International Virtual Workshop on Water, Energy, Food Nexus G20-MACS-2020

INDONESIA

SMART FARMING ON DRYLAND MANAGEMENT TO SUPPORT FOOD SECURITY

Ministry of Agriculture

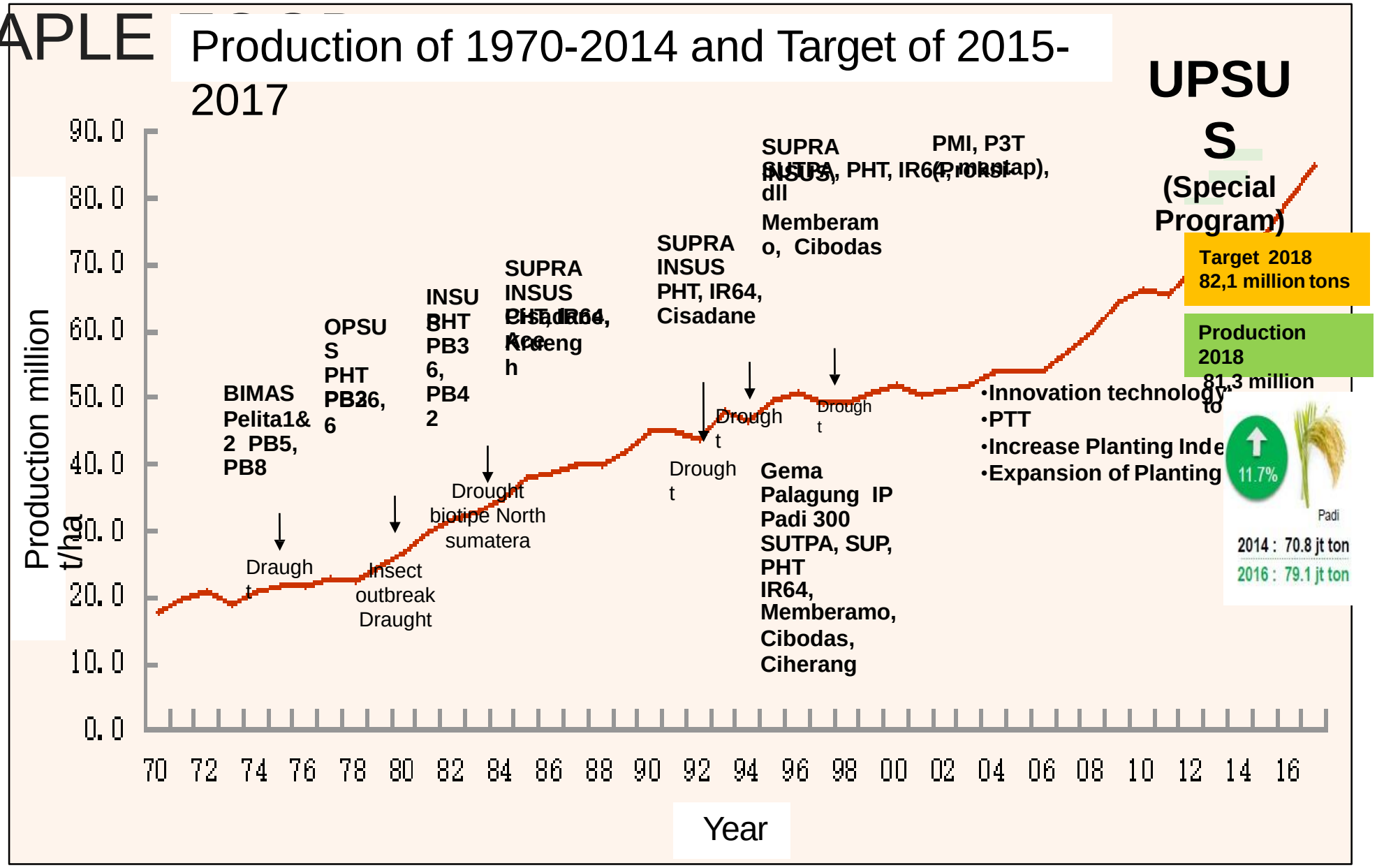
31 August 2020

RECENT AGRICULTURAL STATUS

- Agricultural GDP grew 16.24% (quarter II 2020) q to q ❼ negative quarter II economic growth (-4.19%)
- GDP structure and growth according to business sector (y to y) in the second quarter of 2020 the national grew -5.32% and the agricultural sector recorded a positive 2.19%

