

INTENSIFICATION OF RICE TECHNOLOGY GENERATION TO SUPPORT 100% SSL

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**Abiotic
factors
(drought
and flood)**

**Weedy
Rice**

**Water
requirement**

**Insect
pests and
diseases**

**High post
harvest
losses
(28 – 35%)**



Issues in Rice Production

RICE

Value Chain

PADDY

Invest : RM 12.9 juta
Benefit : RM 10.2 billion
ROI : 738%

Hybrid Rice

-Development
Stage

Inbred Rice

Acreage : 90% granary.
Contribution to economy
:RM1.6bilion
Stakeholder: MADA, KADA, IADA,
Farmers

Clear Field Rice :

To overcome weedy
rice problem
Contribution to
economy: RM50
million

Aerobic Rice:

Area : 1000ha (non granary)
Stakeholder : FELCRA & Farmers

Liquid Paddy fertilizer: Nutri Biotech
Fertilizer Sdn Bhd (RM10 mil)

Zeolite fertilizer: Hipotech Sdn Bhd (RM2.2 mil)

Rice based product: Jabi Rice Sdn Bhd (baby
food)

Red Rice

Planted in Tanjung Purun & Sri
Aman (Sarawak)

Reduction to 2% Post Harvest Losses (Paddy)

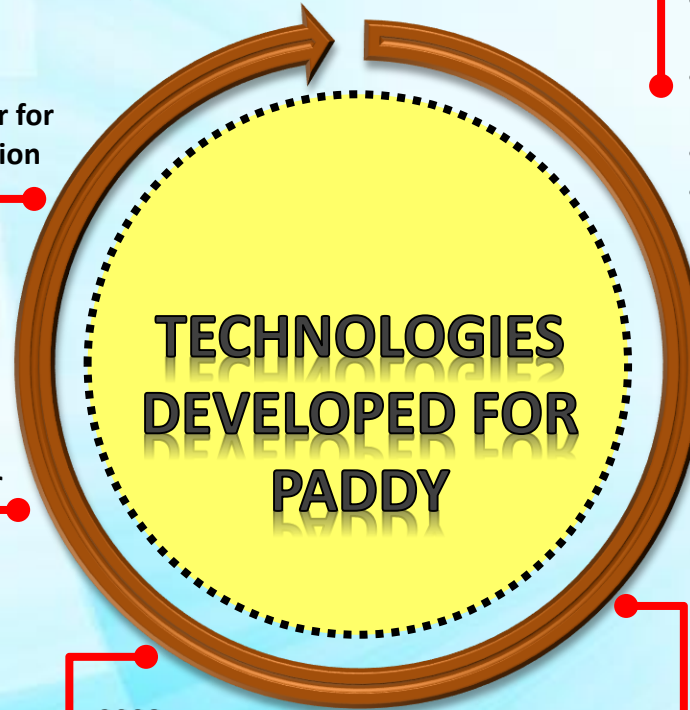
1% = RM64 million
Achievement in 2014
2.58%= RM165 million

Specialty Rice

Yield: 4 mt/ha

Reduced importation of specialty
rice valued at RM700 mil
Stakeholder: 5 anchor companies

RICE



1992

- Portable Rice Thresher
- Recycling of drainage water for rice irrigation in MUDA region

1994

- Multipurpose paddy tractor

1998

- Mechanized fertilizer application with knapsack powered broadcaster

2010

- Knapsack powered wetland paddy row seeder

2009

- Aerobic Rice Fertilizer Package
- Granular organic fertilizer from paddy husk
- Padiview – Paddy quality analyzer

2008

- Aerobic Rice-Water saving rice production system
- QMAP – Low cost and rapid field plot digital mapping technique
- Integrated management of golden apple snail
- TRANS-Pack – Precision forming production package for large scale mechanized transplanting of rice
- BOX Leveler – Cost effective field levelling implement for large scale precision rice farming

2004

- Direct Seeding-Weedy Rice Management Package
- Controlled Atmosphere storage of stockpile rice in concrete silo
- Zeolite fertilizer for paddy
- Flavoured emping products

2006

- Water Seeding-Weeds and Weedy Rice Control
- Management of rice field rat using trap barrier system
- RiPE – rice population estimation using image digital
- MRQ74 fingerprinting
- Nutritious Malaysian traditional cakes from rice bran

2007

- Water saving irrigated rice production
- Biological control agent for disease management yield enhancement of rice
- Fertilizer package for rice grown under non flooded saturated soil conditions
- eWeeds-Decision support system for weeds in rice cultivation
- CREST – Package for yield enhancement of direct seeded rice

