

# ROLE OF TECHNOLOGICAL INNOVATION FOR PROMOTING SUSTAINABLE AGRICULTURE

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# Outline:



Introduction



Research and Development Policy  
Direction 2015-2019



Strategy Policy to Develop  
Innovative-Adaptive Technology



Technological Innovations in  
Sustainable Agriculture

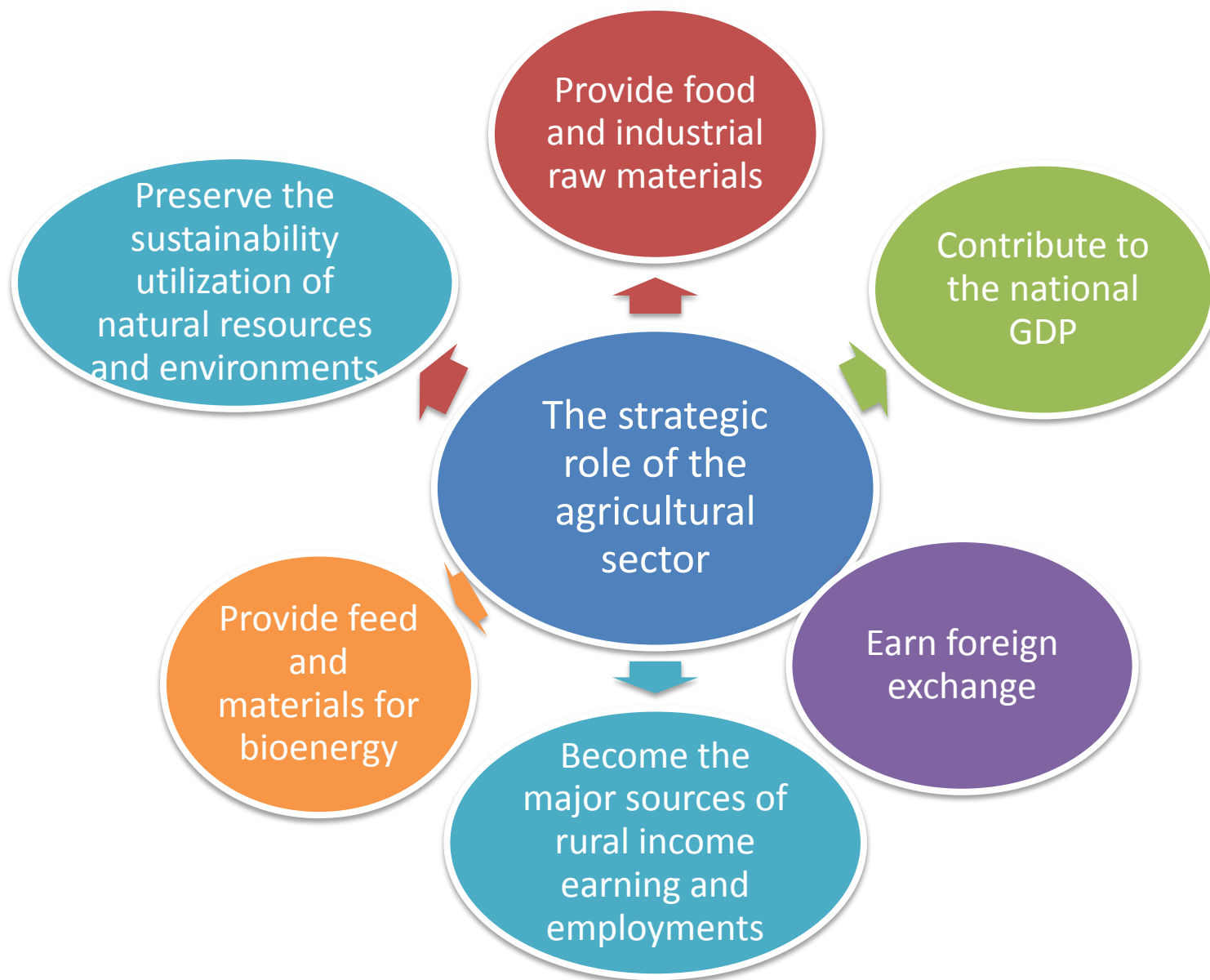




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# INTRODUCTION





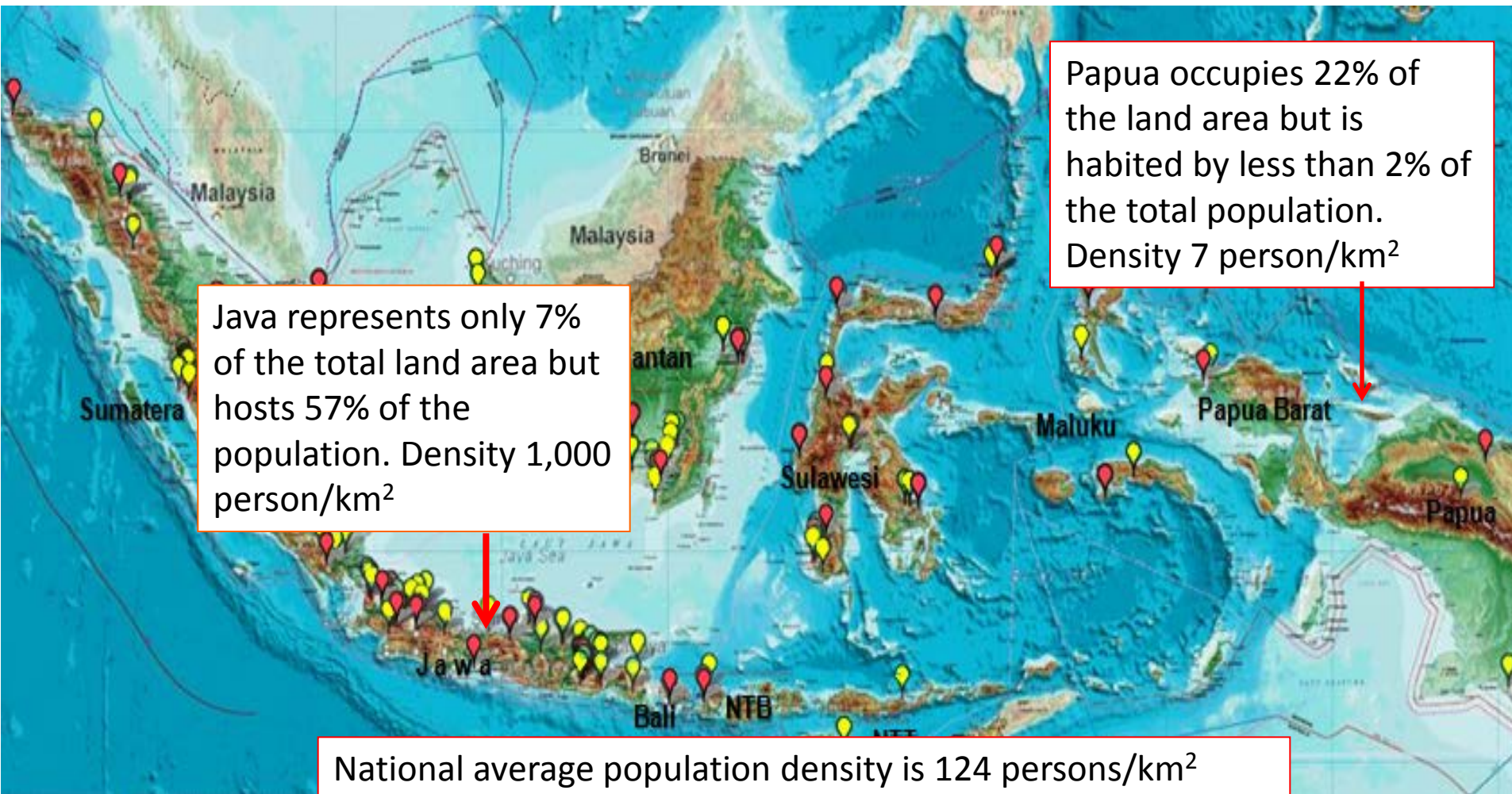
Global issues faced by every country in the future are food, energy and water problems due to the persistent problems of agricultural land conversion to non agriculture activities and uncertainty of climate change