2020 ❼ 267.000.000

PROGRAM FOR RICE PRODUCTION AS MAIN STAPLE FOOD



Source: Sarlan,2014; Central Bureau of Statistics 2015, MoA

INDONESIAN EFFORT ON AUTOMATION THE TRADITIONAL AGRICULTURE PRACTICES USING MODERN SMART TECHNOLOGY

Indonesian smart farming

Farmer aging

Food loss and waste problem

Food demand increase

Less preference of youth

salinization

Land fragmentation

Less predictable of rainfall

Sea level rise

Natural disaster

Water scarcity

COVID-19 outbreak

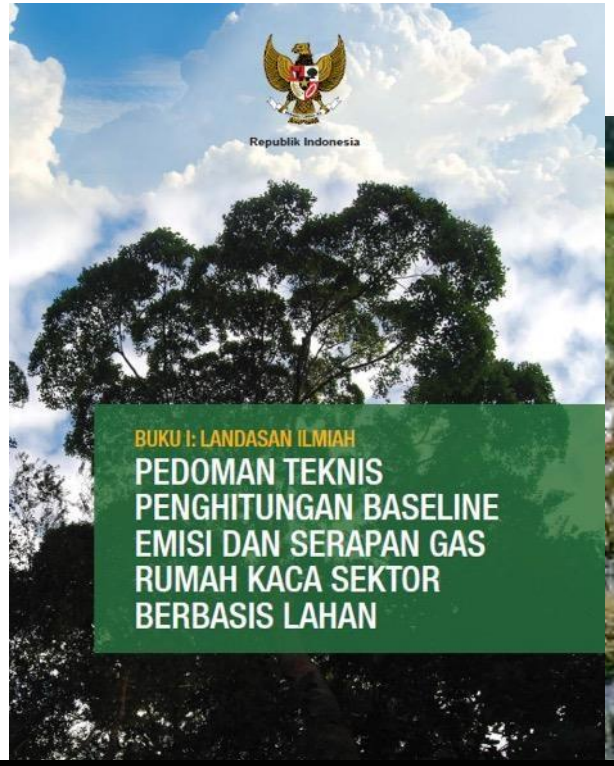
Land degradation

Climate change

Smart farming is supported by 19 Research Centers and 18 Research Institutes under Indonesian Ministry of Agriculture.

AGRICULTURAL SECTOR DUE TO CLIMATE CHANGE

THE GOVERNMEN'T COMMITMENT



Indonesia is committed to reducing GHG emission by 26% in 2020 from the BAU level with its own efforts and reaching 41% reduction if it secures international support

Presidential Regulation No. 61/2011 on National Action Plan GHG

Ministry of Agriculture Position :

- **Contribute to the reduction of GHG emissions**
- **Adapting to climate change**

National priorities in coping with Climate Change

Adaptation the top-most priority

Mitigation has been pledged by the government

Synergizing of adaptation and mitigation actions

ACTION PROGRAM ADAPTATION FOR FOOD CROP AND HORTICULTURE

- Improvement of water management, irrigation system, rehabilitation of conditions of the upstream and downstream catchment area
- Development of water harvesting and water efficiency technology
- Development of tolerant environment varieties/adaptive varieties (temperature, drought, flood, inundation and salinity).
- Development of soil and crop management technologies to improve adaptability of crops: (a) land optimalization, (b) improvement of soil fertility

- Development of Weather Index Insurance
- Rural Agricultural Development Model Through Innovation (M-P3MI)
- Development “Model of the Sustainable Regional Food Area ” (M-KRPL)
- Cultivation sleigh systems in the dry season, especially in the end of irrigation period.
- Cultivation of water-saving, by reducing high inundation in paddy field: intermittent irrigation

SEED VARIETIES ADAPTIVE TO CLIMATE CHANGE

Low Emission Varieties :

Rice: Ciherang; Cisantana; Tukad Belian; Memberamo, IR 36, Dodokan.

Tolerant Salinity Varieties

- *Rice*: Way Apburu; Margasari; Lambur; GH-TS-1; GH-TS-2, Banyuasin, Indragiri.

Drought Stand Varieties

Rice: Dodokan; S-3382; BP-23, Imparari-10, Situ Bagendit, Situ Patenggang

Age Short Varieties

- Rice: Dodokan; Silugonggo; Impari-1, Impari-12, Impari-13, S-3382; BP-23,

Immersion Resistant Varieties

- Inpara-3, Impara-4, Impara-5, GH-TR-1; IR-69502-etc; IR7018-dst; IR70213-etc.

