Executive Education Program on Disaster Risk Finance for Indonesia

SESSION : Fundamentals of Disaster Risk Finance for Agriculture

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SUPPORTED BY WORLD BANK GROUP

Global Shield Financing Facility

DRF for the Rural and Agricultural Sector

Small rural households and farmers are disproportionately vulnerable to/and affected by risk (natural, climatic, pests & diseases, price) and to climate change:

3.4 BILLION PEOPLE

(44% of global population) live in rural areas as of 2019

Rural population mainly derive their livelihoods (employment, consumption, and incomes) from small-scale agricultural crop production, rearing of livestock, and fisheries

POVERTY RATES

and food insecurity are much higher for rural than urban people

Word Cloud 1:

What are the different types of risks to the agriculture sector?

Go to
www.menti.com

(or prepare the QR scanner on your phone)

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Role of DRF for Agriculture

DRFA advocates for financial mechanisms which can be put in place before the disaster event occurs (ex-ante) to:

- Increase certainty of financing and planning, and
- To provide timely financial assistance to affected farming populations to put them back into business in the
- Quickest possible time

DRF for Agriculture focuses on achieving a balance of financial mechanisms which maximize:

- Welfare for rural/agricultural households, protection of their economic farming activity and resilience building
- Financial protection for agricultural |value chain actors and businesses
- Fiscal/budget efficiency and certainty for Governments

Structuring a Financial Protection Scheme for Agriculture

WHO to protect?	WHAT to protect them against?
First step is to establish clear policy objectives and priorities to form the foundations for the program	When considering the policy objectives, it is helpful to identify and prioritize financial impact:
Analytical work is needed to understand risks and capacity gaps to support (or oppose!) objectives	Assess disaster risk, vulnerability and financial impacts
Policy objectives should focus on the needs of the target beneficiaries	Identify and segment beneficiaries based on vulnerabilities and access to financial services, this can help align and prioritise intervention to their needs
Clear objectives helps with stakeholder engagement	Useful communication tool as to why certain segments have been targeted/chosen

Broader considerations to be made when assessing the how

What instruments are available to the country? (i.e., is there a regulated local insurance market with capacity)

Are the appropriate legal and regulatory frameworks in place?

What funding is available, including concessionary finance and other incentives?

What existing financial infrastructure and data is available?

Are technical partners available to assess the risks and mix of instruments?

What capacity gaps exist across government and implementing partners and what is needed to fill these?

Pre-positioned instruments

A **mix of instruments** is often required to ensure timeliness and cost efficiency; products should be developed with these key dimensions in mind:

Clear and transparent triggers that determine how/ when financial disbursement will be made;

Financing secured at the lowest cost, as a result of an optimal mix of risk retention and risk transfer; and

Disbursement systems and plans in place to ensure that the finance reaches the targeted beneficiaries in a timely and transparent manner.

Think about needs – when is money needed and for what

Different instruments targeting different segments

How different disaster risk financing tools can be used to meet different segments of farmers (simplified example with counties in Southern and Southeast Asia in mind)

PRODUCT RANGE

Most Productive/ Less Vulnerable

- Multi-peril Crop Insurance (MPCI)
- Named peril Crop Insurance (NPCI)
- Index Insurance
- Credit (long-term finance and guarntees
- Savings and payments
- Micro-Credit

Indonesia's cocoa farmer program

Safety Net Programs for the very Poor:

1. Fully subsidized index insurance based on specific criteria for targeted producers
2. Risk finance-enabled safety nets

Less Productive/ Most Vulnerable

FARMER SEGMENTS

Commercial farmers

- Medium and large farm units (> 5 ha)
- Access to credit
- High levels of input use
- Produce for sale

Small subsistence farmers and sharecroppers

- Very few assets; < 1 ha land
- Subsistence farming
- Very vulnerable to climatic shocks

Semi commercial smallholder farmers

- Small farm units typically < 5 ha
- Some assets
- Some access to credit
- Part consumption/part sale

