



# *Rice breeding, production and distribution of rice in Malaysia*

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# OVERVIEW OF RICE INDUSTRY (2013)

planted area	671,679ha
average yield	3.876 t/ha
total production	2.604 million tonne
price	RM 1,200
population	28.96 mil
per capita consumption	78.8 kg/person/year
total milled rice production	1.68 million tonne
total import	1.01 million tonne (RM1854mil) including 0.63 million tonne fragrant rice(RM1096 mil)
self sufficiency level(SSL)	71.7 %
certified seed producer	8
rice grower	296,000
total rice mill	230

# Average granary yield (Off season 2013)

granary	average yield (t/ha)
MADA	5.3
KADA	3.7
IADA Kerian/Sg. Manik	4.5
IADA Pulau Pinang	5.8
IADA Ketara	5.5
IADA Barat Laut Selangor	6.2
IADA Seberang Perak	4.9
IADA Kemasin/Semerak	3.9

Source: RICE STATISTICS DOA (2013)

► Marketable rice in Malaysia is categorised as:

- ✓ Super Special (LOCAL)
- ✓ Super Import

► Specialty rice is categorised as:

- ✓ fragrant rice
- ✓ Basmati rice
- ✓ glutinous rice
- ✓ coloured rice
- ✓ Japonica rice

► All of the specialty rice are imported and marketed under different brands

# PRODUCTION & IMPORTS

	1990	2000	2006	2007	2008	2009	2010	2011	2012	2013
<b>PRODUC-TION – MT</b>	1.22	1.38	1.38	1.53	1.52	1.62	1.64	1.67	1.70	1.67
<b>SSL (%)</b>	78.7	70.0	62.2	65.7	58.2	58.9	63.8	62.5	63.0	62.5
<b>IMPORT - MT</b>	0.33	0.59	0.84	0.80	1.09	1.13	0.93	1.0	1.0	1.0



# RESEARCH PROGRAMME

## HYBRID RICE

- Varietal development
- Agronomic package
- Seed production

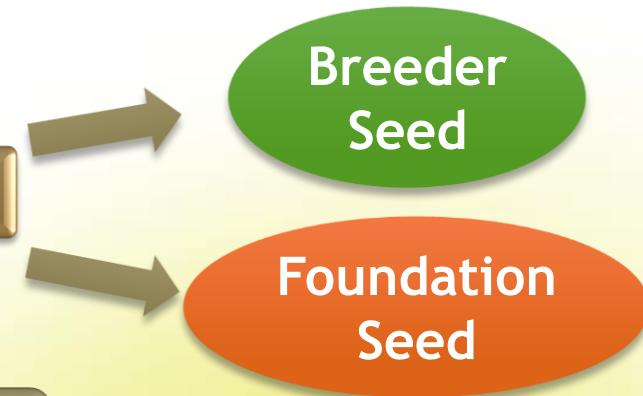
## INBRED RICE

- Varietal development
- Pest and disease management

## SPECIALTY RICE

- Varietal development
- Agronomic package





# MALAYSIAN RELEASED RICE VARIETIES

1	MALINJA	1964	21	MR 81	1988
2	MAHSURI	1965	22	MR 103	1990
3	RIA	1966	23	MR 106	1990
4	BAHAGIA	1968	24	P. HITAM 9	1990
5	MURNI	1972	25	MR 123	1991
6	MASRIA	1972	26	MR 127	1991
7	JAYA	1973	27	MR 159	1995
8	S. MALAYSIA 1	1974	28	MR 167	1995
9	S. MALAYSIA 2	1974	29	MR 185	1997
10	P. MALAYSIA 1	1974	30	MR 211	1999
11	SETANJUNG	1979	31	MRQ 50	1999
12	SEKENCANG	1979	32	MR 219	2001
13	SEKEMBANG	1979	33	MR 220	2003
14	KADARIA	1981	34	MRQ 74	2005
15	P.SIDING	1981	35	MR 232	2006
16	MANIK	1984	36	MR 220 CL 1	2010
17	MUDA	1984	37	MR 220 CL 2	2010
18	SEBERANG (MR 77)	1984	38	MRM 16	2010
19	MAKMUR	1985	39	MR 253	2010
20	MR 84	1986	40	MR 263	2010
			41	MRQ 76	2012
			42	MR 269	2012
			43	MR 284	2015



