

Leading the Way for Climate-Smart Agriculture through Machinery and Practices in Indonesia

Presentation by

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Area : 5.193.250 km²
- Land : 1.919.440 km²
- Water : 3.273.810 km²
Island : 17.508
Population : 253 000 000

- Agricultural land : 70,2 mill ha**
- **Wetland paddy : 8.11 mill ha**
 - **Dry Land : 11.87 mill ha**
 - **Plantation : 18,5 mill ha**
 - **Meadow/pastures: 2,4 mill ha**
 - **Yard : 5,4 mill ha**
 - **Ponds : 0,8 mill ha**
 - **Timber Plants : 9,3 mill ha**
 - **Sub optimal lands: 11,3 mill ha**

MAJOR AGRICULTURAL PRODUCTS (2014)

- The rainy season : October to April
- The dry season : April to October
- Land holding : 0,3 - 0,5 ha/farmer

No.	Commodity	Harvested Area (ha)	Productivity (Ton/ha)	Production (Ton)
1	Paddy	13.569.941	5,15	69.870.950
2	Corn	3.786.376	4,89	18.548.872
3	Soybean	601.237	1.48	892.602
4	Ground nut	501.142	1,32	664.003
5	Green beans	180.055	1,17	210.819
6	Cassava	1.149.208	22,99	26.421.770
7	Sweet potato	156.862	15,07	2.363.568

NUMBER OF AGRICULTURAL MACHINERY IN INDONESIA

NO	AGRICULTURAL MACHINERY	2015
1	2 Wheel tractor	216 174
2	4 Wheel tractor	3 887
3	Irrigation pump	148 275
4	Rice transplanter	5 617
5	Combine harvester	1 090
6	Thresher	70 678
7	Grain dryer	2 323

Source: Sudaryanto, 2016

TARGET OF INDONESIA AGRICULTURE DEVELOPMENT



SUSTAINABLE FOOD SUFFICIENCY & SECURITY



INCREASING FOOD DEVERSIFICATION



**INCREASE ADDED VALUE,
COMPETITIVENESS AND EXPORT**



INCREASING FARMER WELFARE

PROBLEMS IN ACHIEVING SUSTAINABLE FOOD SELF SUFFICIENCY

LAND

- High land conversion rate (+/-60 000ha/year)
- Small land holding (0.3 ha/farmer)

INFRASTRUCTURE

- Poor maintenance of irrigation & drainage facilities (48% was not function properly)
- High cost of food production

AGRICULTURE INPUT

- Seed and fertilizer production and distribution system does not work properly
- Limited number and low utilization of Farm machinery

CLIMATE CHANGE & ENVIRONMENT

- Flood, drought, pest & disease explosion

COMPETITIVENES

- Lack of agricultural labor (5 mill agricl' labor shifted to non agricultural job within 10 year) → high labor cost, low crop index
- High losses, Low product quality

The Impact of Climate Change in Indonesia

- 1. Decreasing capacity of water in some large reservoirs: (5.7→4.9 mill m³/year), Citarum, Gajah Mungkur & Kedung Ombo**
- 2. Delay planting season → decreases rice production in West Java and Central Java 6.5%, Bali 11%**
- 3. Decreases planting area & Increased land area prone to drought (0.03 to 3.1%) / flood (1,4 to 7,8%) & inundated area (0,8 → 13,8%)**
- 4. Disorderly/failure of flowering system → Reduce production of fruit & estate crop: 5-8% → more than 20%**
- 5. In 2015 delay of rainy season by more than 1 month and in 2016 rainy season start 2 month earlier → flood**

PROGRAM PRIORITY OF MOA TO ACHIEVE SUSTAINABLE RICE SELF SUFFICIENCY

IRRIGATION

- Improvement of tertiary cannal
- Maintenance of main Irrigation cannal

SEED

- Supply of seed to the farmer on time
- Support seed industry

SUSTAINABLE FOOD SELF SUFFICIENCY

AGRICL' MACHINERY

- Farm machinery grand to overcome lack of labor, increasing cropping index and reducing post harvrst losses, reducing labor cost
- Optimation of existing farm machinery.