Landless Laboring households

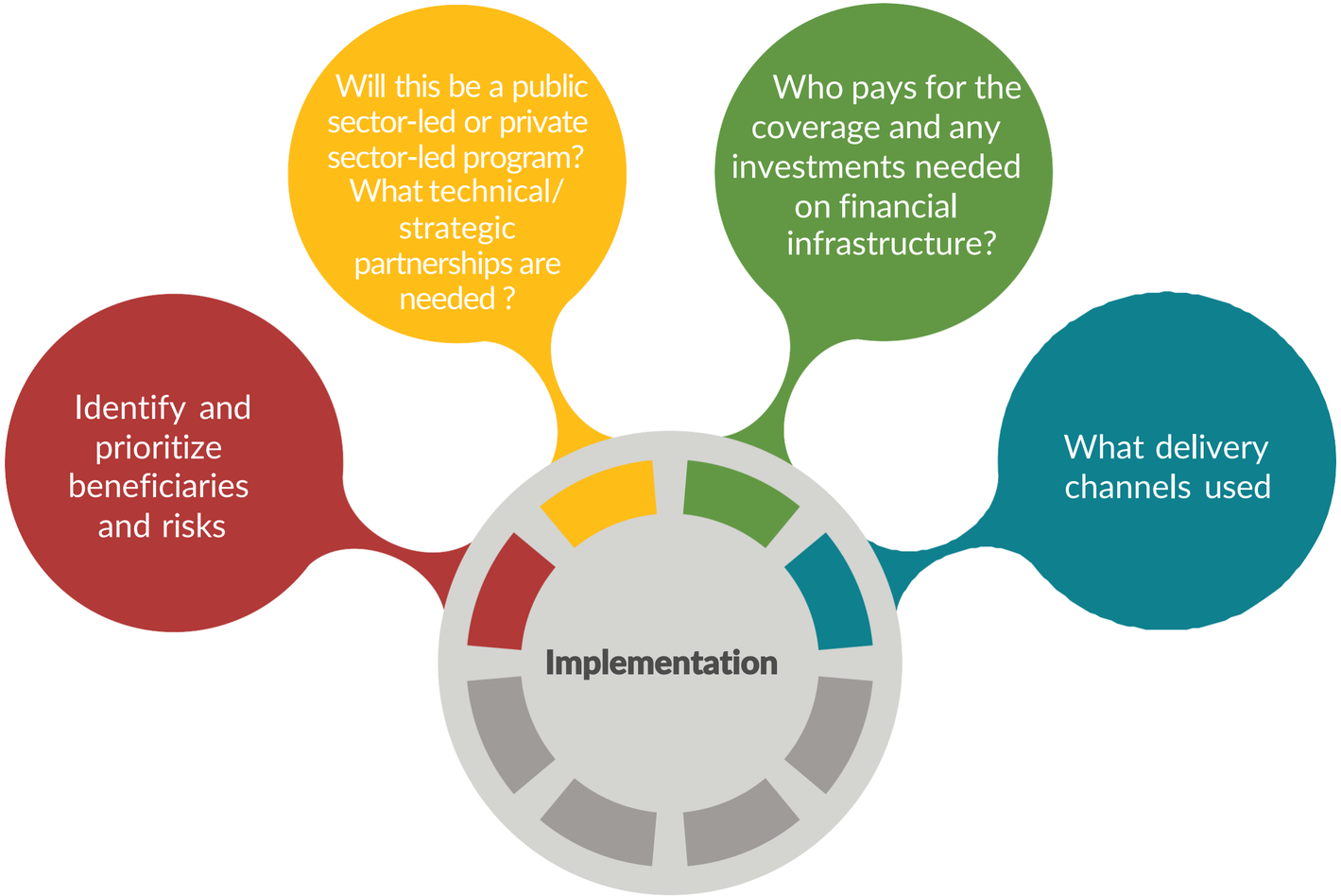
- Very few assets; no land Paid labor
- Very vulnerable to climatic shocks

How can Index Insurance be used?

Type of insurance	Who?	How?		
 **Micro**	• Individuals are policyholders • Usually smallholder farmers • Often grouped in farmer organisations	 Policyholder: **Farmer**	 **Distributor**	 **Insurer**
 **Meso**	Aggregator as policyholder (MFI, co-operative, input supplier…)	 **Farmers**	 Policyholder is the **Aggregator (e.g. processor, bank)**	 **Insurer**
 **Macro**	Policies issued to governments as the policyholder	 **Beneficiaries (Farmers)**	 Policyholder is the **National or State Government**	 **Insurer**

The implementation process

The implementation arrangements will likely differ by objectives, financial instruments and delivery channels. Some key questions to consider shown on the right.



Typical roles in a public-private arrangement

Government	Private sector	Development agencies
Data collection		Assists in best practice data collection
Outreach and Distribution		
Consumer financial education Market conduct	Sale and distribution Two-way delivery of payments	Brings in knowledge and learning from similar programs in other countries, links up government and project to experts
Enabling environment	Risk financing	Supports government on areas where they may lack knowledge or expertise
Product design and development		
Set parameters for subsidies Establish a monitoring and evaluation framework	Responsible for: The design and development of insurance products	Advises on involvement of private sector and helps to assess and design tender process Capacity building where required

Agricultural Hazard Monitoring in West Java

Agricultural productivity can decline due to natural hazards such as floods and droughts. Monitoring floods and droughts in paddy fields are necessary to prevent decreased agricultural productivity.