Immersion Resistant Varieties

- Soybean : Argomulyo, Burangrang, GH-SHR/Wil-60, GH 983/W-D-5-211
- Peanuts: Singa, Jarapah,
- Green beans: Kutilang, GH-157D-KP-1,
- Maize : Bima, Lamuru, Sukmaraga, Anoman,

RESEARCH AND DEVELOPMENT SUPPORT ADAPTATION ACTION PROGRAM OF AGRICULTURAL SECTOR

- Vulnerability analysis and the impact of climate change on agriculture.
- Development of information networks, communication systems, climate advocacy, modules, maps and guides/tools (Cropping calender, flood, drought)
- Development of adaptive crop varieties more extreme climate change (drought, high temperature, salinity, flood).
- Comprehensive study of the impact of peat land use.

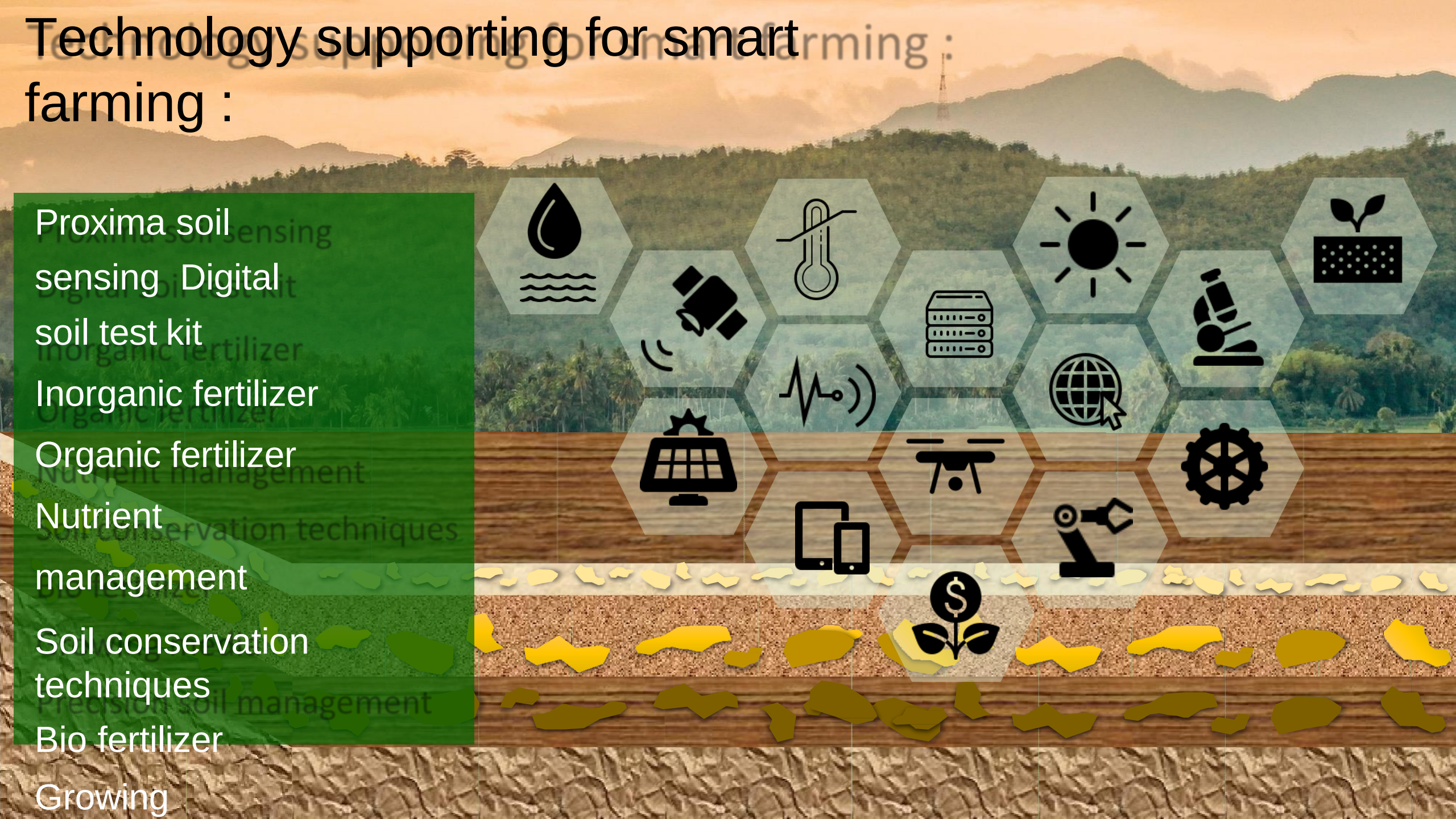
- Identification and mapping of climate change adaptation and mitigation
- Policy analysis for climate change adaptation and mitigation .
- Increased food production capacity through expansion and development of new agricultural land
- Improved agricultural research and development capabilities
- Adoption system or transfer of technology at the farm level

DRY LAND OPTIMALIZATION TECHNOLOGY

To meet food needs by 2050, Indonesia needs additional land of ± 14.9 million ha (rice fields, dry land and swamps).