FERTILIZER

- Supply of fertilizer to the farmer on time
- Improvement of distribution system
- Utilization organik fertilizer

EXTENSION

- Farmer group
- Custom hiring
- Water user association

AGRICULTURAL TECHNOLOGY & INNOVATION TO SUPPORT SUSTAINABLE SELF FOOD SUFFICIENCY

A

- R&D to develop New superior variety of crops and cattle, Pest & disease control;

B

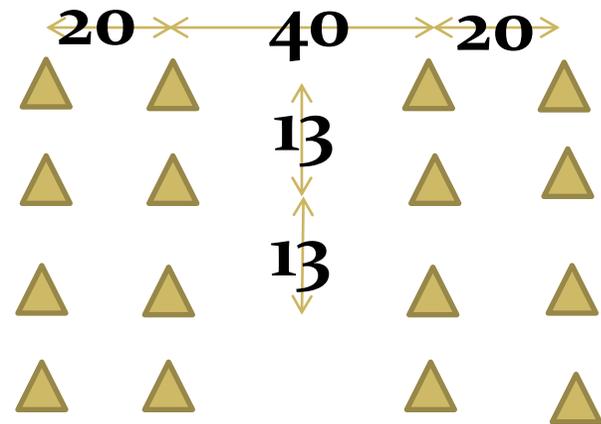
- R&D to develop Agricultural machinery specific location, Land, water and fertilizer management, Improve crops management through “JAJAR LEGOWO SYSTEM”, Post harvest handling and processing

C

- Agricultural planning and management based on IT
 - Crop calendar
 - Dynamic standing crops map
 - Expert system for pest and disease control
 - Expert system for farm machinery distribution



**“JAJAR LEGOWO”
TRANSPLANTER
FOR PADDY**



BEST PRACTICES OF DEVELOPMENT AND UTILIZATION OF AGRICULTURAL MACHNERY

- ▶ **JAJAR LEGOWO TRANSPLANTER**
- ▶ **Designed and developed in 2013 - 2014**



1000 unit was produced and marketted in 2015
2000 unit was produced and marketted in 2016



**Using combination of “Jajar Legowo Super
“techniqe and Transplanter, Rice productivity
has increase from 6 ton/ ha to 9.5 ton/ ha of
dried paddy in Central Jawa (2016)**



SEEDLING PREPARATION FOR JAJAR LEGOWO SYSTEM

- Using seedling trays
- Amount of seed 30% higher than existing system



Paddy seedling practices for Jajar Legowo Transplanter at corporate farming in Sukoharjo- Central Jawa



Paddy seedling practices for Jajar Legowo Transplanter in East Kotawaringin, Central Kalimantan



TRANSPLANTER AND JAJAR LEGOWO TECHNIQUE



- ▶ Increase the number of crops by 30 %
- ▶ Increase Rice Yield 20-30%
- ▶ Machine capacity : 6 - 7 h/ha
- ▶ 7 Indonesian Agricultural Machinery Industries has produced and marketed Transplanter Jajar Legowo

MINI COMBINE HARVESTER



- ▶ **Reduced harvesting cost 30%**
- ▶ **Grain losses 1,87%**
- ▶ **Capacity 7 - 9 h/ha**
- ▶ **5 Indonesian agricultural machinery industries has produced and marketing mini combine harvester**

MEDIUM SIZE COMBINE HARVESTER



- ▶ Reduced harvesting cost 30%
- ▶ Grain losses < 2%
- ▶ Capacity 4-6 h/ha
- ▶ 4 Indonesian agricultural machinery industries has produced and marketing mini combine harvester

R&D ON AGRICULTURAL MACHNERY FOR MAIZE

- ▶ MAIZE AND PADDY COMBINE HARVESTER
- ▶ RUBBER TRACK SHOE ROTAVATOR CUM DECOMPOSER



TO INCREASE CROPPING INTENSITY, REDUCE LOSSES AND COST, IN 2015 MOA OF INDONESIA HAS GRANTED NUMBER OF AGRICULTURAL MACHINERY TO THE FARMER GROUP

NO	AGRICULTURAL MACHINERY	NUMBER	UNIT
1	2 Wheel Tractor	26 100	Unit
2	4 Wheel Tractor	1 000	Unit
3	Irrigation Pump	8 178	Unit
4	Rice Transplanter	5 000	Unit
5	Chopper	697	Unit