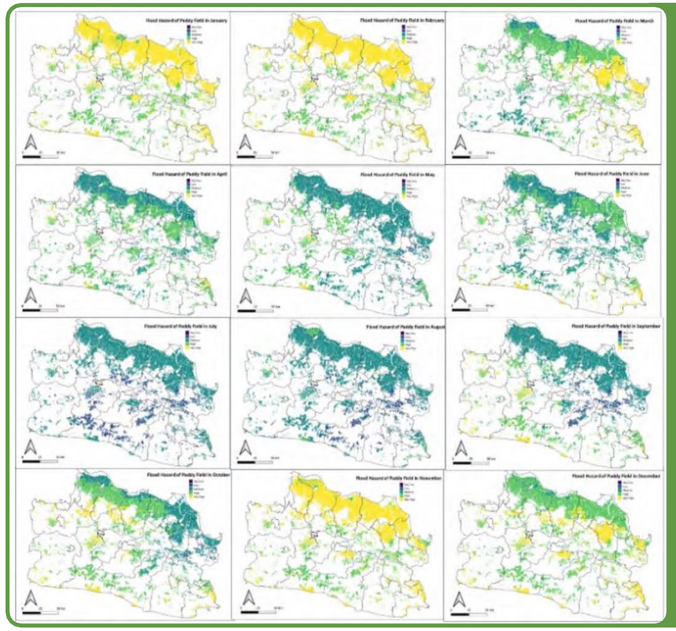
West Java Province is the third national rice producer with 16.6%, but West Java Province is the most extensive rice consumer, around 21.1% of the total national rice consumption.

Virtriana et al. 2022 modelled the hazard of drought and flood posed to rice fields in West Java by integrating GIS and remote sensing data.

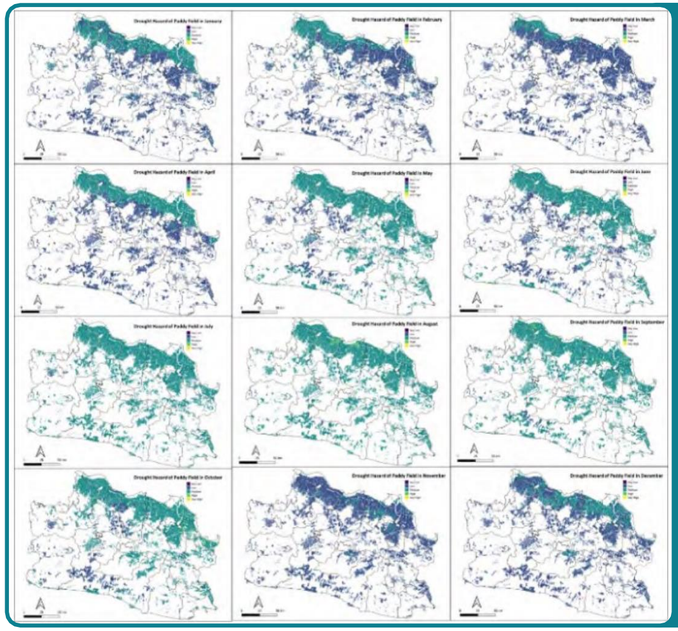
No.	Data	Resolution
1	Digital Elevation Model	30 m
2	River	1:25,000
3	Precipitation	5566 m
4	Land Use Land Cover	30 m
5	Soil Moisture	10 km
6	Watersheds	1:250,000
7	Keetch-Bryam Drought Index	4000 m
8	Normalized Difference Vegetation Index	1 km

Agricultural Hazard Monitoring in West Java

There are various technologies used to monitor agricultural productivity, one of which is big data technology.
Big data technology can capture data from multiple sources related to agriculture. This data capture can be done with various technologies such as remote sensing with satellite imagery, drones, radar, or even smartphones (Islam Sarker et al., 2019).