The available DRY LAND covers an area of ± 10 million ha which is mostly in the form of degraded and abandoned land so it needs to be optimized.

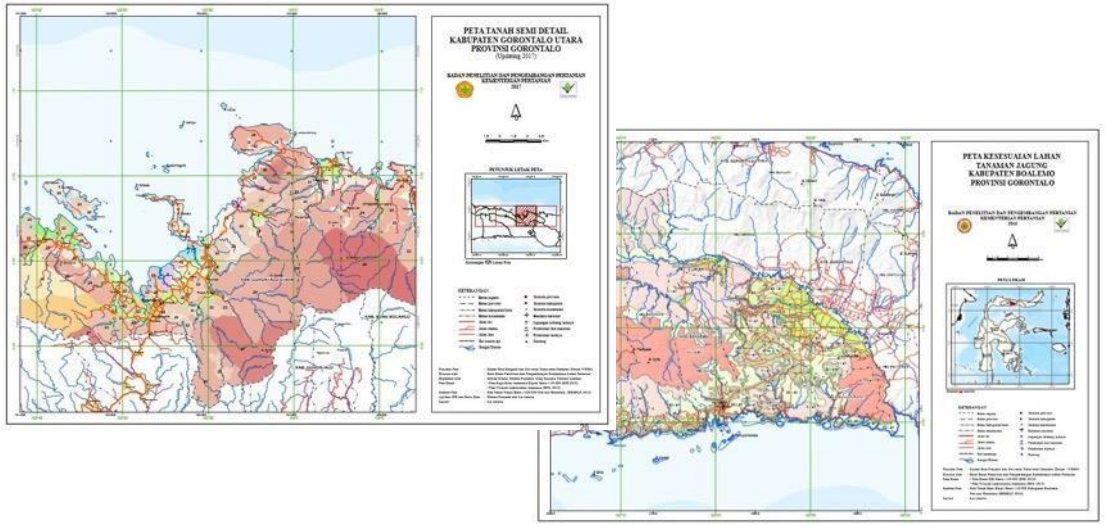
Technology supporting for smart farming :

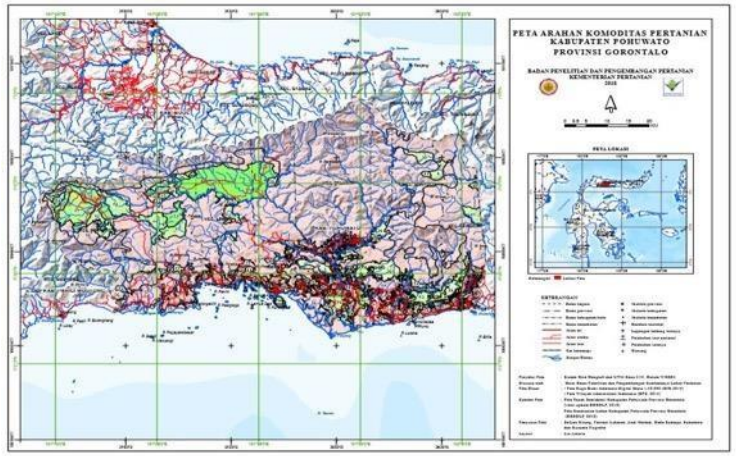


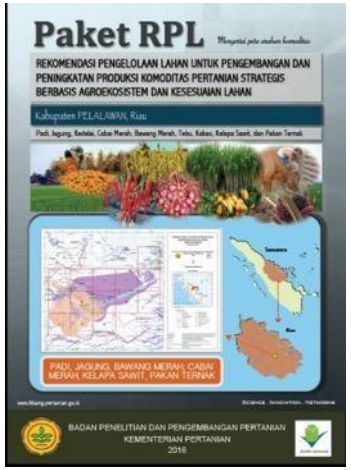
- Proxima soil sensing
- Digital soil test kit
- Inorganic fertilizer
- Organic fertilizer
- Nutrient management
- Soil conservation techniques
- Bio fertilizer
- Growing