RICE

2000

- 2001 Rice variety MR219
- Yield (tan/ha) : 6.5 – 10.5
- 2003 – Rice variety MR220 :
5.0 – 9.5 t/ha
- 2005 – Rice variety Wangi MRQ74 (MASWANGI) : 4.5 – 5.5 t/ha
- 2006 Rice variety MR232 :
Yield (tan/ha) : 6.5 – 8.5
- 2010 Rice variety MR253 :
Yield (tan/ha) : 5.5 – 6.0
- 2010 Rice variety MR263 :
Yield (tan/ha) : 5.5 – 6.0
- 2010 Rice variety MR220CL1 & MR220CL2:
Yield (tan/ha) : 5.0 – 9.5
- 2012 – Rice variety Wangi MRQ76 :
Yield (tan/ha) : 4.5 – 5.5 t/ha
- 2012 – Rice variety MR269 : Yield (tan/ha) : 7.5 – 9.9 t/ha
- 2013- Rice variety MR1A: Yield (tan/ha): 2.0-3.0 t/ha
- 2015 – Rice variety MARDI 284 (tan/ha): 5.0-9.2 t/ha

1973

- Rice variety Jaya (C4-63)
- Yield (tan/ha) : 3.5 – 5.0

1980

- 1981 – Rice variety Kadaria (MR27) :
3-5 t/ha
- 1984 - Rice variety Manik (MR52):
4 -5 t/ha
- 1984 - Rice variety Seberang (MR77):
5 -5.5 t/ha
- 1985 - Rice variety Makmur(MR73):
4.5-5.5 t/ha
- 1986 - Rice variety MR84
4.0 - 6.2 t/ha
- 1988 - Rice variety MR81
4.2 - 6.0 t/ha

PADDY VARIETIES RELEASED

1990

- 1990 – Rice variety MR106 : 4.5 – 7.0 t/ha
- 1990 – Rice variety Pulut Hitam PH9 : 4.0 -4.5 t/ha

- 1991 – Rice variety MR127 : 4.5 – 6.0 t/ha
- 1995 – Rice variety MR159 : 3.0 – 5.4 t/ha
- 1995 – Rice variety MR167 : 4.0 – 6.0 t/ha
- 1995 – Rice variety Wangi MRQ50 : 4.0 – 5.0 t/ha
- 1999 – Rice variety MR211 : 4.0 – 5.0 t/ha



Resistant to major pests and diseases : Blast, bacterial leaf blight, brown plant hopper


Rice varieties with high yielding potential 10-12 tons/ha : Inbred & hybrid



Improved disease resistance of elite varieties MR219 and MR263 through MAS


Introducing improved varieties to accelerate new varieties released

STRENGTHEN RICE BREEDING PIPELINES



High quality varieties, to meet demands of niche markets : aromatic

Variety for specific site, purpose or product and adaptation



Aromatic, low amylose, medium gel consistency



Feed rice, marginal soil, organic and aerobic condition

Seven years of intensive research had enabled the development of four potential hybrid rice varieties that will be assessed in multi location trials during the in coming off season 2016. Their genetic and environmental interactions will be determined.



Two CMS lines HY004H & HY010H developed for the hybrid rice breeding program



POTENTIAL LINES SELECTED FOR SPECIFIC ENVIRONMENTS



MR 253

Acid sulphate soil



Flood prone areas

MR 255





- **MECHANISATION SUITABLE FOR SOFT SOIL (WITHOUT HARDPAN)**



Full track



2-half track



4-half track



MADOX

NEW GENERATION IPM



Intensification
and
improvement of
current
Integrated pest
management
(IPM) practices

Artificial rearing
of parasitoid for
early pest and
brown plant
hopper
management

