Activities of Asian Institute of Technology (AIT)

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Introduction

- Asian Institute of Technology (AIT) was established in 1959 as an international institute for higher learning
- Geoinformatics Center is based in AIT
- Over 1,600 Graduate students from 40+ countries in AIT
- 14,000 alumni from 74 countries
- 22,000 short-term trainees from 71 countries
- 100+ faculty members from 20+ countries

GIC-AIT Offers a Wide Range of Expertise

REMOTE SENSING & GIS APPLICATIONS

- Satellite and drone-based mapping
- Machine Learning and AI based Applications
- Web-GIS based platform development
- Mobile Apps development for crowd-sourcing
- IOT for geospatial applications
- GNSS applications and tools
- Data analytics

AGRICULTURE

- Crop mapping and monitoring
- Development of agriculture related web-based platforms
- Agro-ecological zoning and crop suitability mapping
- Agriculture statistics
- Climate downscaling

DISASTER MANAGEMENT

- Post-disaster satellite data processing for response
- Multi-Hazard Risk Assessment
- Development of DSS for disaster management
- Land stability monitoring
- Weather Insurance Index
- Technical Assistance Missions and Capacity Building

ENVIRONMENT

- Drought mapping
- Land cover mapping
- Biomass estimation
- Land-based plastic pollution

CAPACITY BUILDNING

- Tailor made trainings
- On-line learning
- Knowledge and technology transfer through consultancy

Post-disaster Satellite Data Processing - SA/IDC Activations (2022 Feb to 2022 Oct)

No.	Activation.ID	Occurrence	Activation	Country	Disaster type	# VAP(s)
1	435	2022 Feb 10	2022 Feb 11	Thailand	Oil Spill	-
2	436	2022 Feb 24	2022 Mar 03	Thailand	Flood	2
3	438*	2022 Apr 12	2022 Apr 11	Philippines	Flood	1
4	439	2022 May 15	2022 May 20	India	Flood	3
5	440	2022 May 23	2022 May 27	Indonesia	Flood	2
6	441*	2022 Jun 05	2022 Jun 13	Philippines	Volcano	-
7	442	2022 Jun 15	2022 Jun 21	India	Flood	2
8	443*	2022 Jun 18	2022 Jun 23	Bangladesh	Flood	1
9	444*	2022 Jun 22	2022 Jun 27	Afghanistan	Earthquake	1
10	445	2022 Jul 07	2022 Jul 07	Vietnam	Flood	-
11	446*	2022 Jul 12	2022 Jul 13	India	Flood	2
12	447*	2022 Jul 12	2022 Jul 13	India	Flood	2
13	448	2022 Jul 27	2022 Jul 27	Philippines	Earthquake	1
14	449	2022 Aug 17	2022 Aug 18	Pakistan	Flood	3
15	450	2022 Aug 23	2022 Aug 23	Philippines	Flood	-
16	451	2022 Aug 23	2022 Aug 24	India	Flood	-
17	452	2022 Sep 05	2022 Sep 05	China	Earthquake	-
18	453	2022 Sep 17	2022 Sep 18	Taiwan	Earthquake	-
19	454	2022 Sep 25	2022 Sep 25	Philippines	Flood	1
20	455	2022 Sep 28	2022 Sep 26	Vietnam	Flood	2
21	458**	2022 Oct 19	2022 Oct 02	Thailand	Flood	5
22	789**	2022 Oct 29	2022 Oct 29	Philippines	Tropical Cyclone	2