Priority Product of Agricultural Land Resources of IAARD

- **Soil Map Semi detail Scale 1:50.000 of 511 districts / cities throughout Indonesia**
- **Land Suitability map of 9 Strategic commodities of MoA (rice, maize, soybean, shallot, chili, sugarcane, cocoa, palm, feed) of 511 districts / cities throughout Indonesia**
- **Strategic Agricultural Commodity Direction Map of 511 districts / cities throughout Indonesia**
- **Strategic Agricultural Commodity Land Management Recommendation Package of 511 districts / cities throughout Indonesia**

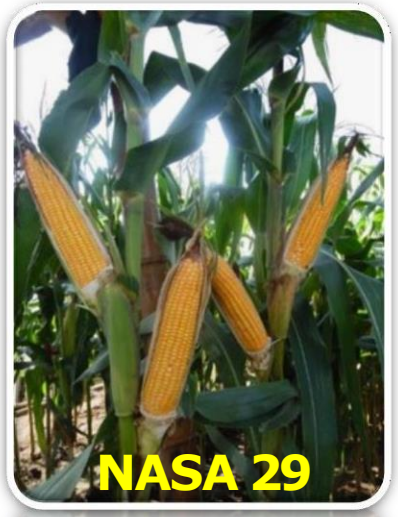






NEW SUPERIOR MAIZE TOLERANT ABIOTIC CONDITION AND HIGH PRODUCTIVITY

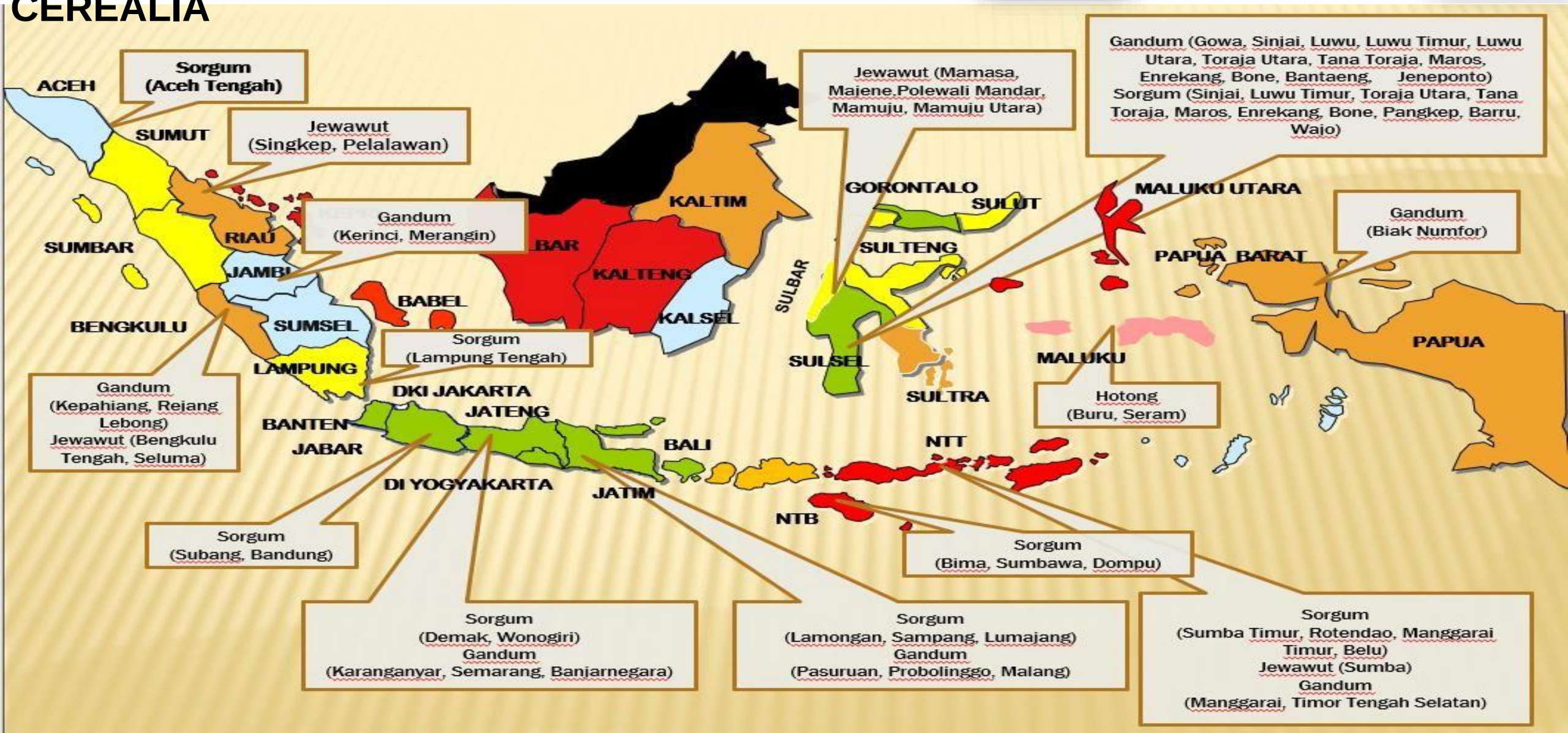
Characteristics	Variety	
Drought tolerant	BIMA 20	JH 36
	JH 27	JH 37
	JH 31	JH 45
Shadding tolerant	Jhana-1	JH 37



