Philippines Rice Breeding and Production

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- **GOAL**

  Increase productivity in the different rice growing ecosystems

- **OBJECTIVE**

  To identify high yielding rice lines with tolerance to biotic and abiotic stresses and good grain quality that can adapt to the different rice growing ecosystems

Plant Breeding Priorities

- Increasing yield potential
- Multiple resistance to diseases and insects
- Increasing tolerance for abiotic Stresses
- Superior quality
- Appropriate growth duration
- Efficient nutrient uptake and utilization
- Adaptation to climate change

Breeding Centers

- IRRI
- UPLB
- PhilRice
- Other private companies

Role of Breeding Centers

Generate promising lines and submit to national programs for test in specific regions/sites

→ a line performing better than commercially cultivated varieties = recommended for release as new variety

The agency sponsoring the line for release provides the breeder seed for foundation seed production.

Breeding Programs

- DEVELOPMENT OF IRRIGATED LOWLAND RICE
  - Transplanted Inbred Rice
  - Direct seeded Inbred Rice
- DEVELOPMENT OF HYBRID RICE
- DEVELOPMENT OF SPECIAL PURPOSE RICE
- Variety development for rainfed, upland and abiotic stress-prone environments

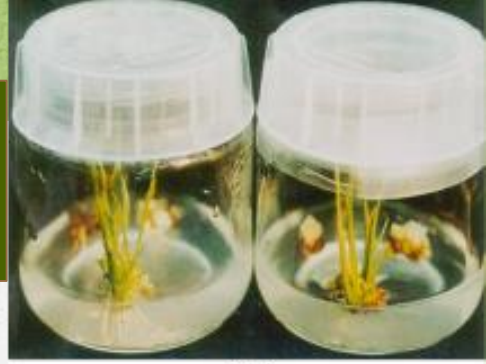
Strategies and breeding methods

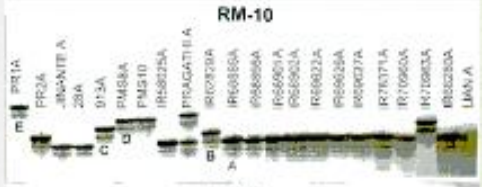
Conventional hybridization and selection procedures

- Basic, time-tested
- To generate and utilize existing genetic variation
- Generates a wide array of combinations of the genes coming from the parent plants
- Cross-pollination followed by several cycles of selection and self-pollination → stable promising lines → candidate varieties