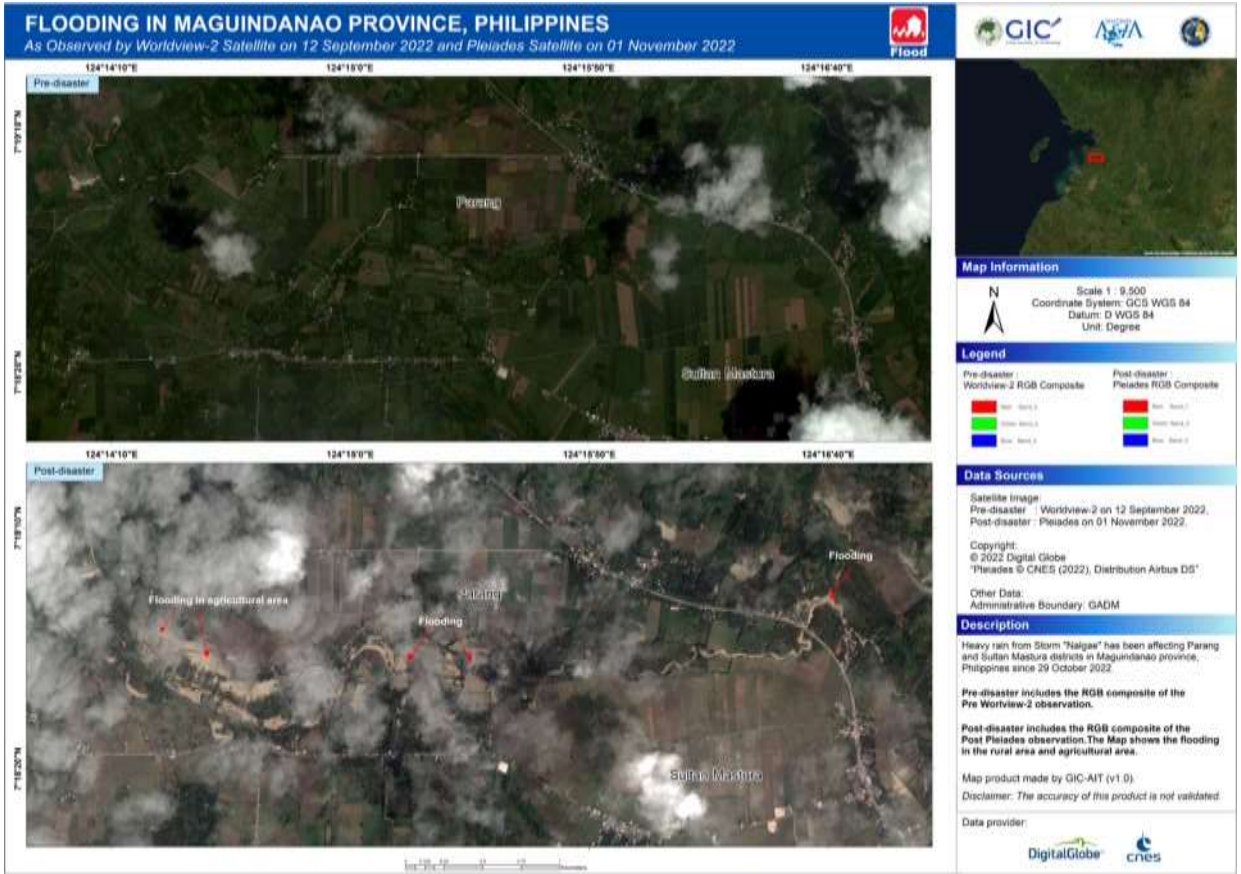
Emergency Response to Flood in Pakistan (30 Aug. 2022)