# RELEASED VARIETIES (1964 – 2015)

**white rice = 34**

**Glutinous rice = 3**

**Black glutinous = 1**

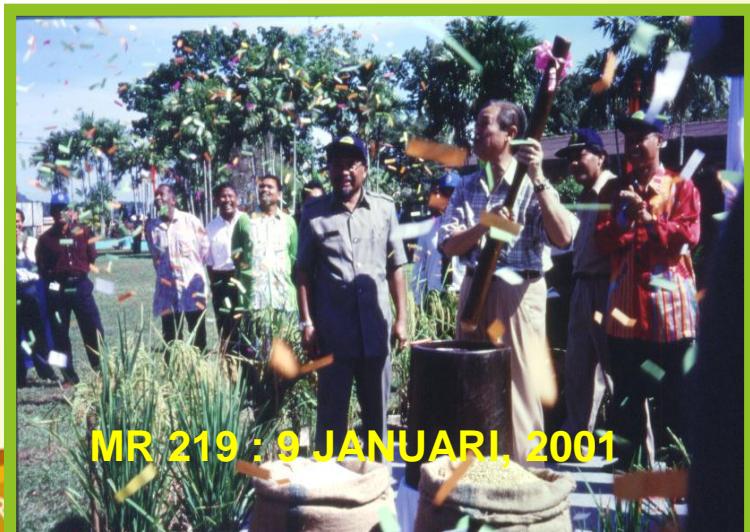
**Fragrant rice = 3**

**herbicide tolerance CL 1 & 2= 2**

**total = 43**



**MR 220 : 10 OKT. 2003**



**MR 219 : 9 JANUARI, 2001**

# MR 253- Rice Variety for Marginal Areas

- ▶ Average yield - 4.5-6.8 t/ha)
- ▶ Maturation - 105-112 days
- ▶ Short and semi-erect plant
- ▶ Long and slender grain
- ▶ Intermediate amylose content
- ▶ Resistant to foliar blast
- ▶ Moderately resistant to panicle blast and brown plant hoppers (BPH)
- ▶ Suitable for planting in organic clay muck (OCM) soil where brown leaf spot disease and iron toxicity can be severe
- ▶ Beneficial to farmers in PBLS, Selangor, and Rompin, Pahang



# MR 263- High Yield Variety

- ▶ Average yield - 7.5 to 9 t/ha)
- ▶ Maturation - 109-112 days
- ▶ Short and semi-erect plant
- ▶ Long and slender grain
- ▶ Intermediate amylose content
- ▶ Resistant to foliar blast
- ▶ Resistant to panicle blast and brown plant hoppers (BPH)



# MR 269- High Yield Variety

- ▶ Average yield - 7 to 7.9 t/ha)
- ▶ Maturation - 104-109 days
- ▶ Tall plant
- ▶ Long and slender grain
- ▶ Intermediate amylose content
- ▶ Resistant to foliar and panicle blast
- ▶ This variety is not resistant to lodging and less nitrogen application is recommended especially in main season



# MRQ 76

## Fragrant Rice Variety

- ▶ Average yield - 5 to 6 t/ha)
- ▶ Maturation - 109-112 days
- ▶ Moderate tall plant type
- ▶ Long and slender grain
- ▶ Soft and sticky rice
- ▶ Designated for non granary



# **MRIA1- Rice Variety Suited for Aerobic Condition**

- ▶ Average yield - 1 to 2 t/ha)
- ▶ Maturation - 90-95 days
- ▶ Long and slender grain
- ▶ Intermediate amylose content
- ▶ Resistant to foliar blast
- ▶ Poor tillering