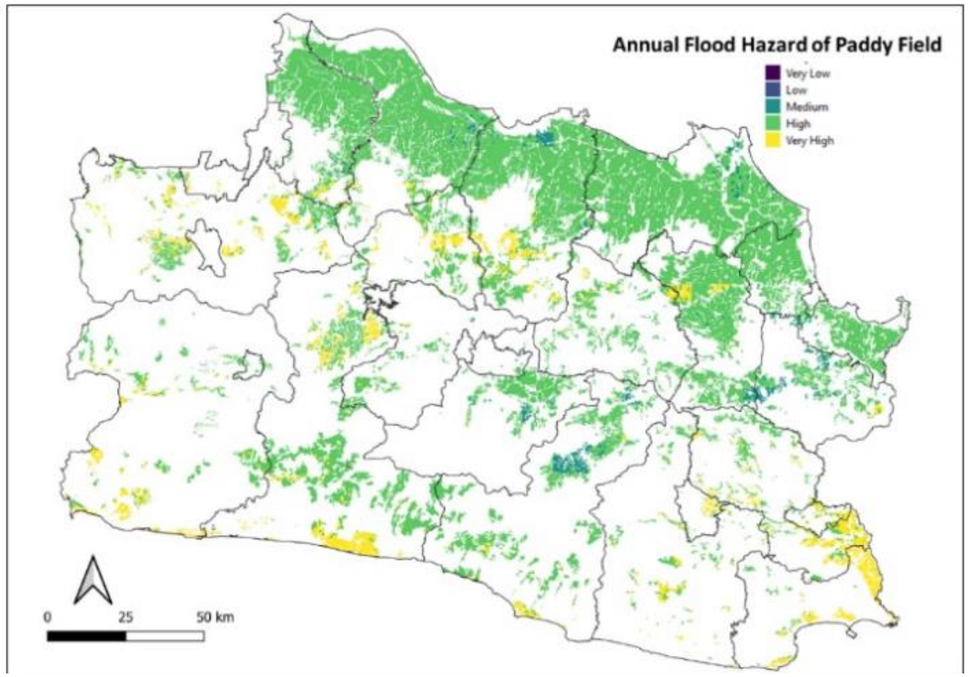
January, February, March, November, and December in 2021 are the most vulnerable due to high rainfall