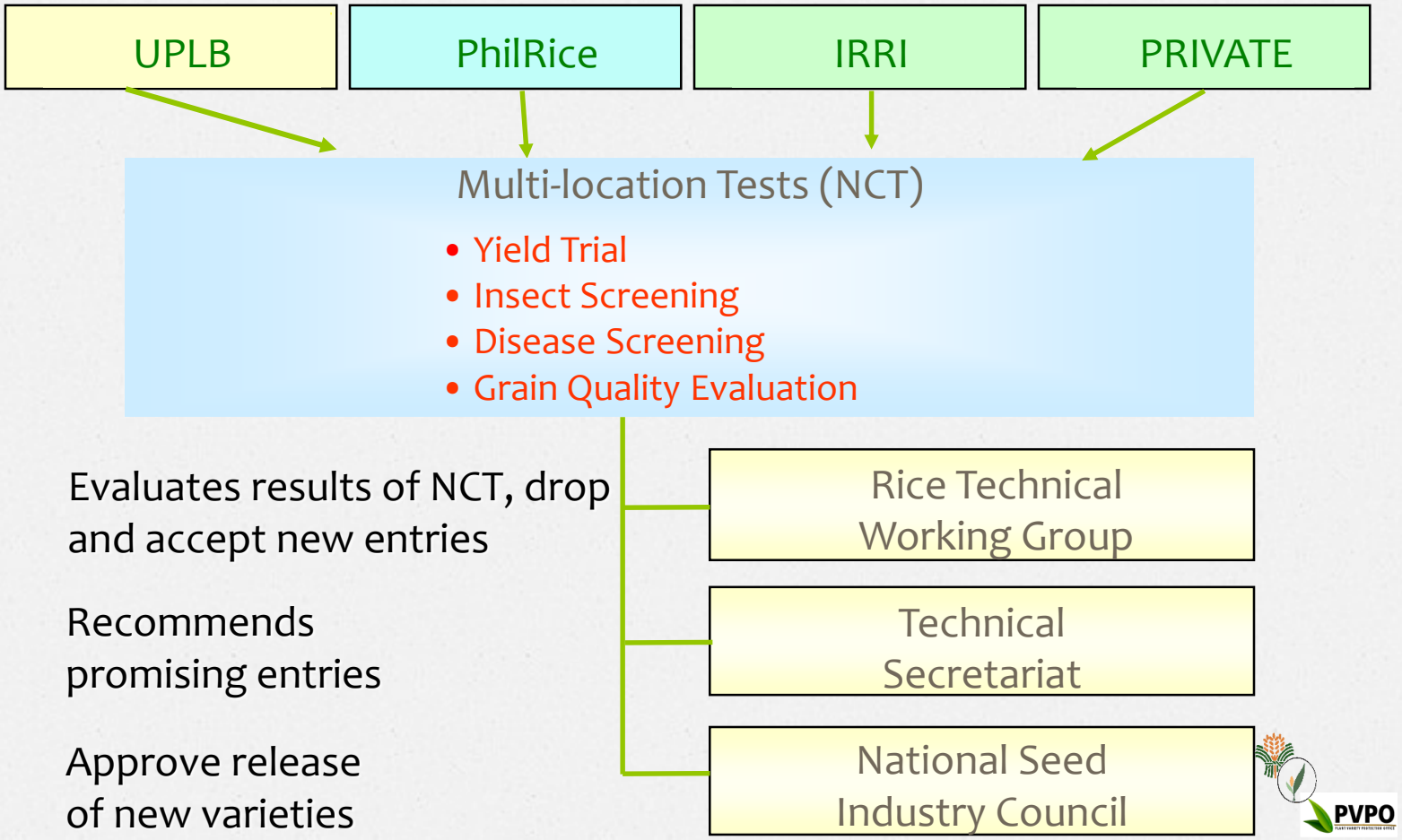
Cutting-edge Technology Development in support to breeding

- Biotechnology
  - increasing breeding efficiency
  - improving resistance/tolerance to biotic & abiotic stresses
- Molecular marker technology
  - using marker-aided selection
  - germplasm characterizations
- Induced mutations
  - *In vitro* techniques- developing lines for adverse environments
  - Physical & Chemical mutagenesis
- Genetic engineering
  - cloning/introduction of important genes
- Wide hybridization
  - transferring resistance genes