# MR 284 – new rice variety



character	MR 284	MR 219
<b>morphology</b>		
maturation	105-108	104-111
culm height (cm)	74-82	76-81
Panicle length (cm)	24-25	23-25
1000 grain weight (g)	27-28	24.8

<b>character</b>	<b>MR 284</b>	<b>MR 219</b>
<b>Pest and disease</b>		
leaf blast	resistant	moderate susceptible
panicle blast	moderate susceptible	susceptible
bacterial leaf blight	moderate susceptible	moderate susceptible
tungro	moderate susceptible	moderate susceptible
brown plant hopper	moderate resistant	moderate resistant
sheath blight	moderate susceptible	moderate susceptible
<b>Pengilangan</b>		
recovery(%)	66.1	65.7
head rice recovery	79.2	80.7
milled grain length(mm)	6.84	6.9
milleg grain width(mm)	2.0	2.1
L/W ratio	3.4	3.27
amylose(%)	22.1	20.1

# PEST AND DISEASE



SHEATH BLIGHT



WEEDY RICE



GOLDEN APPLE  
SNAIL



RATS



BROWN PLANT HOPPER



## NECK BLAST

MALAYSIAN AGRICULTURAL RESEARCH AND DEVELOPMENT INSTITUTE



# granary soil series

- ▶ 23 major soil series- categorized into 4 main zone based on CEC value

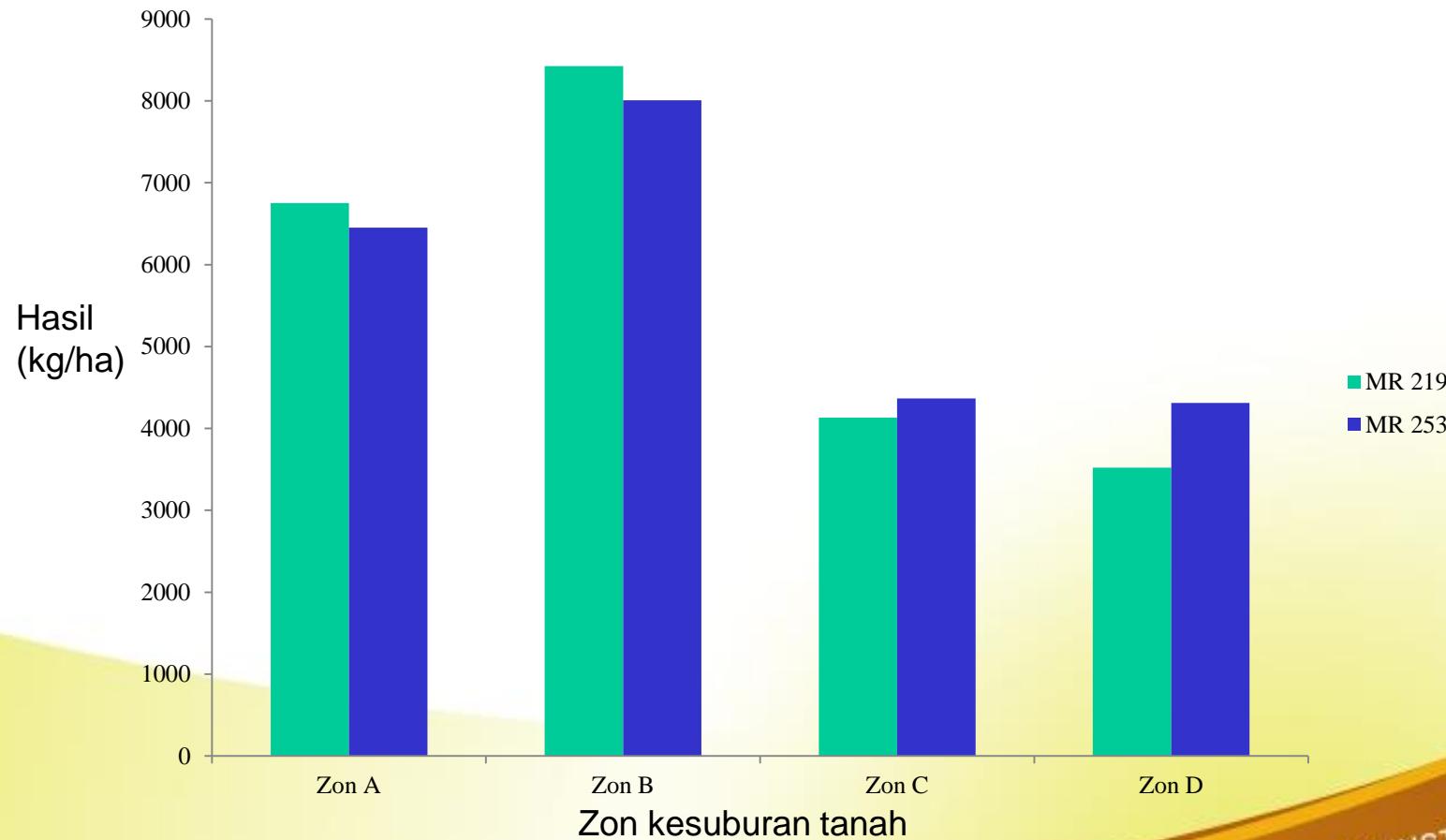
soil fertility zone	CEC (cmol /kg)
A	fertile soil (CEC >26)
B	moderate fertile(CEC 16-26)
C	less fertile(CEC < 16)
D	organic matter(CEC >35)

