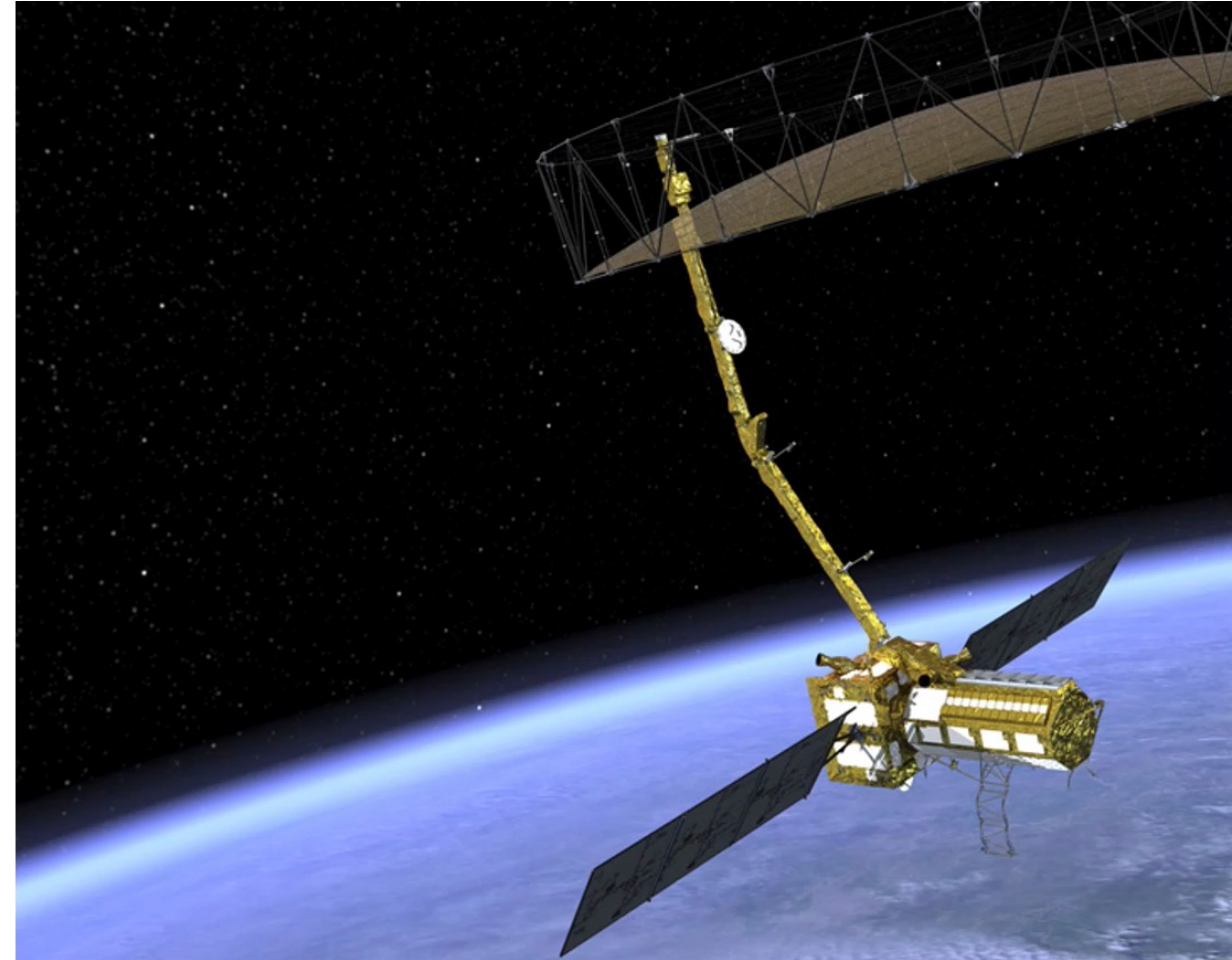


What did we learn?

- ▶ Users compared to multiple ancillary data layers
- ▶ Definition of permanent water varies
- ▶ Web-map interactions versus importing to own decision support system
- ▶ Levels of analysis
- ▶ Projections

Application
of HYDRO30
& FD30
tools

ICIMOD



Linking global forecasts and community-based early warning systems: CBFEWS

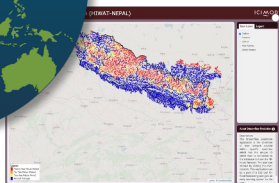
The Government of Malawi is using a [Community-Based Flood Early Warning System \(CBFEWS\)](#) to warn communities of flooding around the Phalombe River.

CBFEWS pairs ground observation with satellite data from the GEO Global Water Sustainability (**GEOGloWS**) initiative to provide up to 15-day flood forecasts.

The service was designed with expertise from SERVIR's Eastern and Southern Africa and Hindu Kush-Himalaya hubs—the latter having previously designed CBFEWS programs in Nepal. It is funded and implemented by the UN Development Programme (UNDP) and other regional partners.