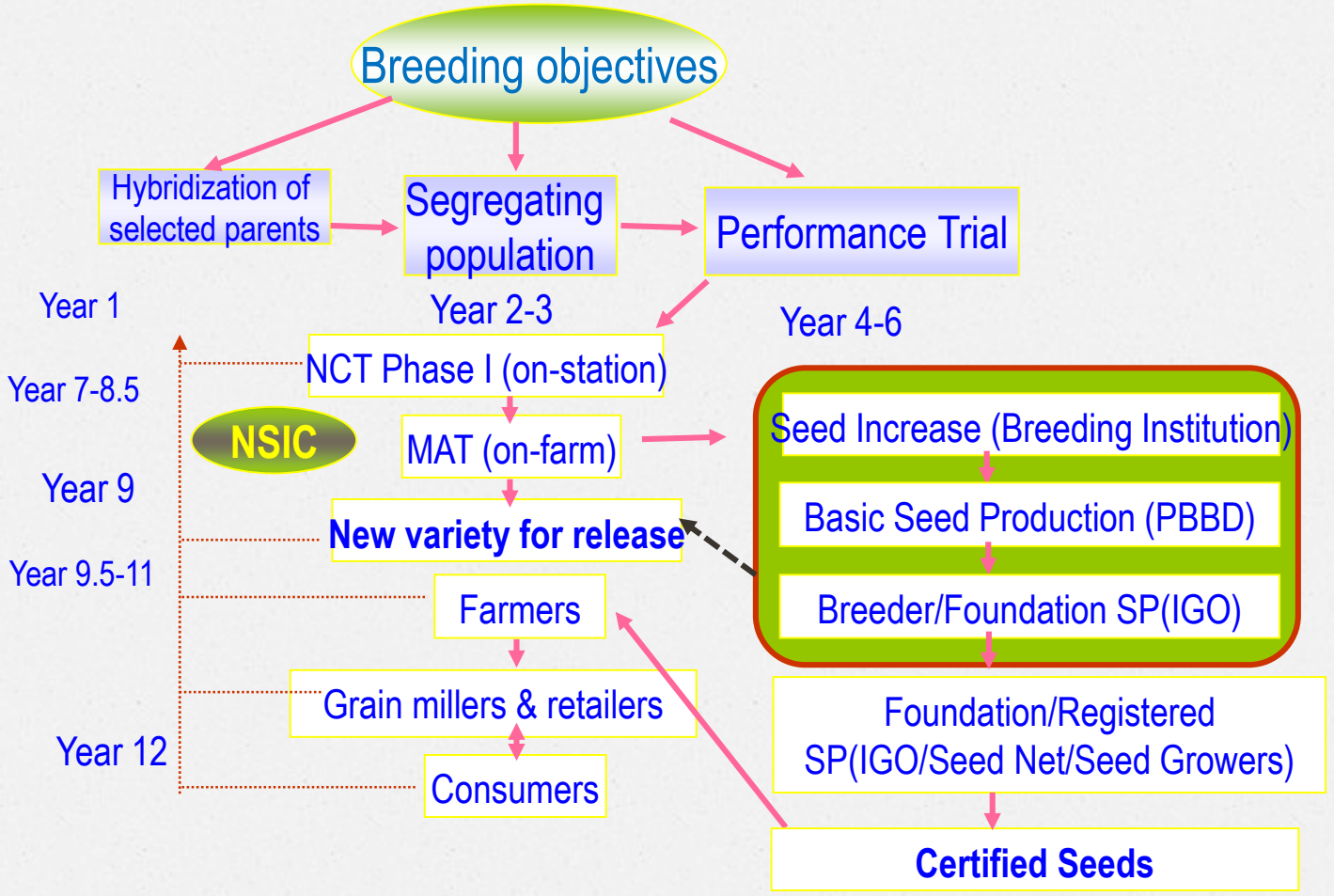




Process of Varietal Release at the NCT



Varietal Development and Release

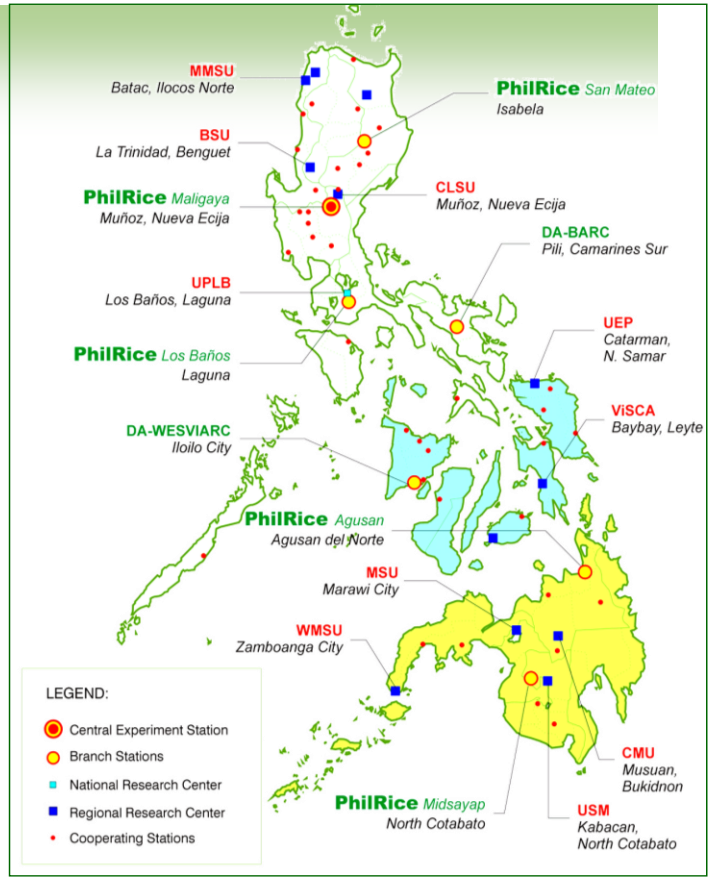


Testing Sites……

The Philippine Rice R&D Network

Composition (57)

- 2 national centers
- 6 branch stations
- 12 regional research stations
- 37 cooperating stations

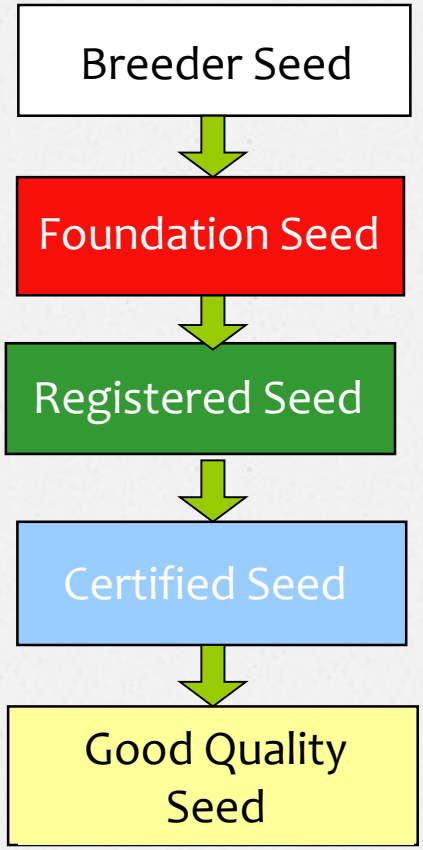


Number of Recommended Varieties by Ecosystem from 1968 to 2013

Period	Irrigated lowland	Rainfed lowland	Upland	Cool elevated	Saline	TOTAL
1968-1988	43	4	7	-	-	54
1990-2010	87	17	6	6	13	129
2011-2013	57	11	1	-	13	82
TOTAL	**187**	**32**	**14**	**6**	**26**	**265**

Trends in Philippine Rice Production

Classes of Seeds



→ comes directly from plant breeder

→ grown from breeder seed

→ grown from foundation seed

→ grown from either foundation, registered or certified seed

→ grown from certified and maybe used in times of emergencies
Seed that are of seed increase status as determined by the RTWG