In the future, agriculture should be able to produce more food and energy for population, while conserving the environment for a sustainable food production

The role of Technological Innovation is important



# The Distribution of the Population Across the Archipelago is Highly Asymmetric



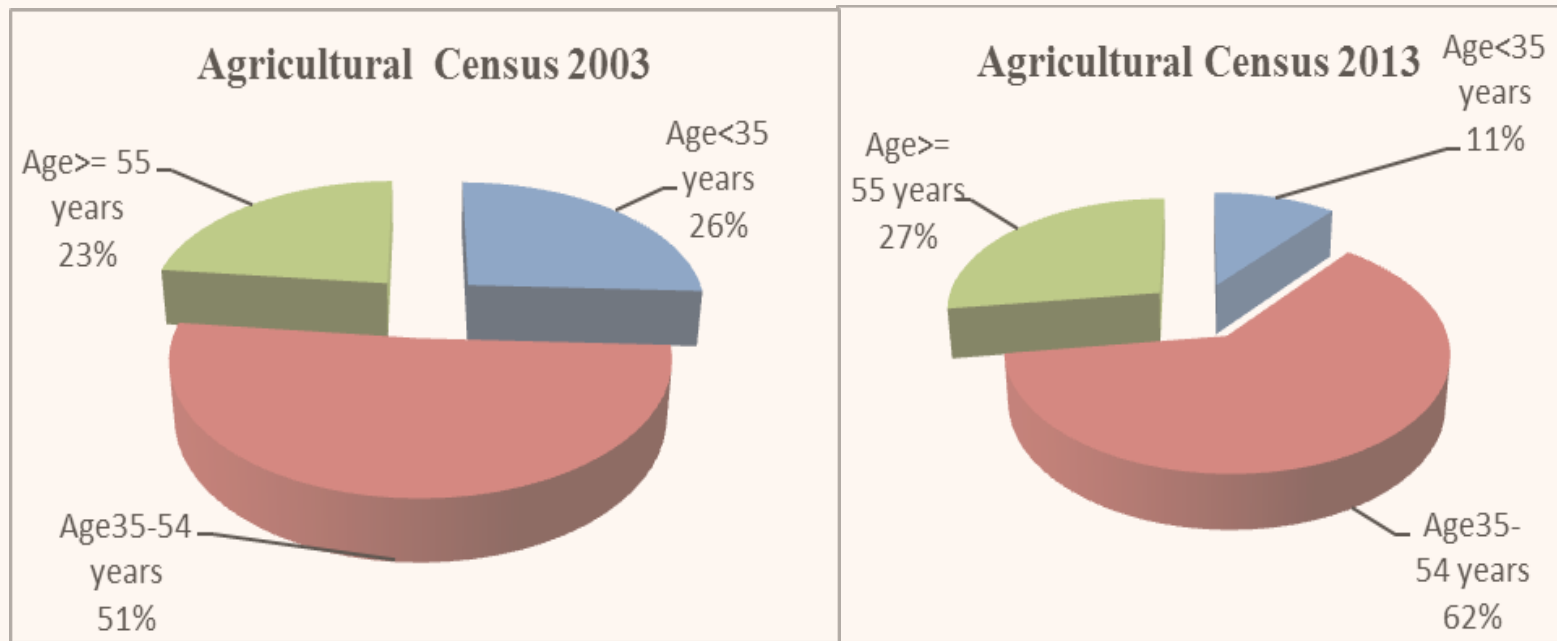
# Land-People Ratio for Food Crops in Some Countries

No	Countries	Total Land (000 ha)	Number of People (000)	Land per capita (m <sup>2</sup> /person)
1.	Indonesia : Paddy Land	7.886	240.000	329
	Paddy land and Dry land	13.386	240.000	558
2.	Vietnam	7.500	78.137	960
3.	Thailand	31.839	60.925	5.230
4.	India	161.750	1.016.938	1.290
5.	China	143.625	1.282.172	1.120
6.	Bangladesh	8.085	123.406	655
7.	Australia	50.304	19.153	26.100
8.	Brazilia	58.865	171.796	3.430