## Soil series according to fertility and location

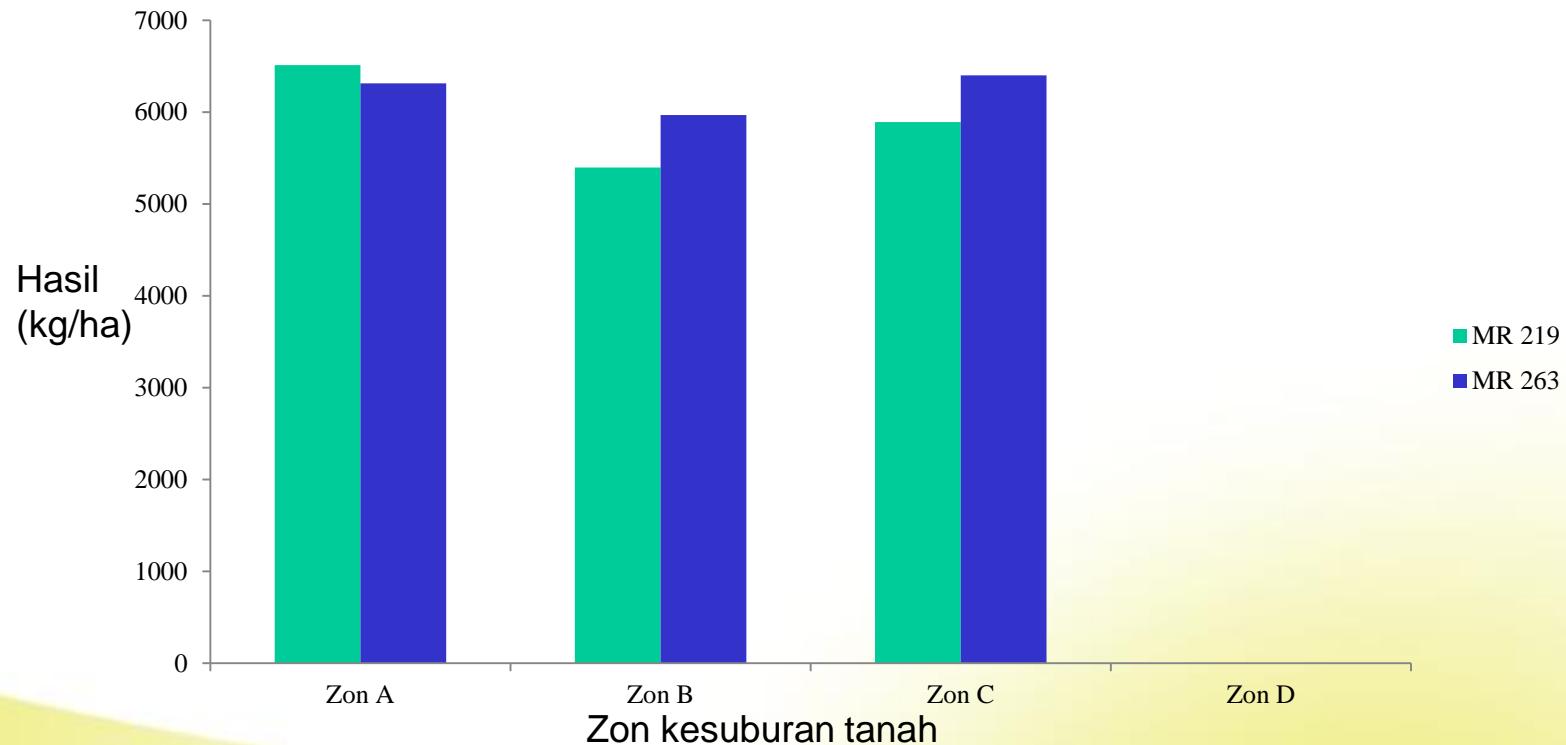
SOIL SERIES	CEC	LOCATION
<b>ZONE A</b>		
Kranji	35	Bukit Merah, Penang
Chengai	33	Permatang Bendahari
Kundur	33	Kerpan, MUDA
Briah	30	
<b>ZONE B</b>		
Sedu	23.1	
Tualang	23.0	
Telok	21.8	Teluk Malik, MUDA
Kangar	20.0	
Selangor	17.5	MARDI Tg Karang