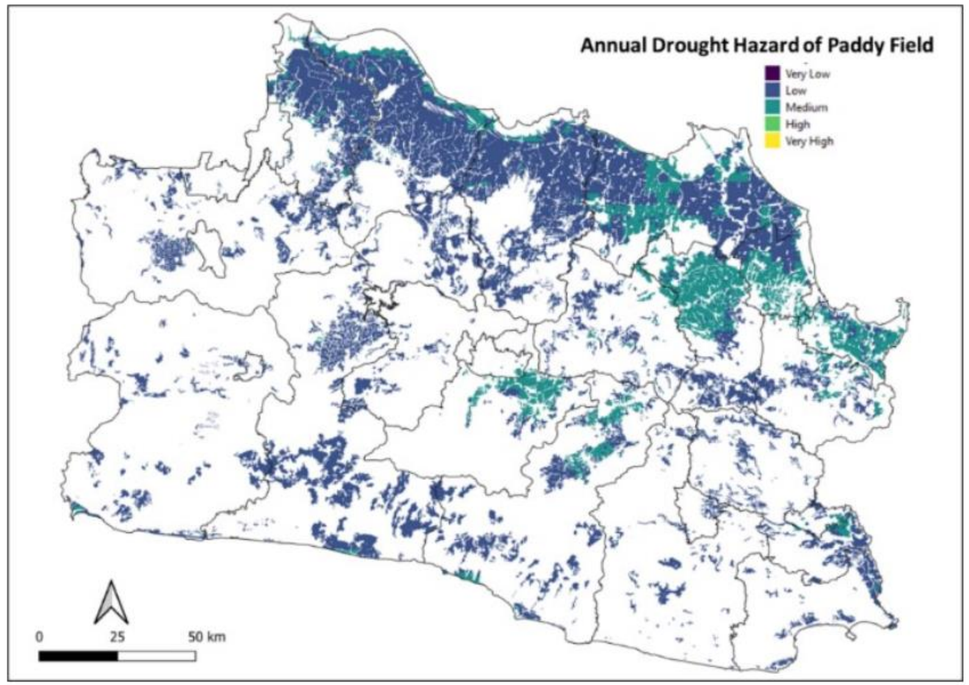


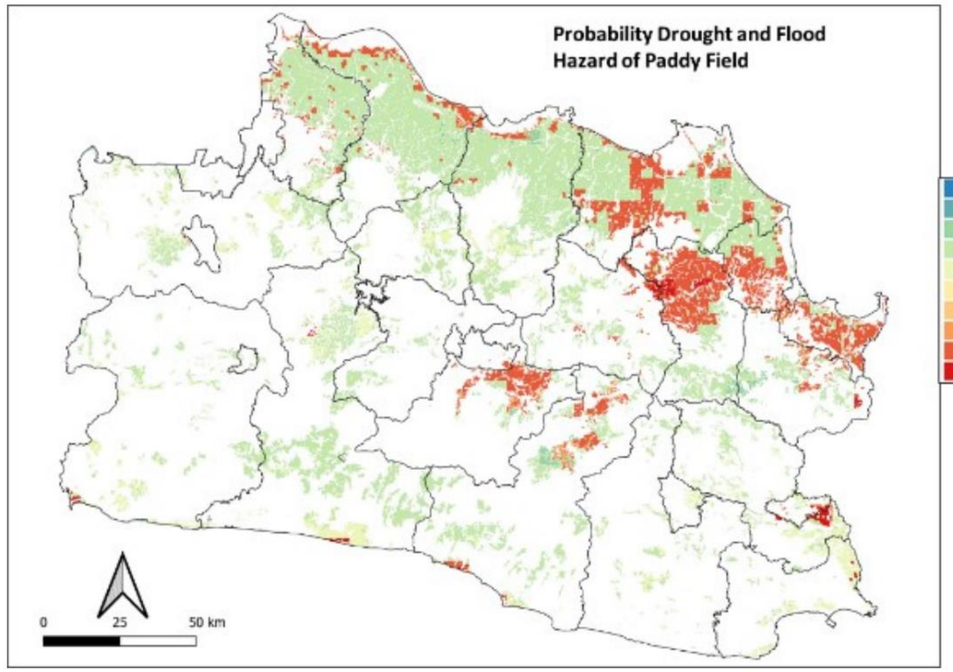
Reasonably high drought conditions are observed in the northeastern part of West Java

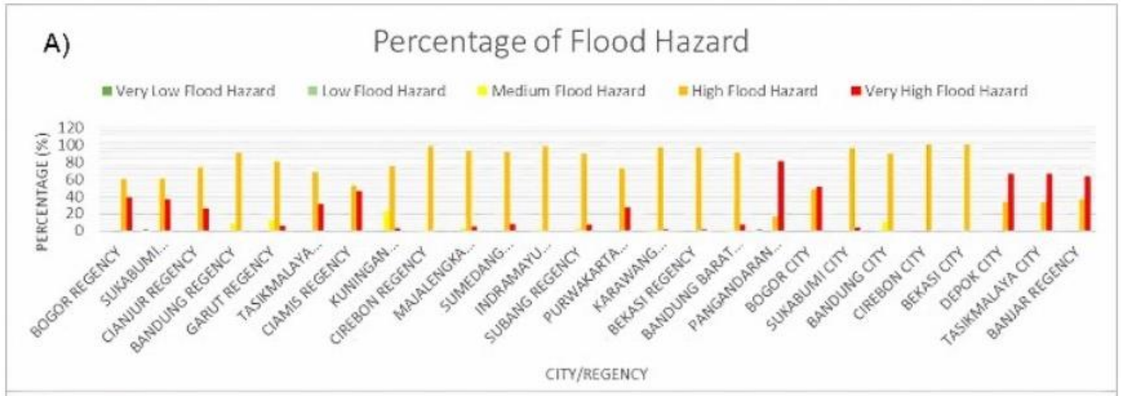