Source :

# Young Generation Participation in Agricultural Sector Tends to Decrease



**The Composition of Farmers by Age, 2003 and 2013**







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## Research and Development Policy Direction 2015-2019



1. Creating innovative technology: good quality seed, new superior variety, fertilizer and agricultural machines,
2. Creating innovative technology for land usage, mitigate and adaptive to climate change,
3. Developing institution model and policy development,
4. Technology transfer to increase products competitiveness in domestic and international market,
5. Creating innovative technology of bio-energy based on renewable local resources,
6. Creating innovative technology for food diversification based on local resources advantages
7. Empowering innovative technology and institution for development of agriculture industry.



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## Strategy Policy to Develop Innovative-Adaptive Technology



# STRATEGY TO DEVELOP INNOVATIVE-ADAPTIVE TECHNOLOGY



Exploration, utilization of genetic resource engineering → ADAPTIVE SUPERIOR VARIETIES



Optimization and efficiency of land-water resources → → technology of LAND AND WATER MANAGEMENT, FERTILIZATION, CONSERVATION



Optimalization of biomass/ORGANIC WASTE >> "zero waste" approach

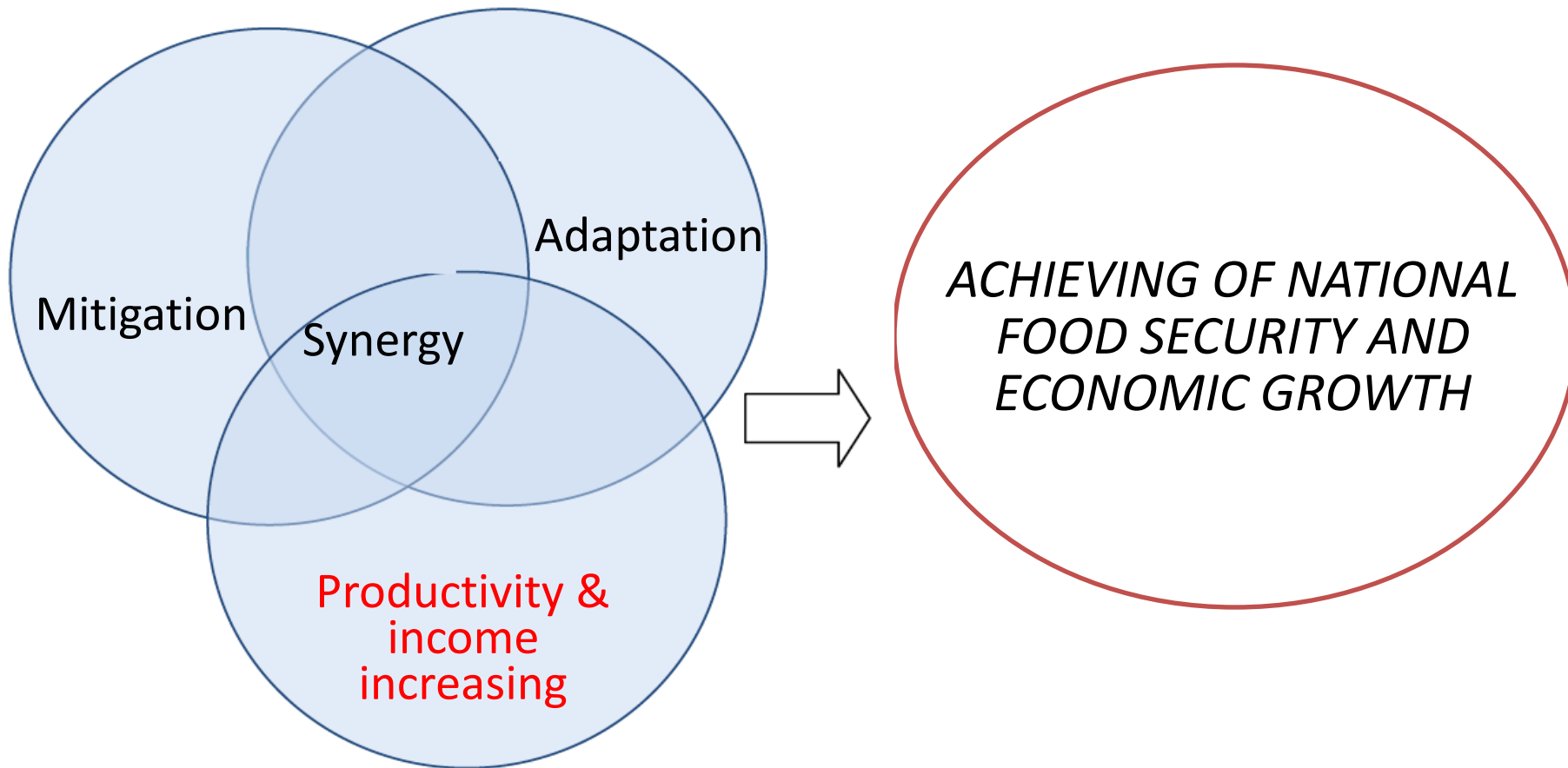


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## Technological Innovations In Sustainable Agriculture



# CLIMATE SMART AGRICULTURE (CSA)



# Integrated Crop Management (ICM)



**Dynamics**  
(improved technologies)

**Integrated**  
(IPM)

**Integrated Crop Management (ICM)**

**Participatory**  
(Based on farmer needs & supported by extension workers)

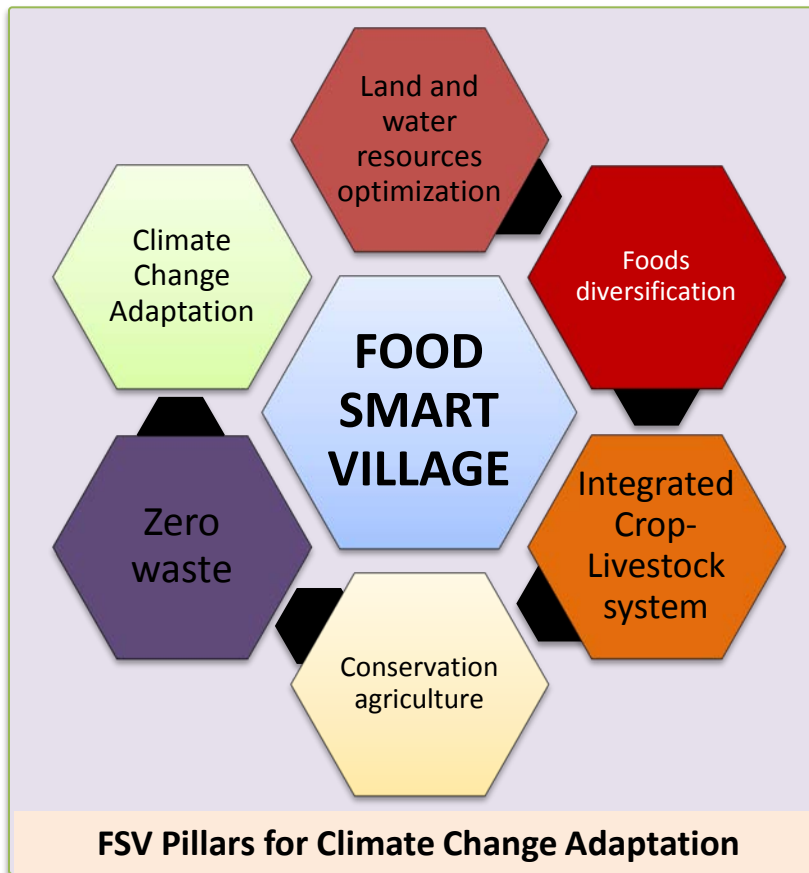


**Synergism**  
(Technologies & Resources)

**Goals**

1. Resources efficiency
2. Increasing yield, production and profit
3. Sustainable

**FOOD SMART VILLAGE** is a rural livelihood that pursue food self-sufficiency by applying innovative agriculture on the marginal land.



**Land and water resources optimization**  
through surface and ground water management, soil fertility enhancement, and micro-climate modification.