21st August 2022

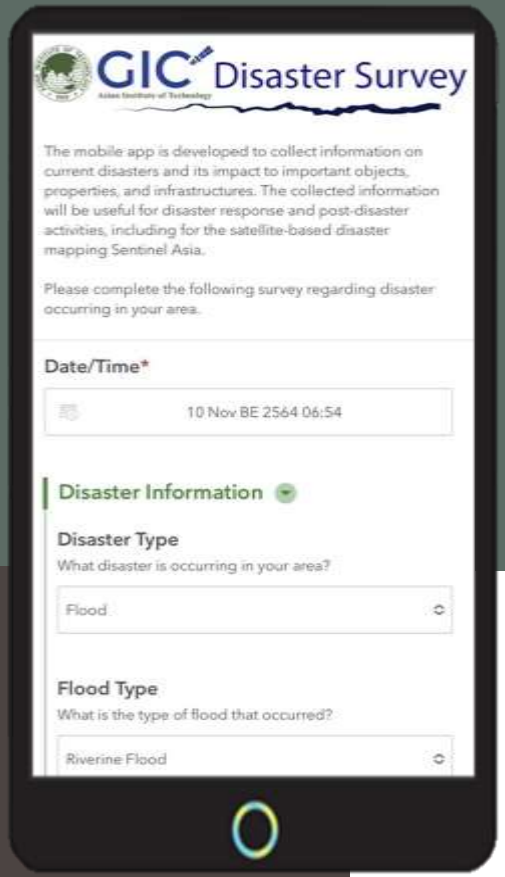
31st August 2022

ALOS-2 PALSAR-2 Data provided through Sentinel Asia Initiative was used to detect flood in Pakistan

Emergency Response Tropical Storm Nalgae in the Philippines (29 Oct. 2022)



Disaster Survey Mobile Application



The survey application can be accessed using a web link or a QR code

https://arcg.is/1HWGWX0

Ayutthaya Thailand flood in 2021

Building Reconstruction Monitoring Using VHR (30 cm) Data

Palu Central Sulawesi, Indonesia

T0: Before earthquake

T1: Damaged/Destroyed

T2: Repaired/Replaced

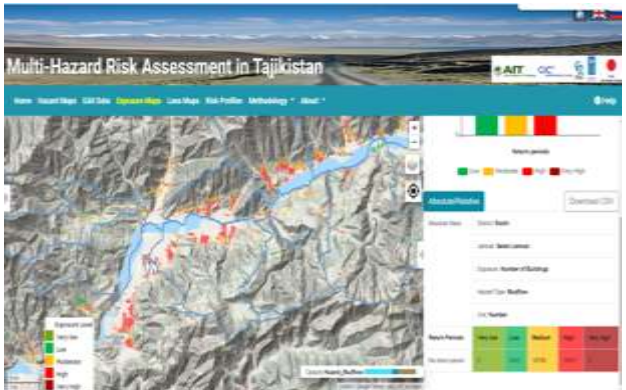
Summary of Building Reconstruction Monitoring

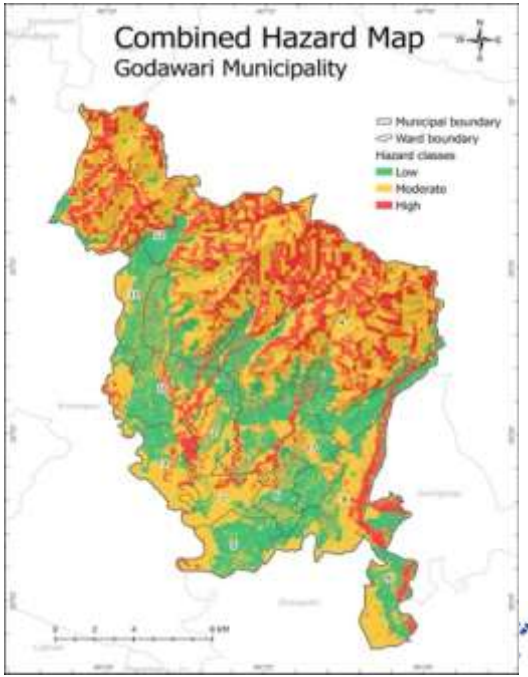
Category	AOI		
	T1 Copernicus **Oct. 2018**	T2 EOS4D **Nov. 2019**	T3 AIT **Apr. 2021**
Damaged/Destroyed	3,578	556	104 ↓
Demolished/Abandoned	0	2,087	1,147 ↓
New	0	992	2,856 ↑
Repaired/Renovated	0	935	1,259 ↑
Replaced	0	-	602 ↑

- The number of damaged buildings have decreased very significantly - 85% in Nov. 2019 and a 97% in Apr. 2021.
- The construction of new buildings have greatly increased – from 992 in Nov. 2019 to 2,856 in Apr. 2021
- Repaired or renovated buildings have also increased - from 935 in Nov. 2019 to 1,259 in Apr. 2021.