Flood and drought hazard model in the rice fields every month in 2021 (Virtriana et al. 2022)

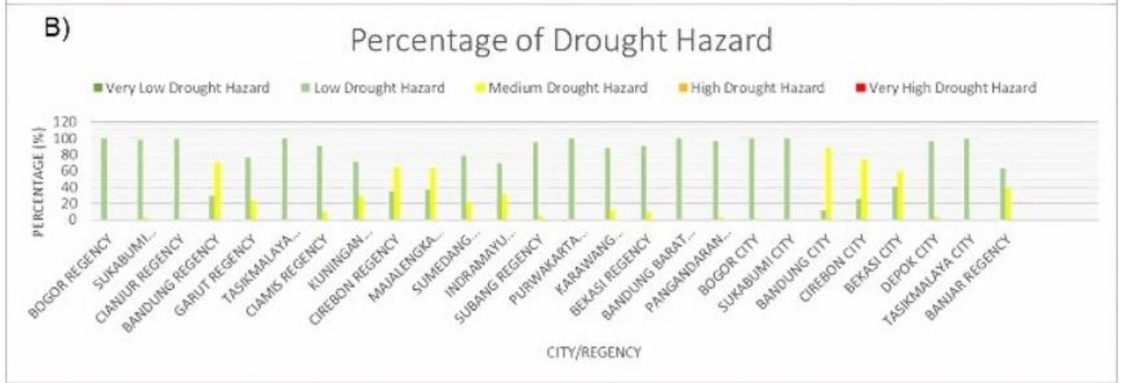
Probability of Drought and Flood Hazard in Rice Fields