SOIL SERIES	CEC	LOCATION
<b>ZONE C</b>		
Tok Yong	14	
Jempol	12.4	
Chenian	12	
Hutan	10	Titi kayu Idris, MUDA
Sogomana	9.0	
Lubuk itik	8.4	Mulong, KADA
Kelau	7.5	
Cherang hangus	8.0	
Batu Hitam	6.0	Tumpat, KADA
Serdang	4.5	
Telemong	3.5	Teratak Pulai, KADA
Rudua	2.2	
<b>ZONE D- HIGH ORGANIC</b>		
Peat	54	
Organic Clay Muck	40	Sawah Sempadan, BLS

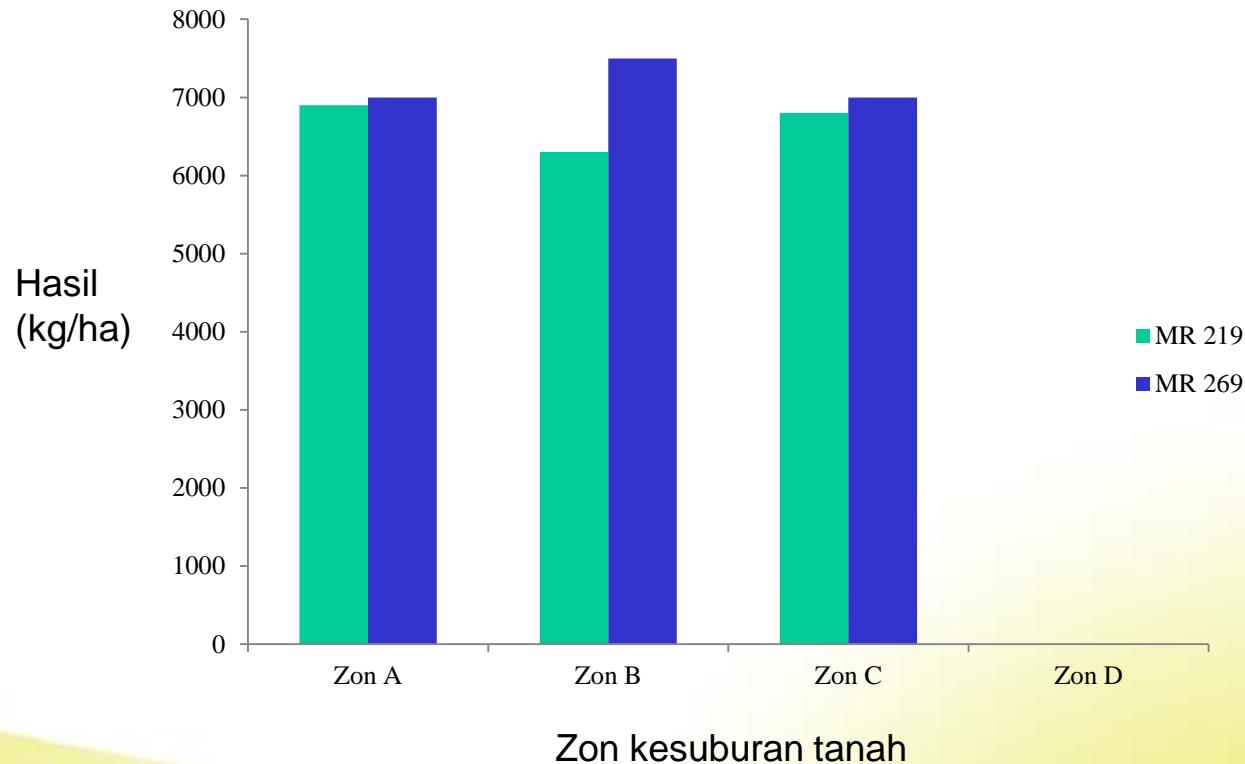
# Performance of MR 253 according to soil fertility zone