Characteristics	Productivity (t/ha)	New Variety
Maize for Feed	13,5	NASA 29, JH 29, JH 31 & JH 37
	21,5	JH 30, JH 32 & JH 45
	11,4	HJ 21, HJ 22
	10,1	JH 28, JH 36
	11,2	BIMA 1 - Bima 20 (semua hibrida)
Maize for Food	7,9	Srikandi
	6,0	Kuning,
	7,5	Srikandi

OTHER POTENTIAL CEREALIAPLANT

MAP OF DEVELOPMENT OTHER POTENTIAL CEREALIA



What is "*Water Harvesting Infrastructure*"

About 30,000 small ponds had been DEVELOPED

....
to increase ***c****ropping* ***i****ntensity per year*

FSV (Food Smart Village) : Water Use Efficiency - Local Food - Climate Change

CLOSED IRRIGATION (*Drip Irigation*):
: super efficient water-use irrigation, clean water, suitable for hilly area, horticulture (but still expensive material)




INTEGRATED TECHNOLOGY ON WATER MANAGEMENT in VERY ARID DRYLAND
: intermittent, water distribution technique, conservation agriculture, mixed crops with limited soil water source :

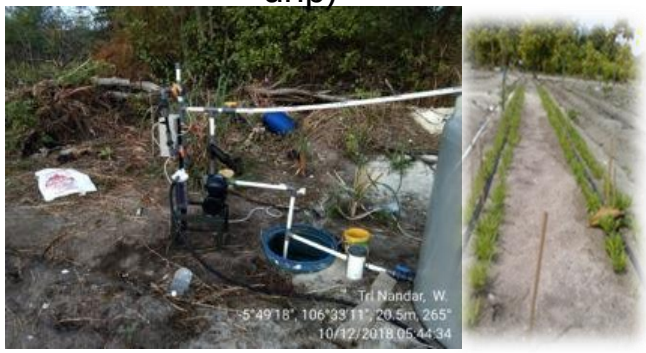

IRRIGATION TECHNOLOGY FOR WATER MANAGEMENT

Solar Irrigation ***… for coastal dryland***

is an environmentally friendly and high efficiency irrigation technology for horticulture

Tipe-3
(Pump DC; drip)

Tipe-2



Tipe-2
(AC Pump, Drip Irrigation)