Polyvarietal
cultivation
concept for
blast disease
management



Physical control



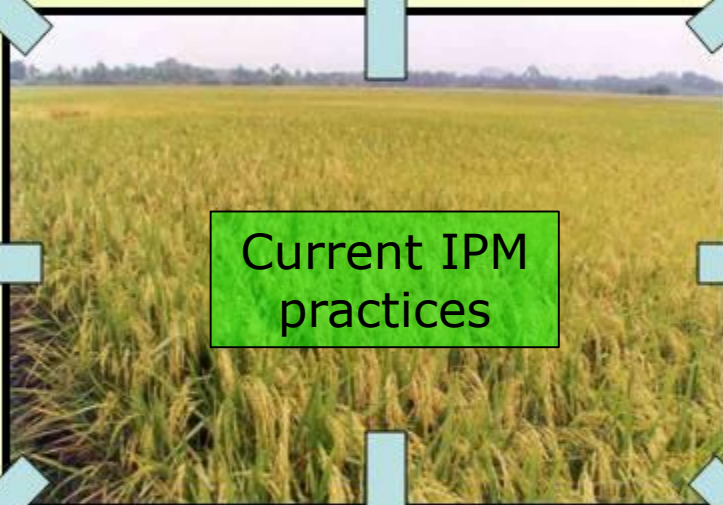
Host plant resistance



Crop surveillance



Current IPM practices



Crop establishment



Crop establishment



Biological control



Chemical application

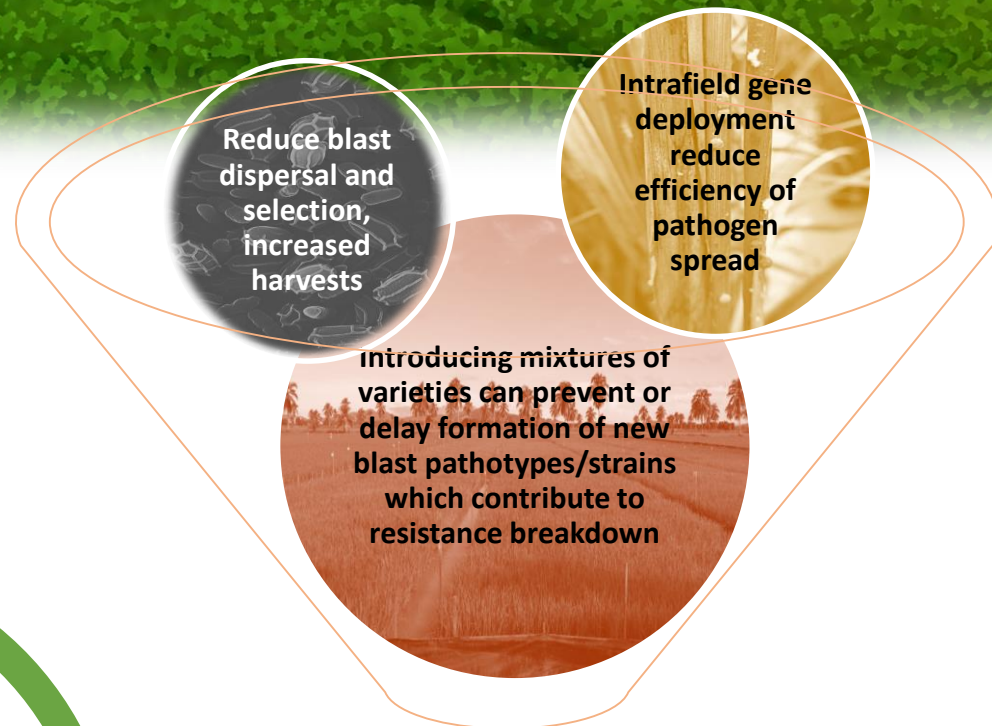
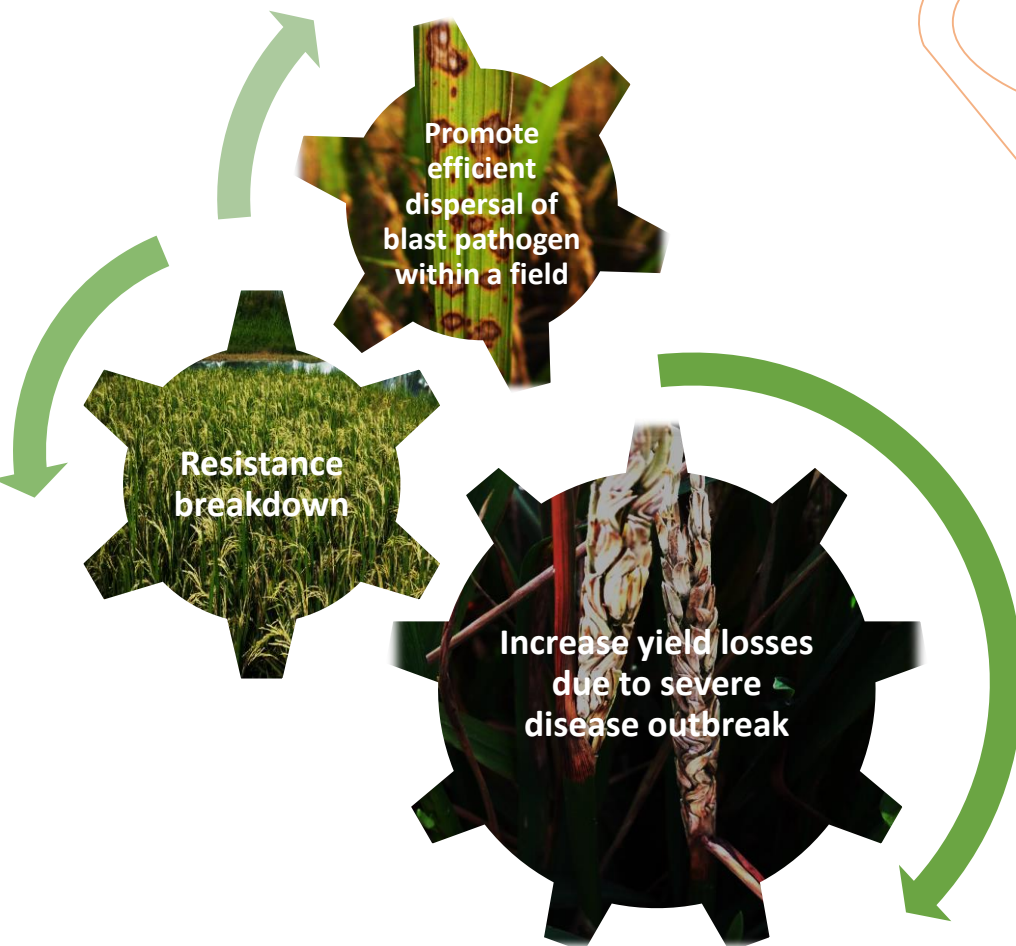


