

Mapping Floods and Green Infrastructures from space for improving Nature-Based Solutions

Miguel A. Belenguer-Plomer, PhD
Indra

1. GDA and NBS collaboration

2. GDA's EO-based products

2.1 Urban Green Infrastructure

2.2 Flood Maps

3. NBS in Thailand

4. Remarks

1.1 GDA Context



Global Development Assistance – is a global partnership to mainstream the use of **Earth observation** (EO) into development operations



Partnership with key **International Financial Institutions** (IFIs) – World Bank and Asian Development Bank

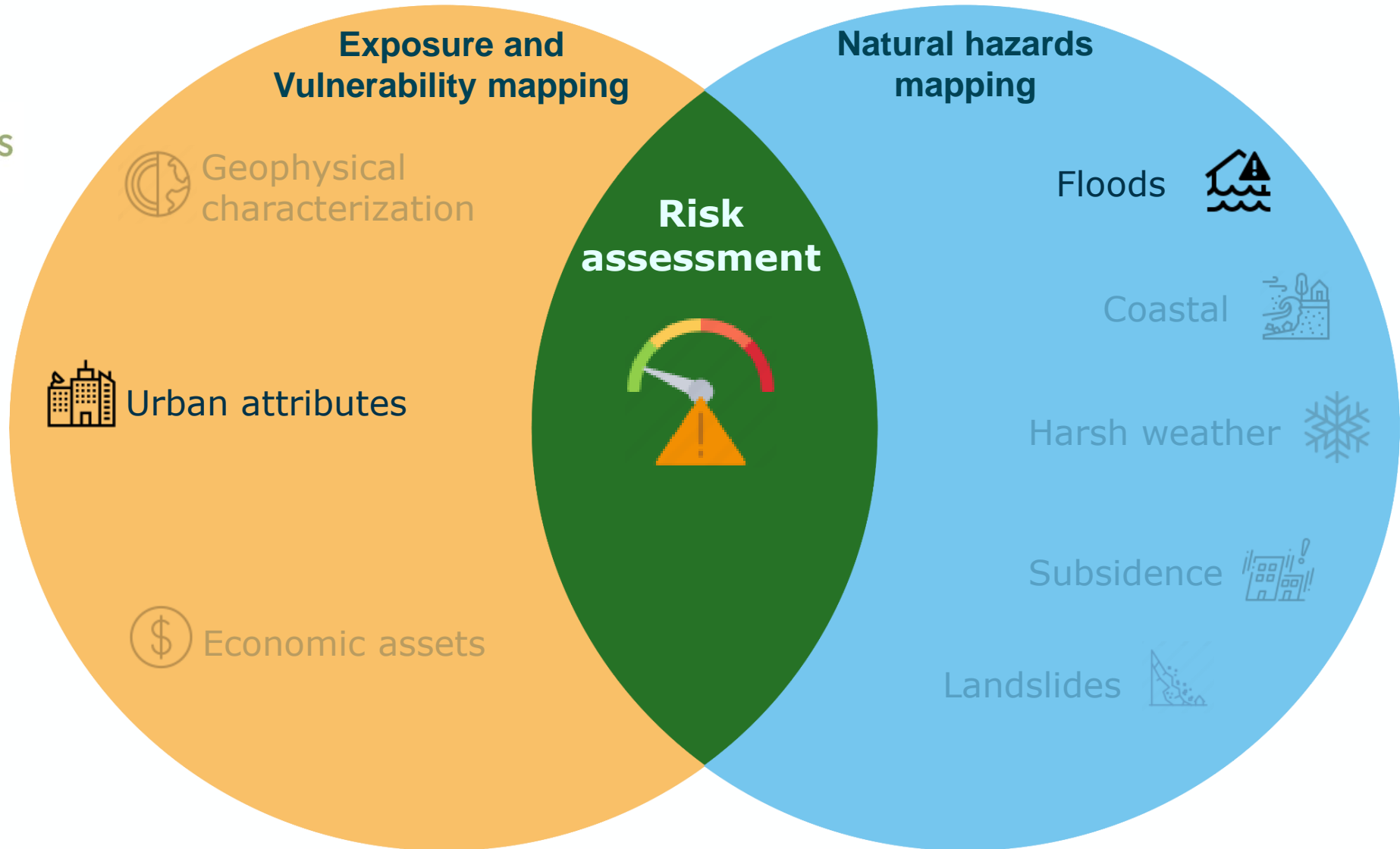


Collaboration between WB Nature-Based Solutions and GDA **Disaster Resilience**



1.2 GDA Disaster Resilience and NBS

GLOBAL PROGRAM ON
NATURE-BASED SOLUTIONS
FOR CLIMATE RESILIENCE



indra

cim

ARGANS

LIST

TERRAUE

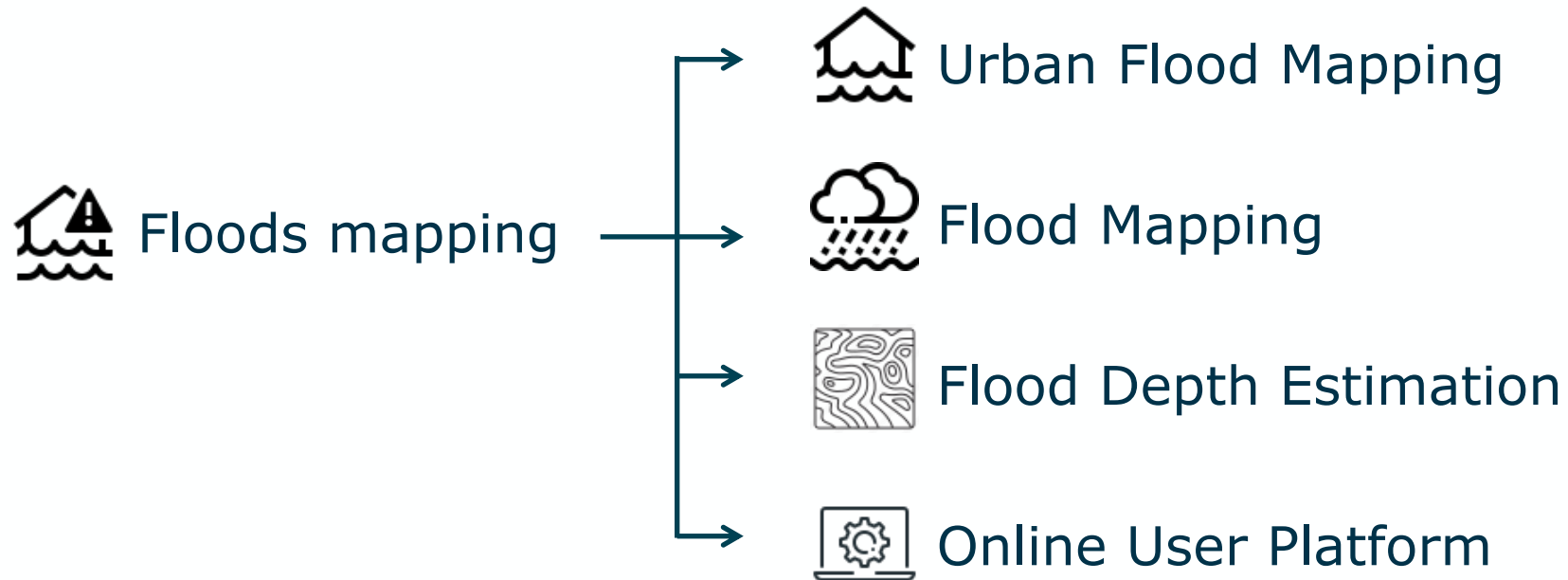
DLR

gisat

planetek
italia