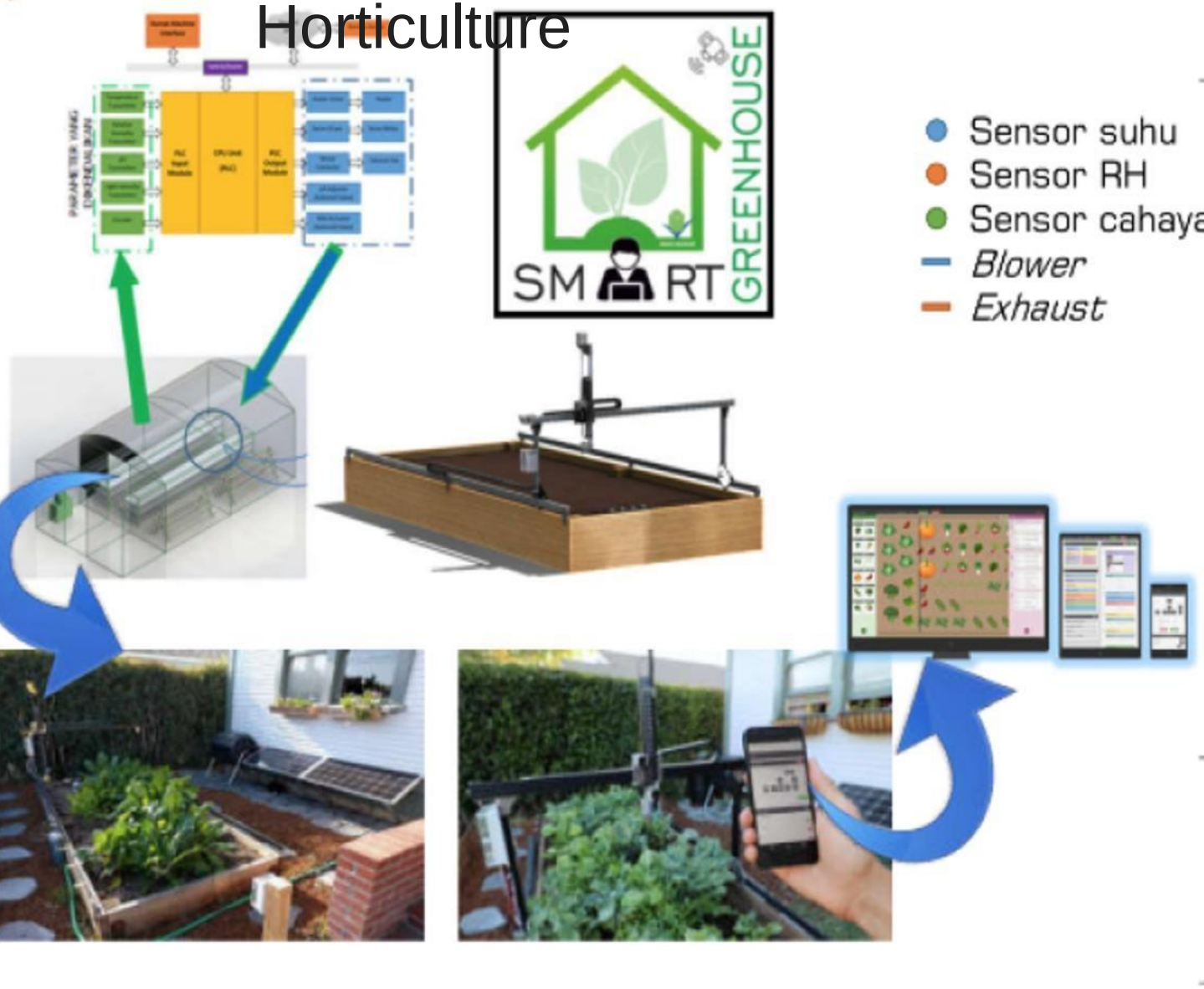
Specification:

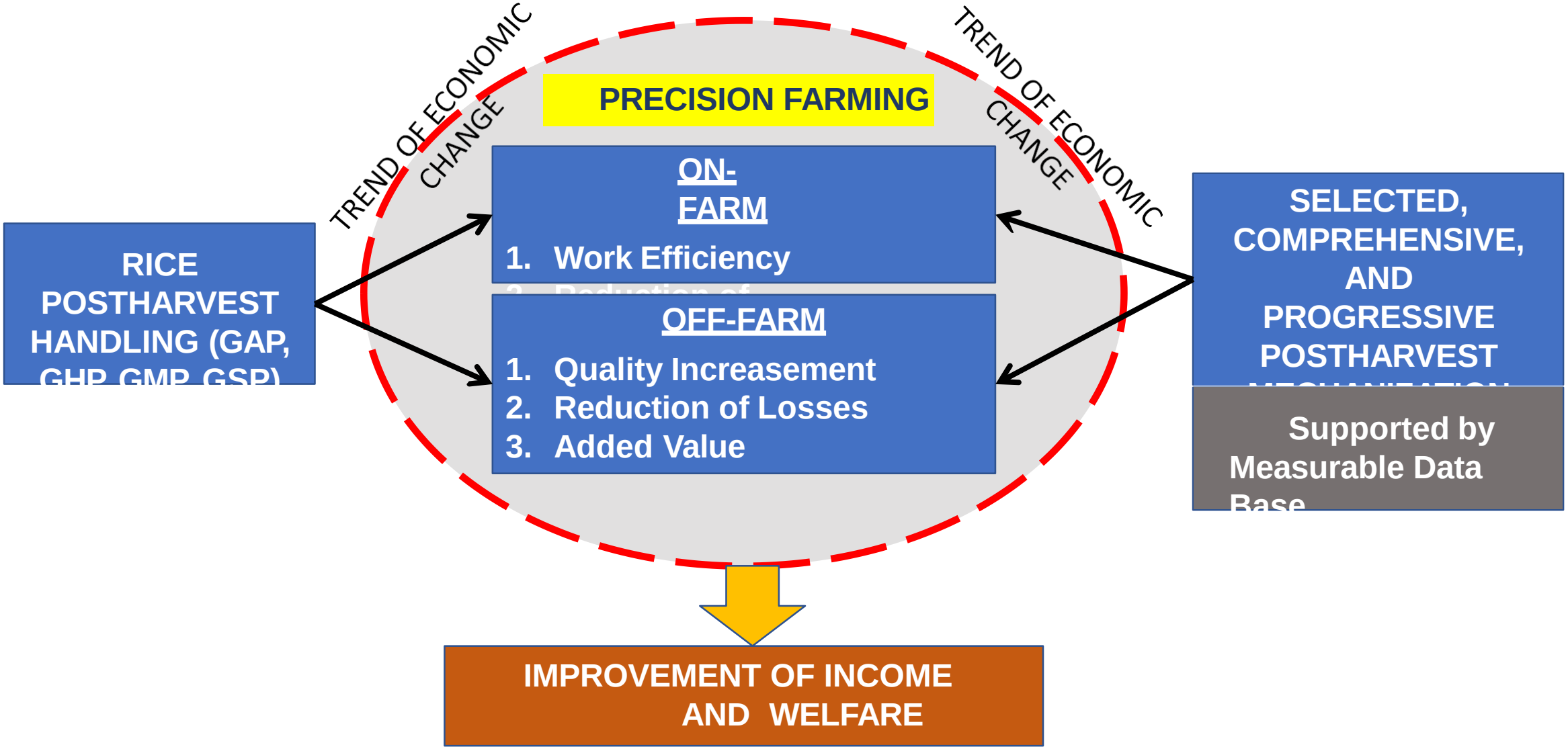
- Solar panel 100 – 400 WA
- Energy: Solar Pump (AC/ DC)
- Micro Irrigation System 0.5 – 1.0 ha
- Cost: 50 – 100 million IDR/unit
- Application: coastal land, dry land and swamp land