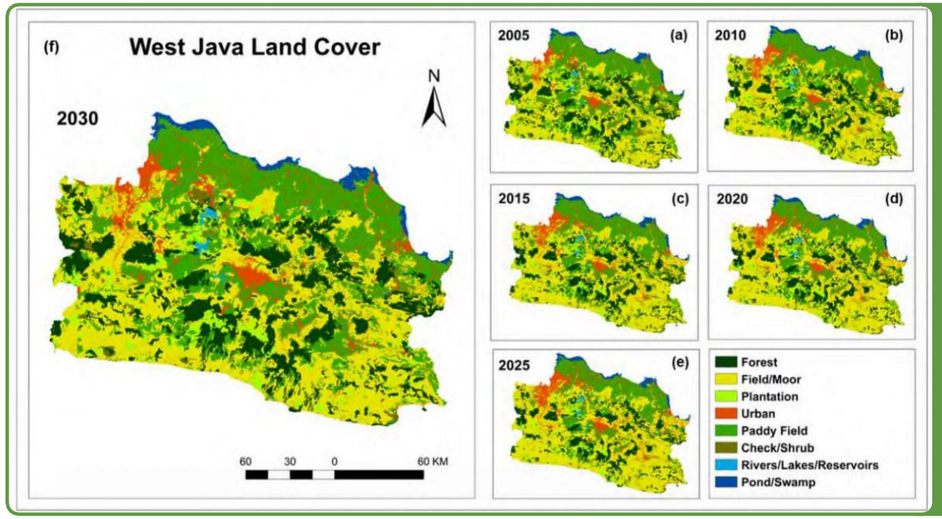




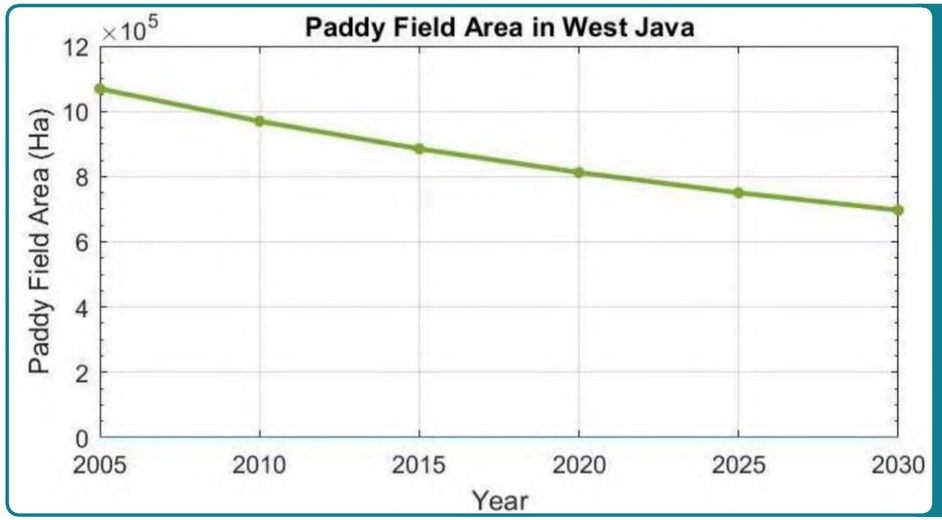




Land cover prediction: decreasing paddy fields in West Java



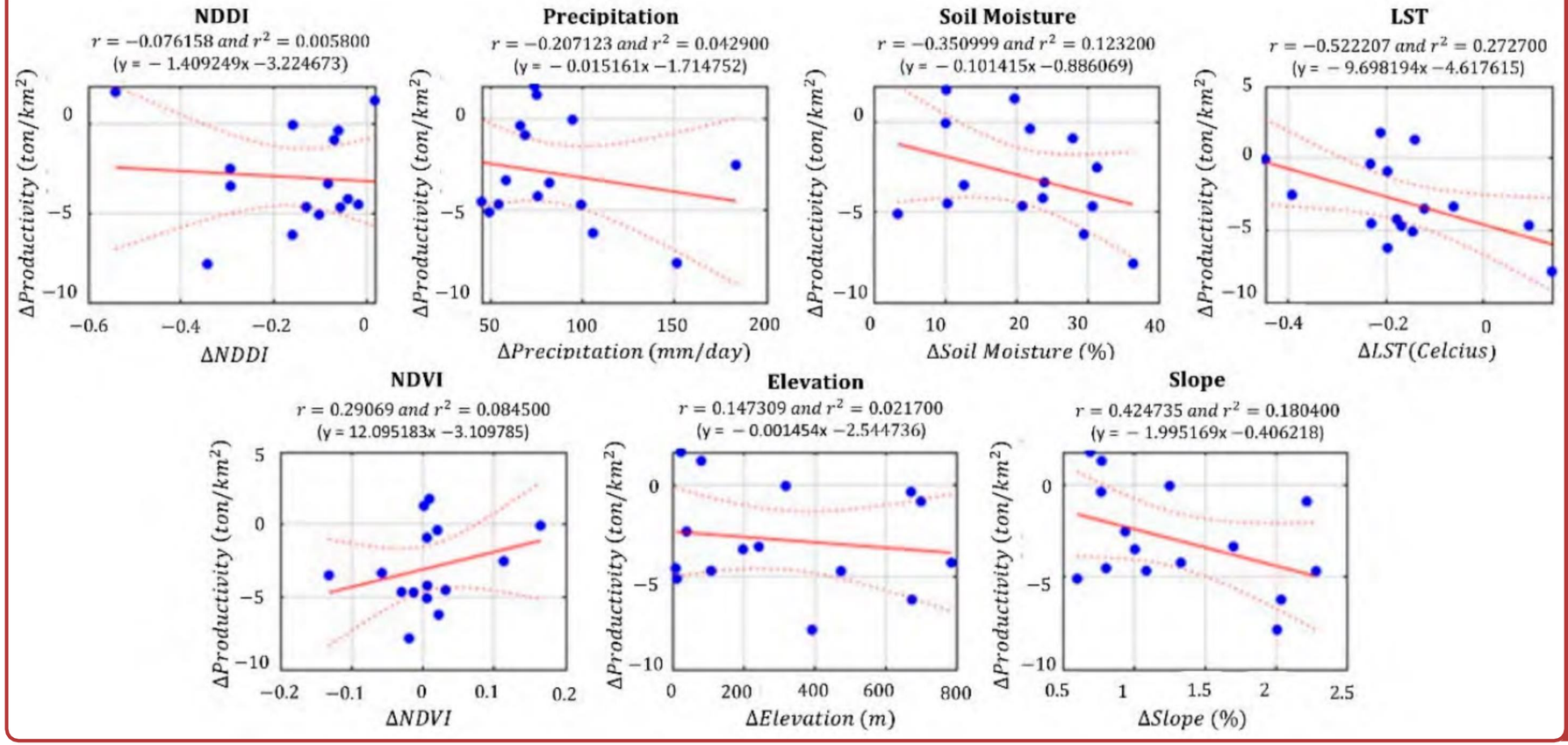
Food security predictions were made for 2030 in West Java using geospatial data and remote sensing (Virtriana et al. 2022).



The decrease in the paddy fields area in 2030 was 31% compared to the paddy fields in 2005, with accuracy value of 83%.