ZAMG

1.2 GDA Disaster Resilience and NBS



1. GDA and NBS collaboration

2. GDA's EO-based products

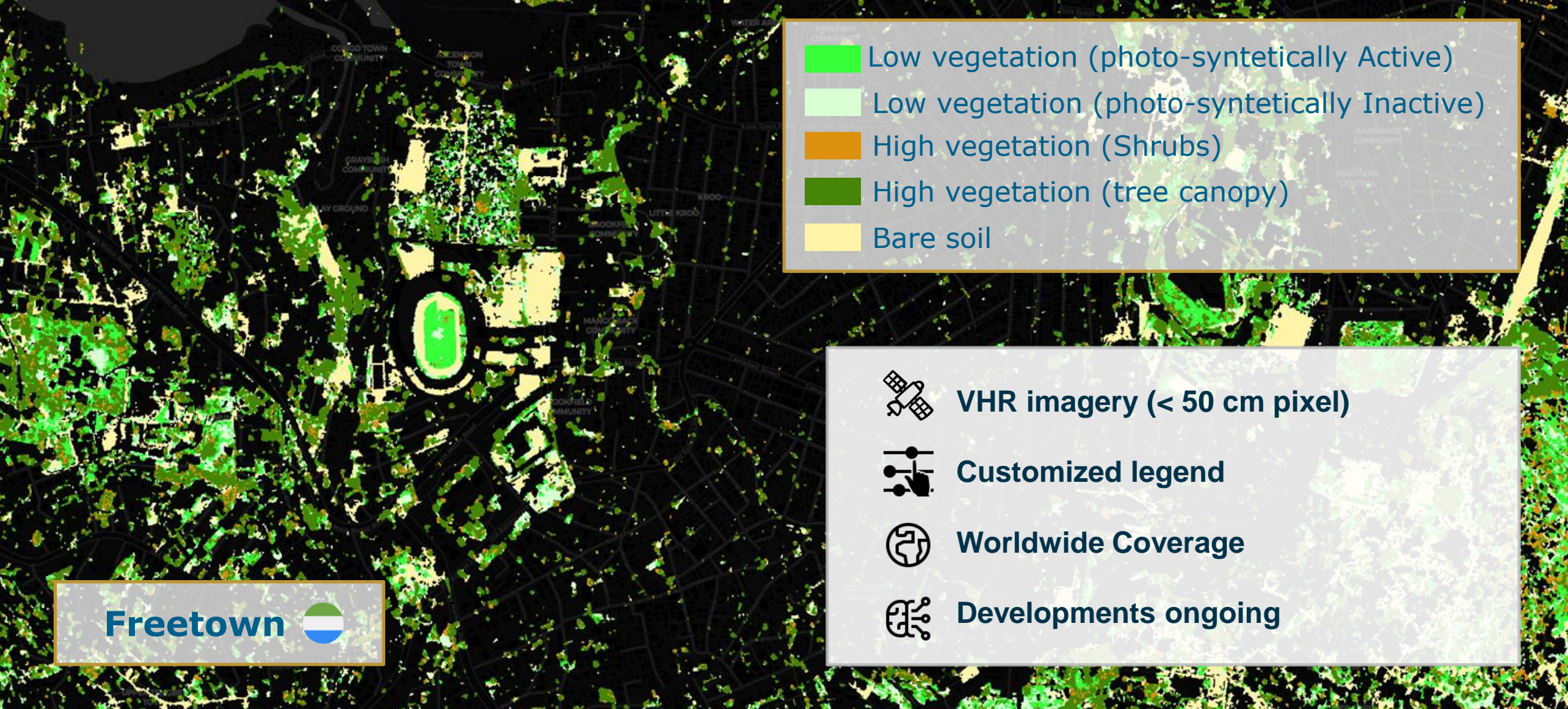
2.1 Urban Green Infrastructure






2.2 Flood Maps

3. NBS in Thailand

4. Remarks

2.1 Urban Green Infrastructure




-  Low vegetation (photo-syntetically Active)
-  Low vegetation (photo-syntetically Inactive)
-  High vegetation (Shrubs)
-  High vegetation (tree canopy)
-  Bare soil