Multi-Hazard Risk Assessment

(1) Caribbean Handbook on Risk Info. Management – Regional (WB, 2016)
(2) Multi-hazard Risk Assessment in Tajikistan – National (UNDP, 2021)
(3) Developing Risk Sensitive Land Use Plan (RSLUP) – Local (USAID, 2022)





Challenges in Multi-Hazard Risk Assessment

- **Lack of multi-hazard risk assessment tools for local level use**
- **Often too complex**
- **Too data intensive**
- **Some are country or region specific**
- Some of them require to link with specific software and data
- Required software are not available or maintained
- No multi-hazard interactions to provide loss and risk info.
- Do not include risk reduction alternatives
- Do not include future scenarios

InaSAFE

RiskScape

OPENQUAKE
calculate share explore

CAPRA
Probabilistic Risk Assessment Platform

Development of RiskChanges (http://riskchanges.org)

What is it about?

In order to understand more about the tool and the various components, the best is to follow the tutorial video below, which will explain the basics of the systems and the various components. Throughout the system there will be similar videos that explain how the individual components work.

Watch video tutorial

RiskChanges

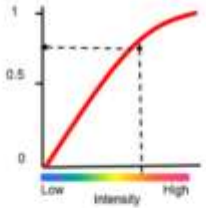
An open-source Spatial Decision Support tool for the analysis of Dynamic Multi-Hazard risk
Visualize and compare your results in different ways

You need to log in

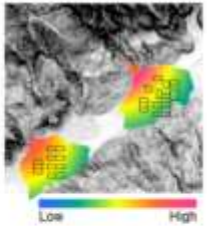
The tool allows you to do the risk calculation in the cloud, and you can store your own data (up to a maximum of 1 GB) for free. You can create a project and collaborate with other colleagues on the project. For this you need to have your own user account. You can be an administrator (create and your own projects) or normal user.

Watch video tutorial

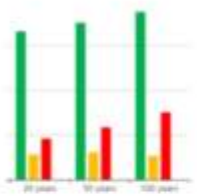
Data Management
Upload your own data hazard data, asset data and administrative units, using shapefiles or GeoTiffs. Or link to web-databases



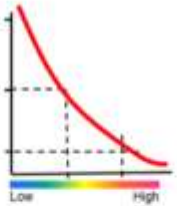
Vulnerability Curves
Upload or create your own curves, or use existing ones from a database for different hazard types



Exposure Analysis
Calculate the hazard intensity for individual asset components. Can be used as basic risk maps if no other data is available



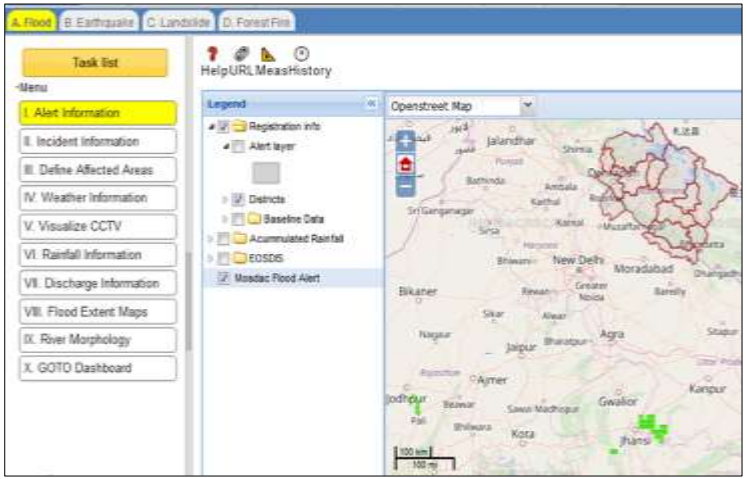
Loss analysis
Calculate losses by integrating exposure and vulnerability for specific combinations of hazards and assets. For individual units, or aggregated in administrative units