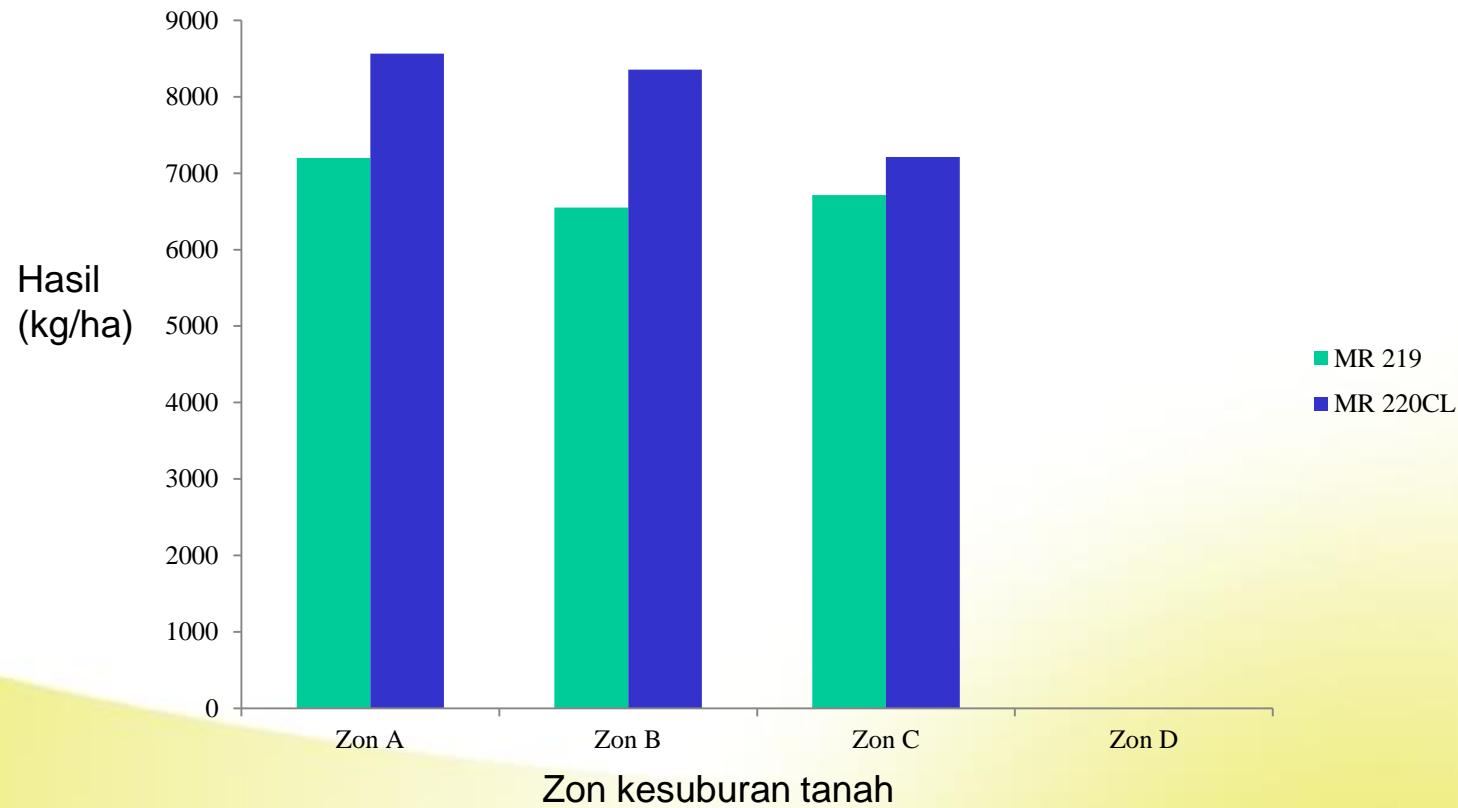
# Performance of MR 263 according to soil fertility zone