-  **VHR imagery (< 50 cm pixel)**
-  **Customized legend**
-  **Worldwide Coverage**
-  **Developments ongoing**

Freetown 

2.2 Flood Maps: Urban and non-urban mapping

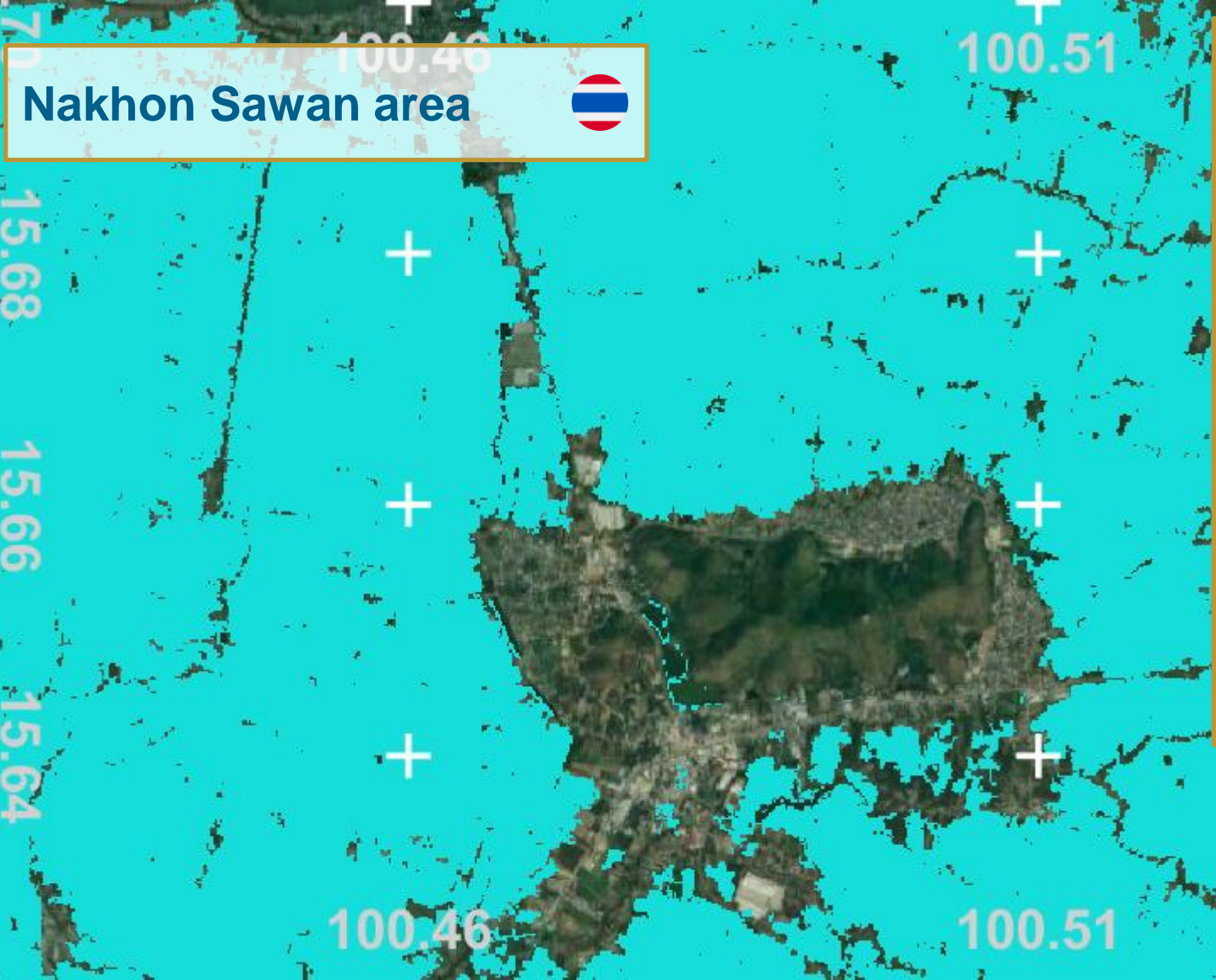








Nakhon Sawan area 

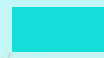


EPSG:4326

2.2 Flood Maps: Urban and non-urban mapping








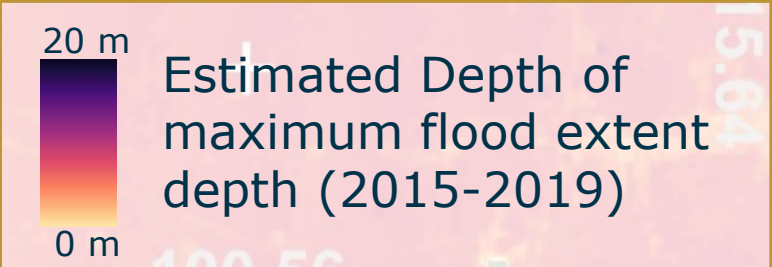
-  **Sentinel-1 and -2 combination**
-  **Specific algorithm to process urban areas based on SAR coherence**
-  **Non-urban processed using optical and backscatter coefficient**
-  **Unaffected by clouds**
-  **Worldwide coverage at 10 m pixel spacing**
-  **2015 - onwards**

 **Maximum flood extent (2015-2019)**

2.2 Flood Maps: Flood Depth Estimation

Nakhon Sawan area 

-  **Sentinel-1 and -2 combination-based flood maps**
-  **Digital Elevation Models**
-  **Unaffected by clouds**
-  **Worldwide coverage at 30 m pixel spacing**
-  **2015 - onwards**