Scaling Streamflow Prediction Around the World from Nepal



The Streamflow Prediction Tool supports official flood bulletins in Nepal, and has been adapted for other parts of the world through GEOGLOWS

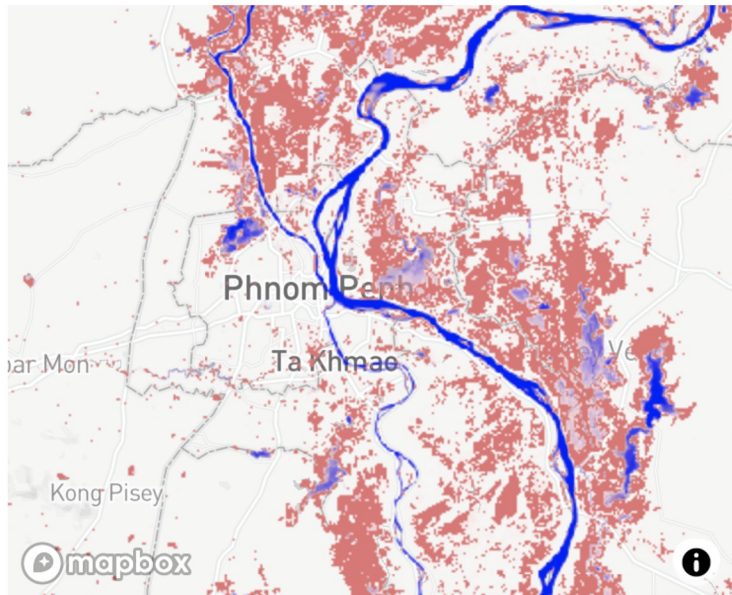
The success of this effort “will save lives and property in these flood-prone areas” when the next major flood occurs.

- Fedson Chikuse, Deputy Director of Malawi’s Department of Disaster Management Affairs says

Getting ahead of flood impacts on food security in Cambodia: a HYDRAFloods-PRISM use case

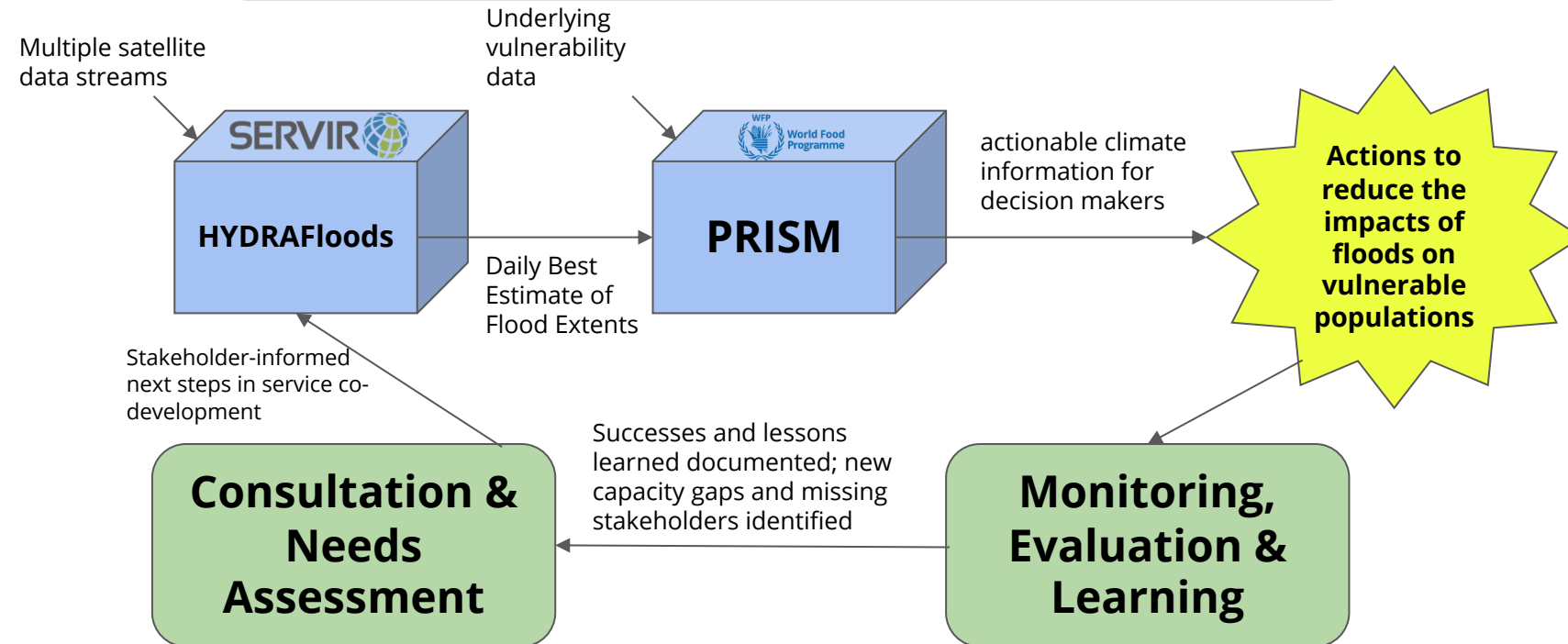
- HYDRAFloods is a multi-sensor NRT flood mapping tool.
- SERVIR and WFP co-developed this tool to inform disaster managers' decisions to reduce

Floods in Phnom Penh, Cambodia | 25 October 2021



Service Design & Delivery: linking EO services to flood early action, and back again

(products, tools, documentation, training, demonstrations, consultation throughout, strengthening capacity of mandated organizations)



Next steps



- How do the AST projects under water and disaster theme work to support each other and thus other hubs
 - Co-development across hubs to develop more robust product
 - Does this further the science? Use cases are usually slightly different, yet increased capacity is the result
 - Combine seemingly different projects – advances the science and leads to increased partnership
- Continued collaboration in Anticipatory Action / Forecast-based Financing
 - Roles for EO in the **design, operation, and evaluation** of flood AA programs
 - designing impact-based triggers
 - tailoring global and regional forecasts for local AA/FbF anticipatory action
 - evaluating the effectiveness of AA/FbF programs
- The need for regional and local tailoring (customization) isn't going away = continued role for capacity builders and boundary organizations