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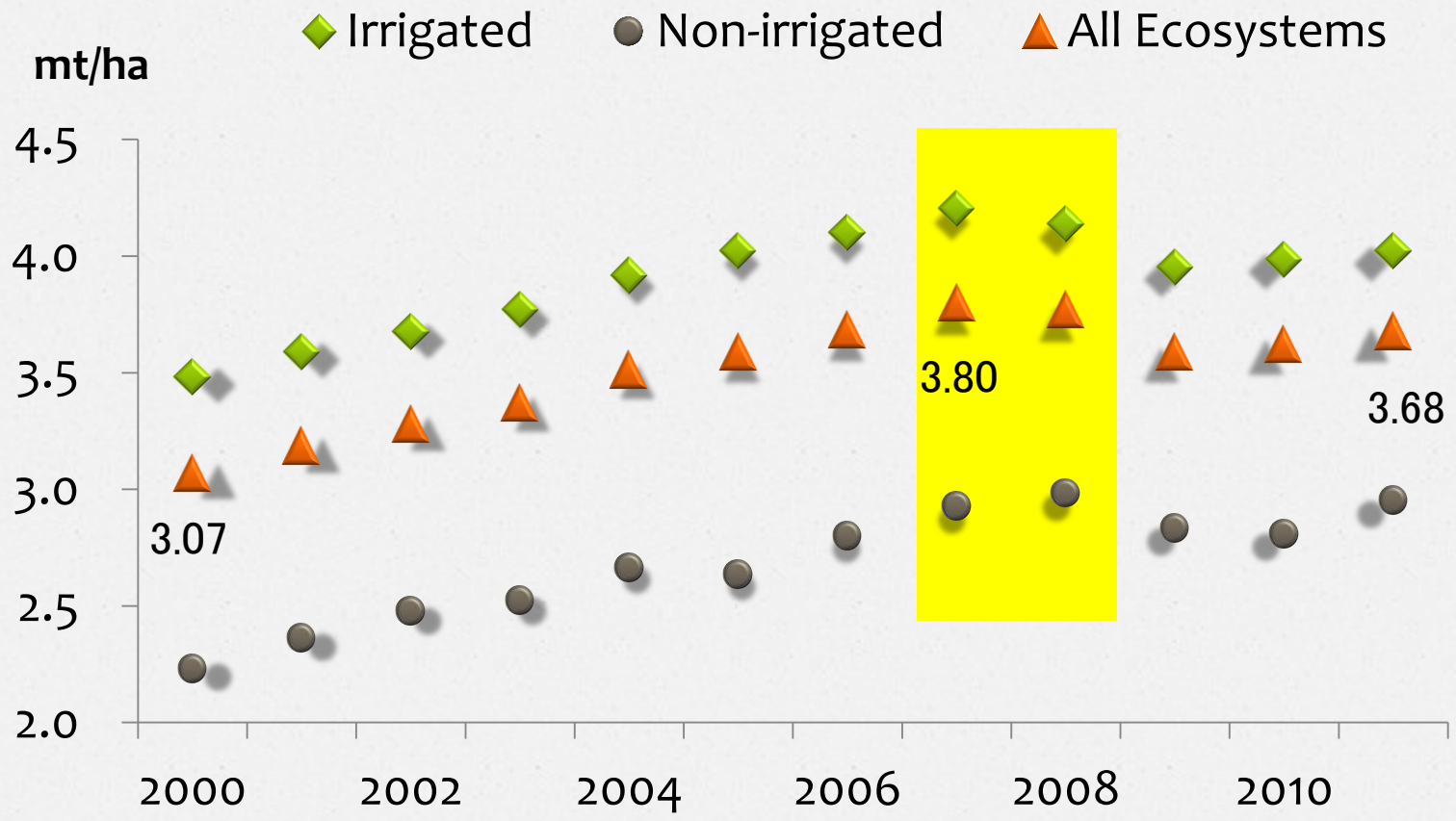
Paddy yield, 2000-2011



Yield peaked in 2007 at 3.80 mt/ha. Highest yield was 4.21 mt/ha in irrigated areas; 2.98 mt/ha in non-irrigated areas.

GROWTH IN YIELD

Growth (in mt/year)	2000-2010	2010-2011
All Ecosystems	63	55
Irrigated	58	36
Non-Irrigated	66	146

Growth (in %)	2000-2010	2010-2011
All Ecosystems	1.83	1.54
Irrigated	1.53	0.90
Non-Irrigated	2.53	5.36