Biological control



Polyvarietal cultivation : Planting of a plot of land with several varieties of the same crop

— MONOCULTURE CULTIVATION



+ POLYVARIETAL CULTIVATION



Precision farming

- ✓ Combined harvester sensory system to evaluated rice yield monitoring and mapping
- ✓ Digital map (QMAP) using images from remote satellite and aerial images
- ✓ Land leveling index derived using commercial instrument, Geo-star
- ✓ Soil quality tilt sensor
- ✓ Plant population monitoring sensor system
- ✓ Plant nitrogen monitoring using digital camera mounted onto a below-cloud remote aircraft
- ✓ DSS software for plant establishment (CREST)
- ✓ Fertilizer recommendation (FERTO)
- ✓ Rice plant nitrogen indicator, GAI model
- ✓ Weeds and pest management (eWeeds, and ePest)
- ✓ Variable Rate Tractor for granular applications of seed and fertilizer
- ✓ Mechanical transplanter as a light weight sprayer, CAREKIT

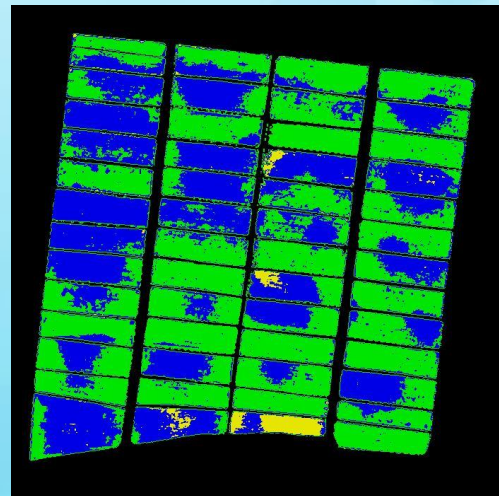
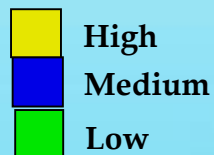
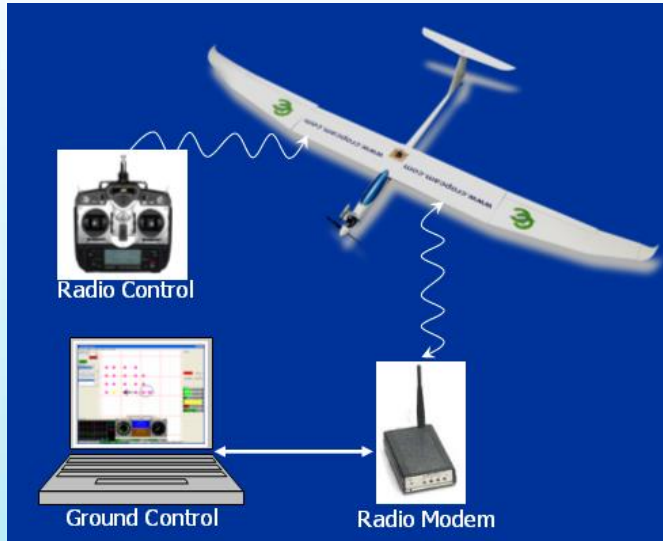