Tipe-1
(AC Pump, Bulk Irrigation)

DRONE FOR ENVIRONMENTAL FRIENDLY PESTICIDES

Smart Screen House Development for Horticulture




TREND OF ECONOMIC CHANGE
TREND OF ECONOMIC CHANGE
PRECISION FARMING
ON-FARM
1. Work Efficiency
OFF-FARM
1. Quality Increasement
2. Reduction of Losses
3. Added Value
RICE POSTHARVEST HANDLING (GAP, GHP, GMP, GSP)
SELECTED, COMPREHENSIVE, AND PROGRESSIVE POSTHARVEST
Supported by Measurable Data Base
IMPROVEMENT OF INCOME AND WELFARE

INFORMATION SYSTEM FOR AGRICULTURAL IN ERA 4.0

SALIN SOIL

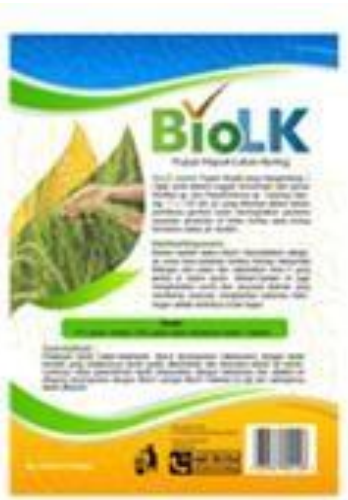
Lands exposed to salinity sources are found
along the coast:

- Low soil productivity (< 4 t/ha)
- SAR >12
- crop failure
- spoiled soil

❼ **Map of soil exposed to salinity**

Remediation:

1. Leaching with fresh water nearby
2. Amelioration with gypsum
3. Planting with saline-resistant varieties
   Rice: Way Apburu; Margasari; Lambur; GH-TS-1; GH-TS-2, Banyuasin, Indragiri
4. Providing good quality organic fertilizer
5. Use of fertilizers biological



Future Project on Dry Land Management for Agricultural Production

Objectiv
e:

- Developing dryland farming models with export-oriented horticultural commodities integrated with livestock adopting advanced cultivation and post-harvest and value added technologies that could increase productivity, value-added products, and marketing supply chains,
- Develop modern agricultural irrigation infrastructure and conservation techniques on dry land to support the successful
  development of location-specific and commodity-specific dryland agriculture
- Developing postharvest management and value added infrastructure and marketing of export-oriented horticultural products
- Developing institutional capital, markets, cooperatives, and enhancing, the ability of farmers based on corporations, and ensuring the supply chain of horticultural commodity marketing

The scope of project activities (5 Years duration):

- Preparation of the Grand Design model of modern dryland agriculture
- Development of modern agricultural irrigation infrastructure and conservation techniques
- Development of postharvest management and value added infrastructure and marketing of export-oriented horticultural products
- Strengthening of horticultural farmer institutions through corporation model based on information technology, and optimizing horticultural commodity supply chain marketing


Terima Kasih
Thankyou