EPSG:4326

1. GDA and NBS collaboration

2. GDA's EO-based products

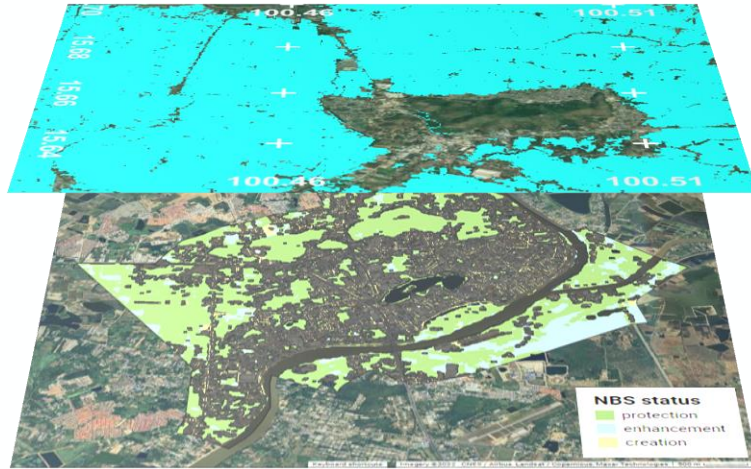
2.1 Urban Green Infrastructure

2.2 Flood Maps

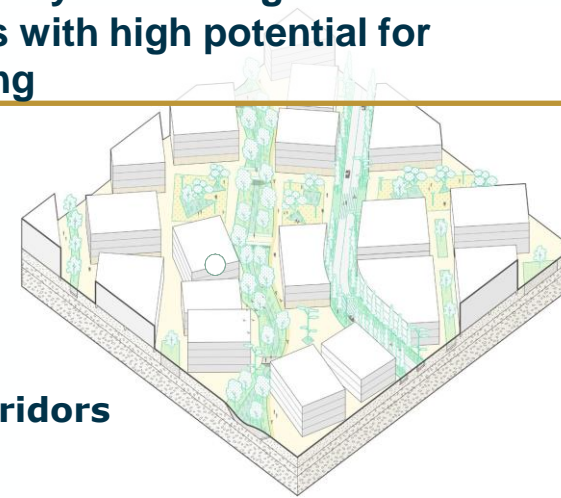
3. NBS in Thailand

4. Remarks

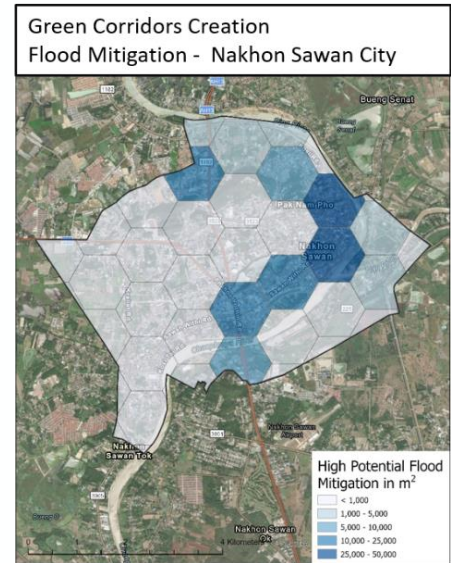
3. NBS in Thailand



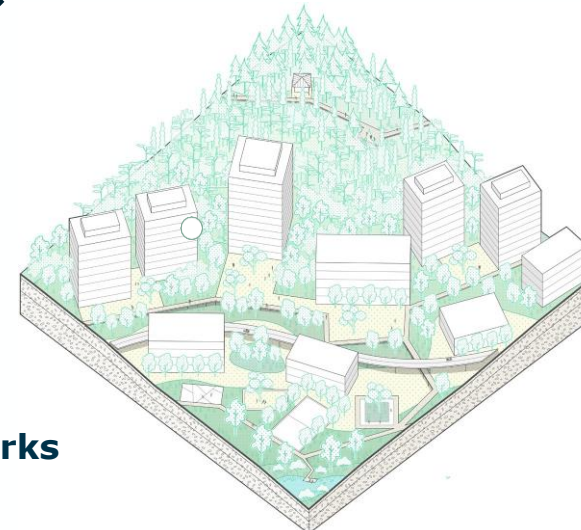
Identify opportunity areas for green corridors and urban parks with high potential for reducing flooding



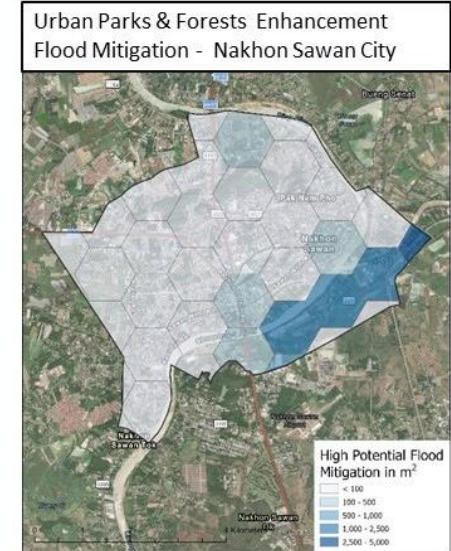
Green corridors



Opportunity mapping
 Overlay flood extents derived from Sentinel-1 and -2 with suitable areas for protecting, enhancing and creating NbS



Urban parks



1. GDA and NBS collaboration

2. GDA's EO-based products

2.1 Urban Green Infrastructure

2.2 Flood Maps

3. NBS in Thailand

4. Remarks

4. Remarks



EO-based flood products were used to identify areas where specific NBS types, such as green corridors and urban parks, would potentially contribute **to reducing flood risk**



A spatial overlay and simple runoff reduction model are used to estimate **effectiveness of different solutions** at neighbourhood level



Products used as input to a **cost-benefit analysis** for the different solutions, considering other important benefits such as recreation, air quality regulation and cost of not using the land for development



GDA has allowed to the consortium to demonstrate its potential to transform satellite data into valuable information for NBS purposes



Thank you

Contact:

mabelenguer@indra.es

Disaster Resilience

GDA

Global Development Assistance

GDA AID

Agile EO Information Development