Risk Analysis
Calculate single or multi-hazard risk. Define hazard interactions. Using risk curves

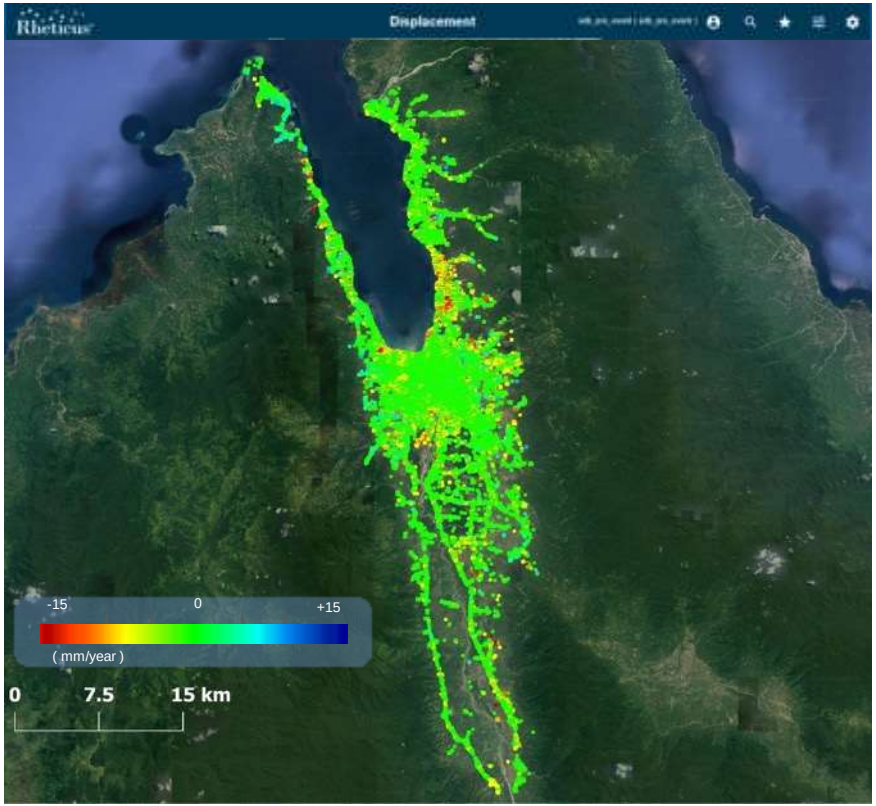
Visualization
Visualise single or multiple input maps, exposure and risk maps