**Foods diversification**  
Expanding food crops options based on agro ecological zone through development variety of food product

**Integrated Crop-Livestock system;**  
Livestock feeds come from agriculture residues, and animal provide energy and manure for the crops. Animal waste be input in biogas as high quality fertilizer





# Food Smart Village

## Desa Oebola, Kupang NTT

Land and water resources optimization

Climate Change Adaptation

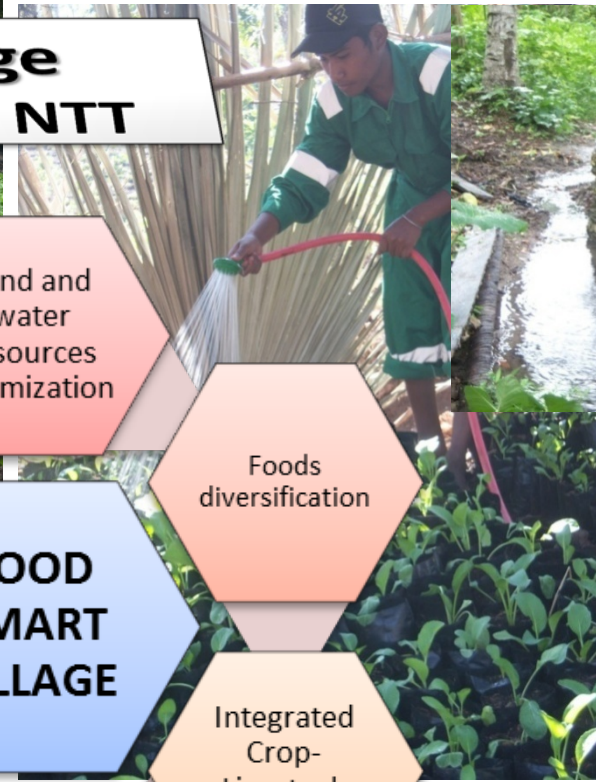
Foods diversification

**FOOD SMART VILLAGE**

Zero waste

Integrated Crop-Livestock system

Conservation agriculture



# KALENDER TANAM TERPADU

Versi  
Musim Kemarau (MK)  
April - September 2015

BADAN PENELITIAN DAN PENGEMBANGAN



ANGKASAPERTANIAN  
KEMENTERIAN PERTANIAN  
2015

## Integrated Planting Calendar



versi Android

SMS Center:

082 123 456 500  
08 123 565 1111

MASUK



Pindai & Unduh

SISTEM INFORMASI KALENDER TANAM TERPADU MEMUAT INFORMASI :

- Estimasi waktu dan luas tanam padi dan palawija
- Estimasi wilayah rawan banjir, kekeringan dan serangan OPT
- Rekomendasi varietas dan kebutuhan benih
- Rekomendasi pupuk
- Rekomendasi mekanisasi pertanian
- Info tanam - BPP
- Kalender Tanam Rawa
- Monitoring online kondisi tanaman pangan menggunakan CCTV
- NEW** Standing Crop Padi Sawah Pulau Jawa, Bali, Sumatera, dan Sulawesi

INFORMASI TERSEDIA UNTUK LAHAN SAWAH IRIGASI DAN LAHAN RAWA  
PADA LEVEL KECAMATAN SELURUH INDONESIA

SCIENCE . INNOVATION . NETWORKS



# Modern Agricultural

## INDO JARWO TRANSPLANTER

- Reduce labor use (20 persons/day),
- Reduce planting Cost (35%)
- Reduce planting time to be 6 hours/ha



## TRACTOR



Reduce labor use from 20 persons to 3 persons/ha, and reduce land preparation cost 28%.

## INDO COMBINE HARVESTER

- Reduce yield loss from 12,2% to 2,2%,
- Reduce labor use (40 persons/ha)
- Reduce Harvesting time to be 4–6 hours/ha
- Reduce harvesting cost (30%)



Mechanization implementation reduces production cost  $\pm 30\%$ , and yield loss 10%, as well as increase farmers' profit 80%



# Thank You



**IAARD- MINISTRY OF AGRICULTURE OF THE REPUBLIC OF INDONESIA**