# Performance of MR 269 according to soil fertility zone



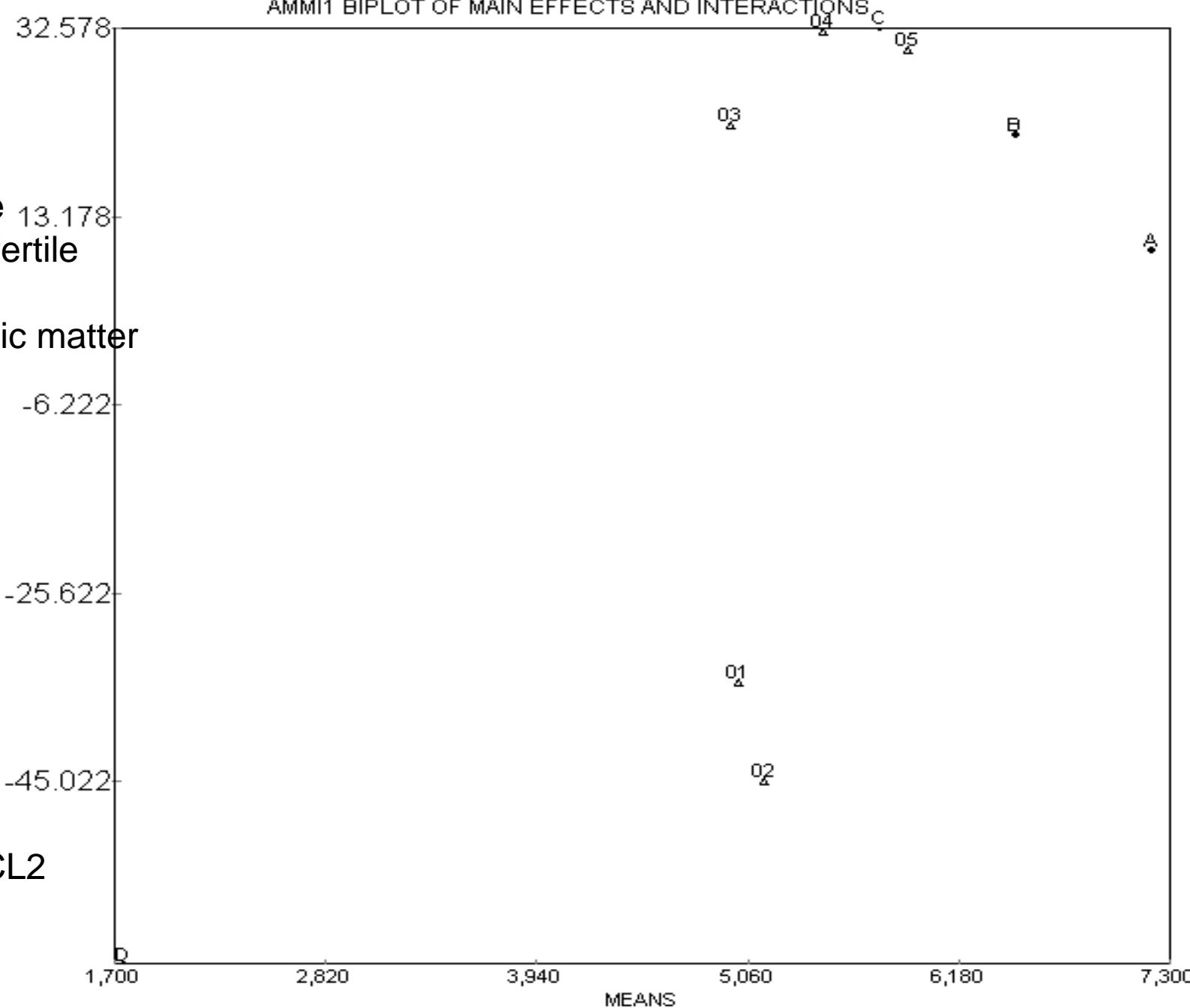
# Performance of MR 220CL2 according to soil fertility zone