Development of DSS for Disaster Management

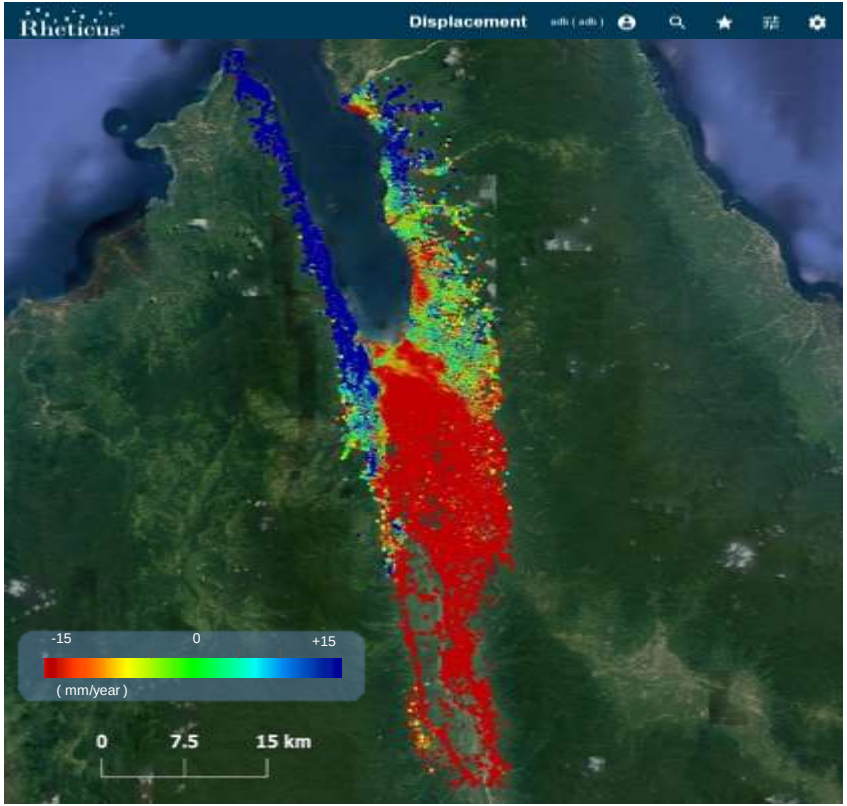


Land Stability Monitoring

Palu Central Sulawesi, Indonesia



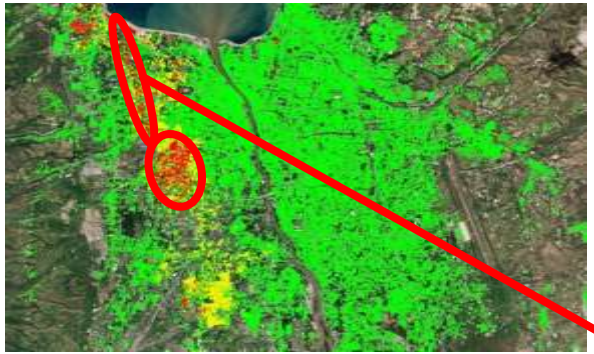
The ground motion map before the earthquake of 28 September 2018 revealed a general stability of the area



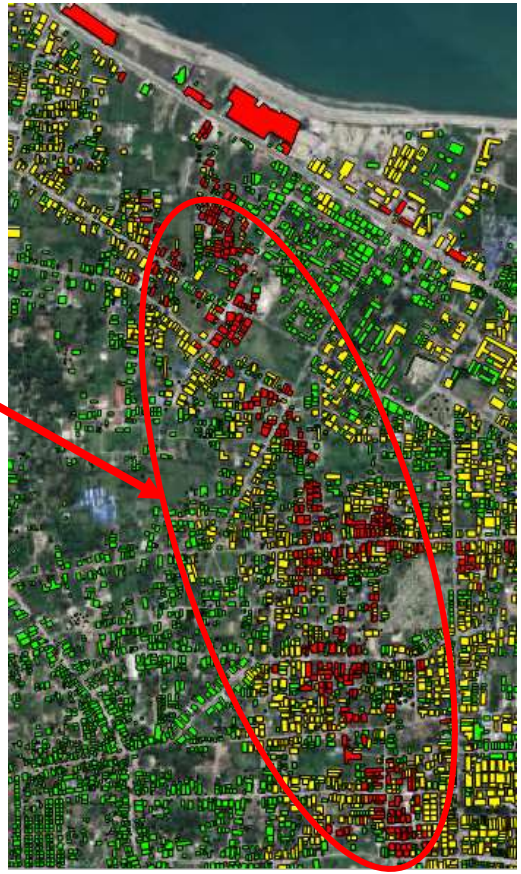
The ground motion map after the earthquake of 28 September 2018.