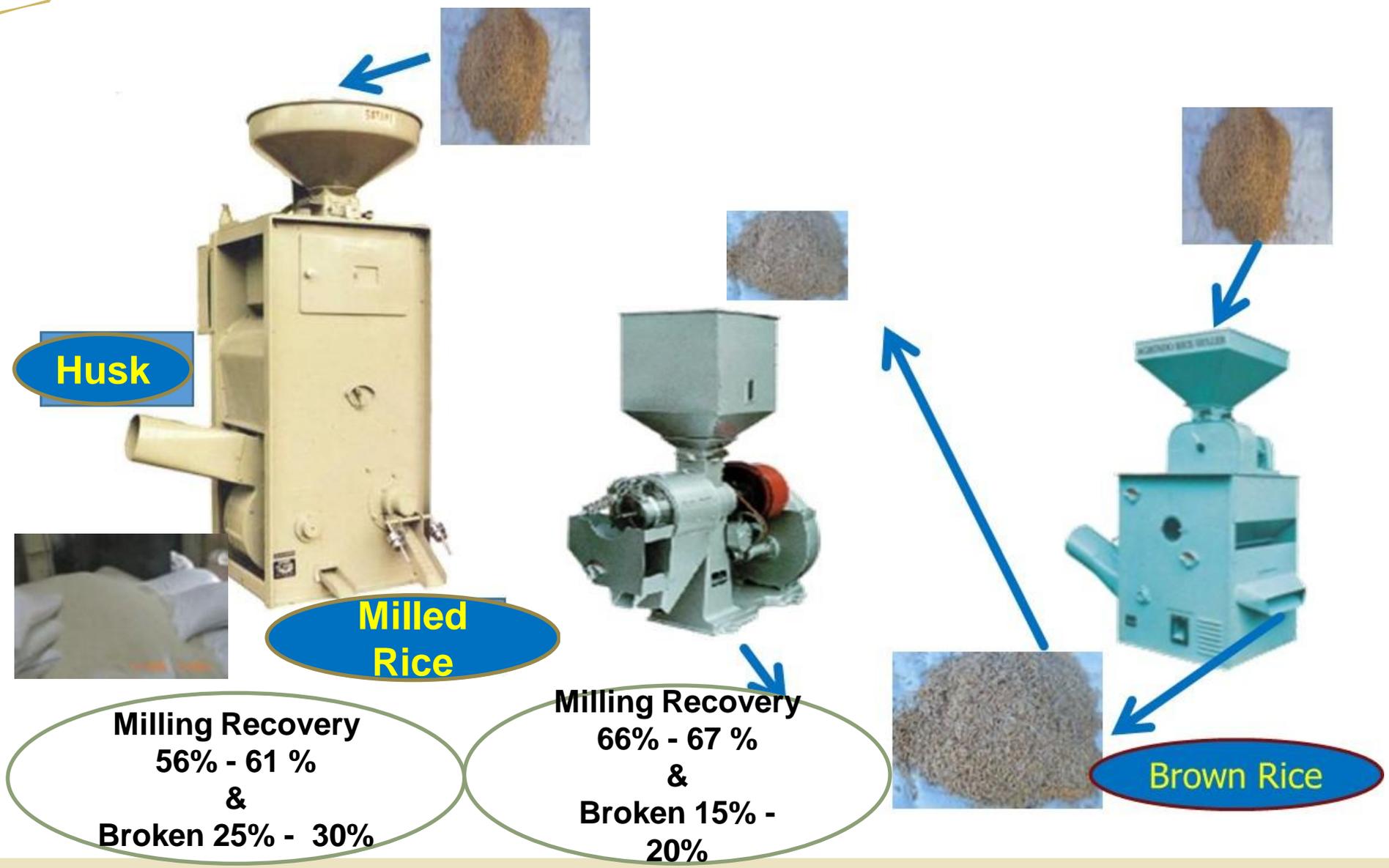
THE USE OF AGRICULTURAL MACHINERY HAS SPEED UP FIELD ACTIVITY IN MANY PROVINCES IN INDONESIA

Field activity	Manual (man days)	Full Mechanized (day)	Time Reduction	
			(man days)	%
• Land preparaation	20	3	-17	-85,0
• Seedling and planting	19	7,5	-11,5	-60,5
• Weeding	15	2	-13	-86,7
• Harvesting	40	7,5	-32,5	-81,3
Total	94	20	-74	-78,4

THE USE OF AGRICULTURAL MACHINERY HAS REDUCE LABOR COST

Activity	Manual (Rp/ha)	Full Mecanized (Rp/ha)	Cost reduction	
			Rp	%
• Land preparaation	1.600.000	1.200.000	-400.000	-25,0
• Seedling and planting	1.720.000	1.100.000	-620.000	-36,0
• Weeding	1.200.000	510.000	-690.000	-57,5
• Harvesting	2.857.125	2.285.700	-571.425	-20,0
Total	7.377.125	5.095.700	-2.281.425	-30,9

MILLING RECOVERY OF SMALL RMP



Thank you.

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