Virtriana et al. 2022

Factors Influencing Rice Productivity in West Java



Normalized Difference Drought Index (NDDI)\

Precipitation

Soil moisture

Land surface

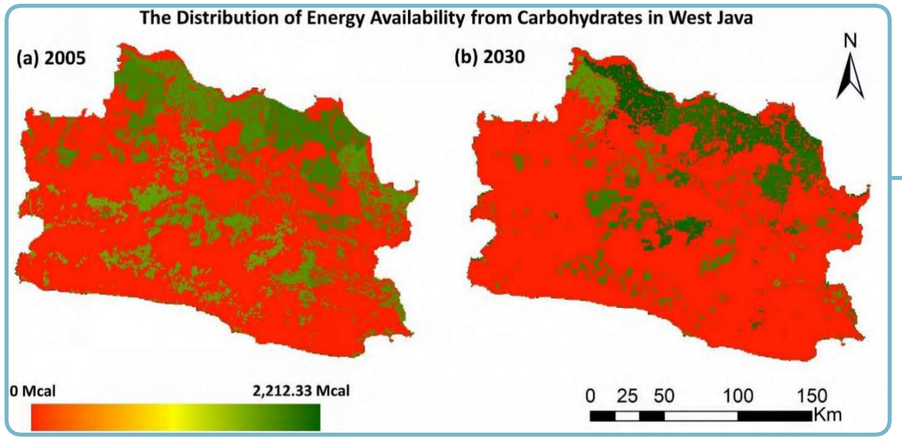
temperature

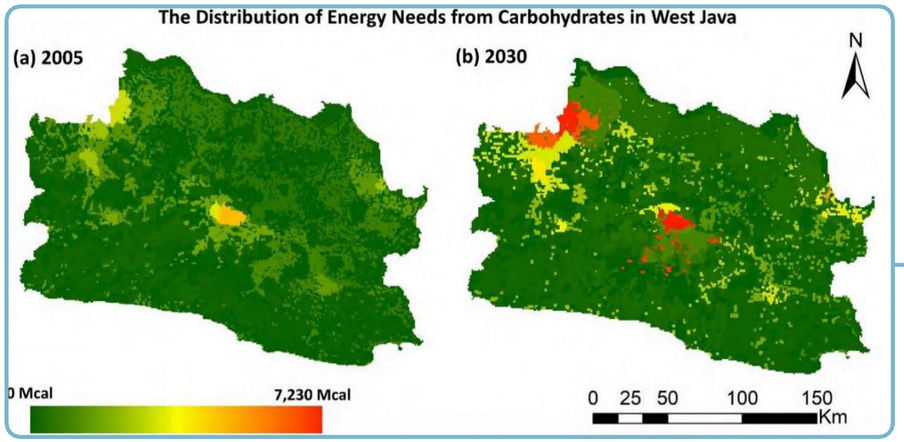
Normalized Difference Vegetation Index (NDVI)

Elevation

Slope

Food security prediction: most of West Java will be deficit in 2030





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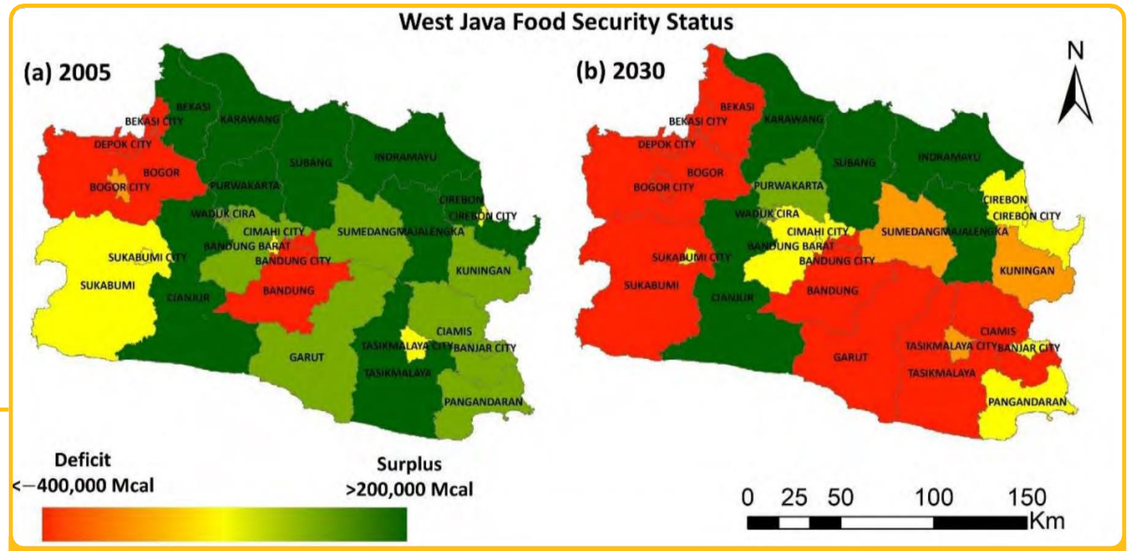

In 2030, the food status in West Java will be dominated by the deficit status. Although there is an increase in productivity in 2030, it still cannot meet the high energy needs as a result of increasing population. This will obtain an energy deficit of up to 13,996,292.42 Mcal.

Conclusions

Modelling of agricultural hazards towards SDGs

Agricultural hazards were modelled by integrating remote sensing data. The models were validated using geographic and social media data mining. This study was conducted as an effort to support the Sustainable Development Goals (SDGs) in meeting the number two goal of ending hunger, achieving better food security and nutrition, and supporting sustainable agriculture.

GIS and remote sensing

GIS and remote sensing are reliable tools that have been used in the evaluation of geo-environmental catastrophes by providing a sort of synoptic coverage of a very broad area in a cost effective way. This overcomes the bottle-necks and limitations caused by the conventional ground stations in recording hydrological information during an extreme event.

Geospatial Data's role in disaster management

Geospatial Data plays a big role in disaster management. Features impacted by disasters are geographically located.

Analysis of environmental factors of food security

The environmental factors that influence food security were analyzed using the multivariable linear regression method. The variables used are NDVI, NDDI, precipitation, humidity, LST, elevation, and slope.

Food security in West Java keeps declining

As one of the national rice barns, West Java has a vital role in national food security. Due to rapid population growth and a significant decrease in paddy fields in several areas, food security continues to decline.