UNMANNED AERIAL VEHICLE (UAV)

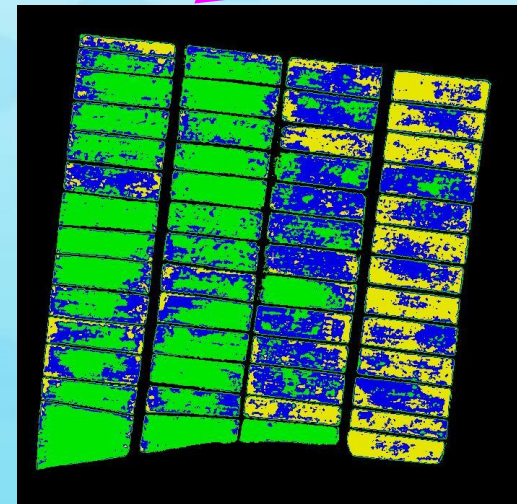
- UAV fitted with digital camera
- Coverage 4,000 ha/day (RM3.00/ha)
- Management of in-homogenous crop growth, nutrient deficiency, pest / disease infestation



Plant population and SPAD value estimation using remote sensing technique for rice production



Plant population map



SPAD value map

PHL Processes and Aspiration

Aspiration : Reduce post harvest losses (PHL) currently at 28.5%*.
Focus on harvesting (2014) to reduce by 2%.

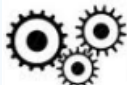
Transformation Focus



Man



Machine Ownership



Machine Mechanism



Crops Maturity



Transportation
(6.0 % Loss)

Harvesting
(9.0%
Loss)

Drying
(3.5%
Loss)



Milling
(6%
Loss)



Storage
(4%
Loss)



28.5%

Paddy PHL (730k tonnes)

RM918m

PHL value
Per annum

*References: 1. MARDI report 2010 2. MARDI Res Bulletin 1984



REHABILITATION AND DEVELOPMENT OF NEW IRRIGATION SCHEMES AND IMPROVING IRRIGATION





ESTATIZATION OF RICE FARMING

CENTRALIZED
MANAGEMENT

EFFICIENT
MACHINERY
MOVEMENT,
ADEQUATE
IRRIGATION AND
DRAINAGE
SYSTEMS

CULTIVATION
INTENSIFIED

SAVES LABOR
UTILIZATION
THROUGH
MECHANIZATION



STRATEGIES FOR THE FUTURE

1. Increase productivity per unit area
2. Agronomic revolution to close existing yield gaps
3. Delivery of new post-harvest technologies
4. Accelerate variety replacement
5. Strengthen breeding research for the future
6. Tap the vast genetic reservoir
7. New generation of rice scientists & professionals
8. Infrastructure investments
9. Policies that support productivity growth
10. Policy intervention for fast track release of MAS generated lines
11. Quality seed production & rapid diffusion to stress prone areas



CONCLUSION

YIELD : ~ 5.0 tons/ha
ACREAGE: 700,000 ha
Rice production: ~2.1 MT

YIELD : ~ 3.0 tons/ha
ACREAGE: 160,000 ha
Rice production: ~0.3 MT

PHL Reduces from
28.5 to <10.0%
Rice production: ~0.4 MT

YIELD : ~ 5-6 tons/ha
ACREAGE: 700,000 ha
Rice production: ~2.4 MT

YIELD : ~ 4.0 tons/ha
ACREAGE: 160,000 ha
Rice production: ~0.4 MT

YIELD : ~ 7.0 tons/ha
ACREAGE: 700,000 ha
Rice production: ~2.8 MT

OPTION 1

GRANARY
Current yield : 3.8 tons/ha
Acreage : 674,322 ha
Estimated production : 1.68 MT

OPTION 2

NON GRANARY
Current yield : 2.1 tons/ha
Acreage : 152,529 ha
Estimated production : 0.19 MT

OPTION 3

100 SSL%



72% SSL





Thank You