## AMMI1 BI PLOT OF MAIN EFFECTS AND INTERACTIONS

A- fertile zone  
B- moderate fertile  
C- non fertile  
D- high organic matter

01- MR 219  
02-MR 253  
03-MR 263  
04-MR 269  
05-MR 220CL2



VARIATE: YIELD DATA FILE: COMBINE MODEL FIT: 99.1% OF TABLE S

# **Selection of variety according to soil fertility**

MR 253 - Zone B and Zone D

MR 263 - Zone A, Zone B and Zone C

MR 269 - Zon C

MR 220CL2 - all granaries (with weedy rice problem)

# PERCENTAGE OF MARDI'S VARIETY IN GRANARY

## MS 13/14

	MR 219	MR 220	220CL1	220CL2	MR 253	MR 263
MADA	23.3	0.4	0	67.7	0	8.3
KADA	42.1	7	0	15.8	0.4	31.9
IADA KERIAN	16	7.1	7.7	62.8	0	4.5
IADA BL	4.5	2.7	0	83.6	0	6.4
IADA P.PINANG	39.8	11.1	4.6	14.8	0	26.9
IADA SEB. PERAK	4.1	1	3.1	73.2	0	17.5
IADA KETARA	78.7	4.9	0	0	0	13.1
IADA KEM. SMERAK	29.4	5.9	0	23.5	0	41.2
IADA PEKAN	0	8.9	0	8.9	0	55.6
IADA ROMPIN	0	0	0	33.3	0	33.3
JUMLAH	26	3.7	1.3	50.2	0.1	16.4

97.7% OF THE PLANTED AREA WAS OFF MARDI'S VARIETY



# OUR PAST CONTRIBUTIONS TO RICE INDUSTRY

1. 43 varieties released to date – latest MR 284
2. Direct sowing technology package
3. Integrated pest management package
4. Soil fertility, fertilizer management & recommendations
5. Production cost reduction through appropriate mechanization package
6. Bulk handling, transportation & post harvest technology
7. Rice Gene Bank – genetic resources for development of new rice varieties



# CONCLUSION

- Rice technologies developed by MARDI has benefited Malaysian farmers for almost 40 years.
- Fertilizer package, crop establishment and management, pest and disease management and post harvest handling have been recommended to farmers
- Two varieties, namely MR 84 and MR 219, have been used for more than 30 seasons.
- However, more genetic resources need to be embraced in upcoming years to develop healthier rice varieties, suitable for climate change with high yield potential and increased resistance to pests and disease.



*THANK YOU*