Building Stability Monitoring for Post Earthquake Reconstructions (In SAR)

Palu, Central Sulawesi, Indonesia



Present status of building stability



Validation: GNSS-CORS Vs. InSAR

- GPS measurement is converted to LOS direction to be compared with the SAR displacement

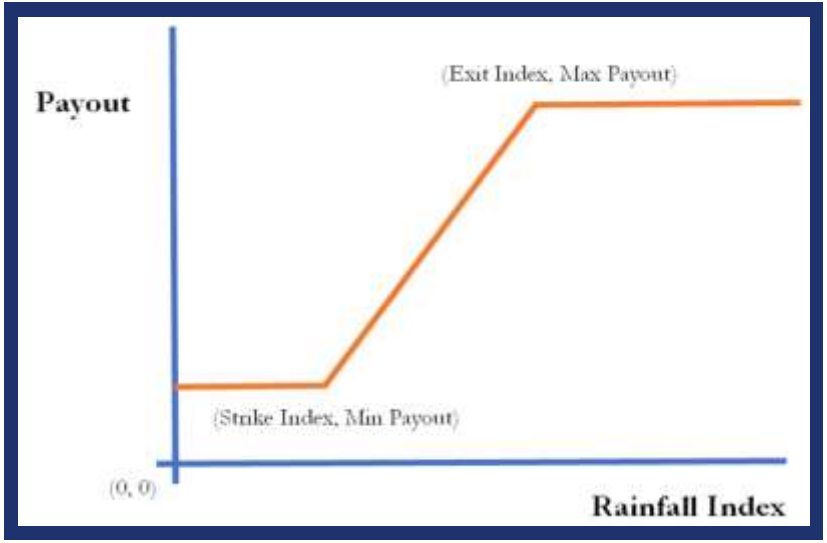
Ascending

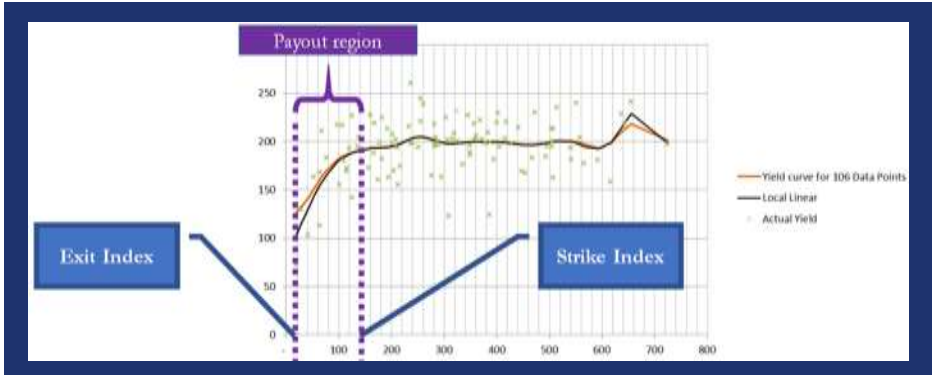
Descending

Weather Index Insurance (WII) - Tajikistan

Why WII:

- Most of traditional insurance schemes are based on field varifications for damage assessment.
- This leads to increase in insurance premiums, which make them not-affordable to farmers.
- WII is a weather-based index insurance scheme.





Four Aspects of Weather Index Insurance Design:

- Reliable meteorological data
- Crop data
- Understanding of regulatory environment
- Marketing instruments to sell insurance products

Technical Assistance Missions and Capacity Building

Philippines
26 Sep - 30 Sep

Armenia
27 Jun -01 Jul

Technical Assistance Missions and **Capacity Building**

ICT for Disaster Risk Management

Academy of ICT Essentials for Government Leaders

UNITED NATIONS ESCAP / APCICT
Economic and Social Commission for Asia and the Pacific

https://www.unapcict.org/flagship-programmes/academy

Clients

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THANK YOU

Geoinformatics Center, Asian Institute of Technology