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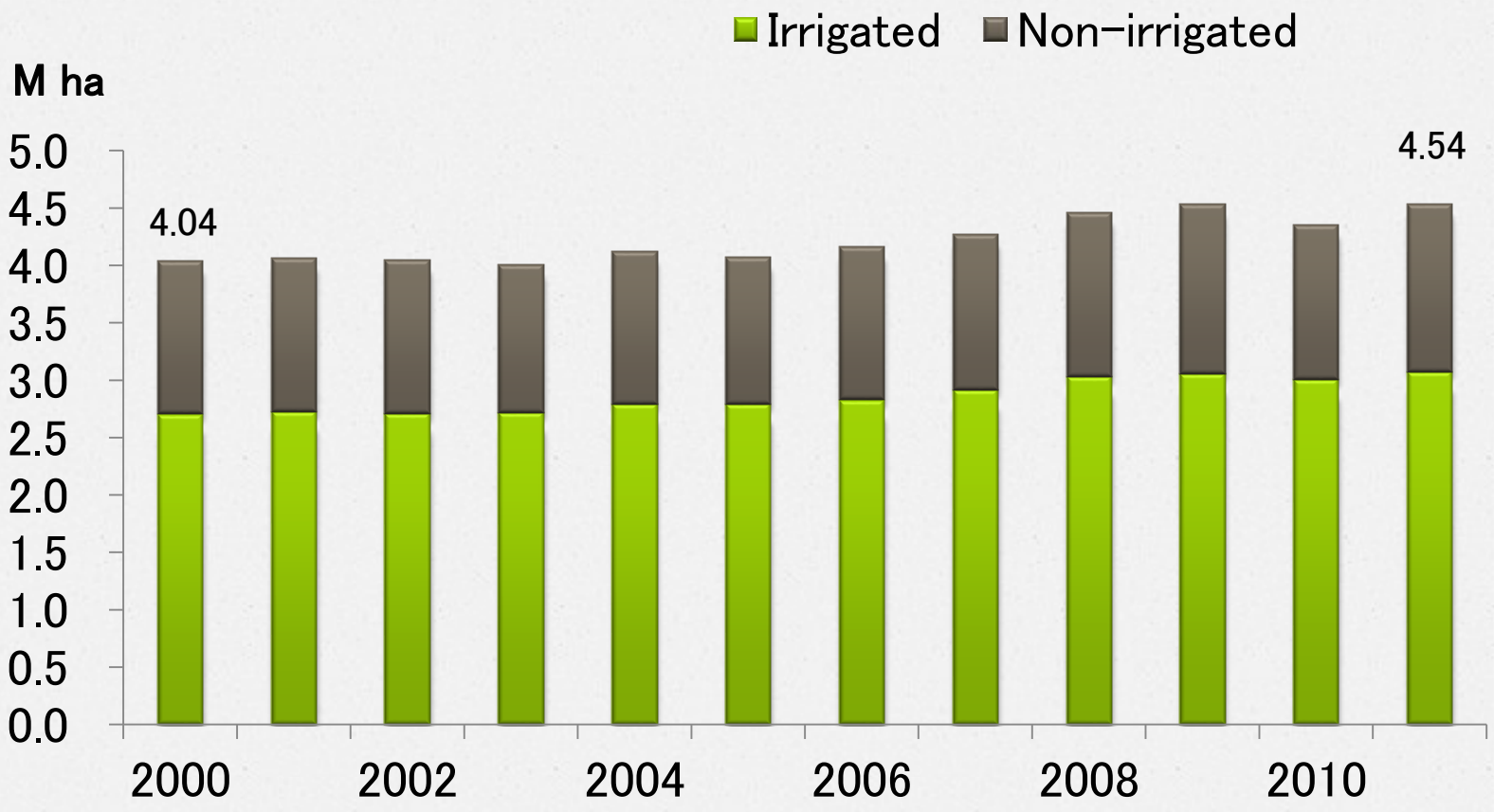
HARVEST AREA, 2000-2011



Harvest area grew by 12% in the last 12 years.
Irrigated areas comprised 68%.

GROWTH IN HARVEST AREA

Growth (in mt/year)	2000-2010	2010-2011
All Ecosystems	47,773	182,481
Irrigated	38,655	64,312
Non-Irrigated	9,118	118,169

Growth (in %)	2000-2010	2010-2011
All Ecosystems	1.13	4.24
Irrigated	1.35	2.15
Non-Irrigated	0.66	9.07

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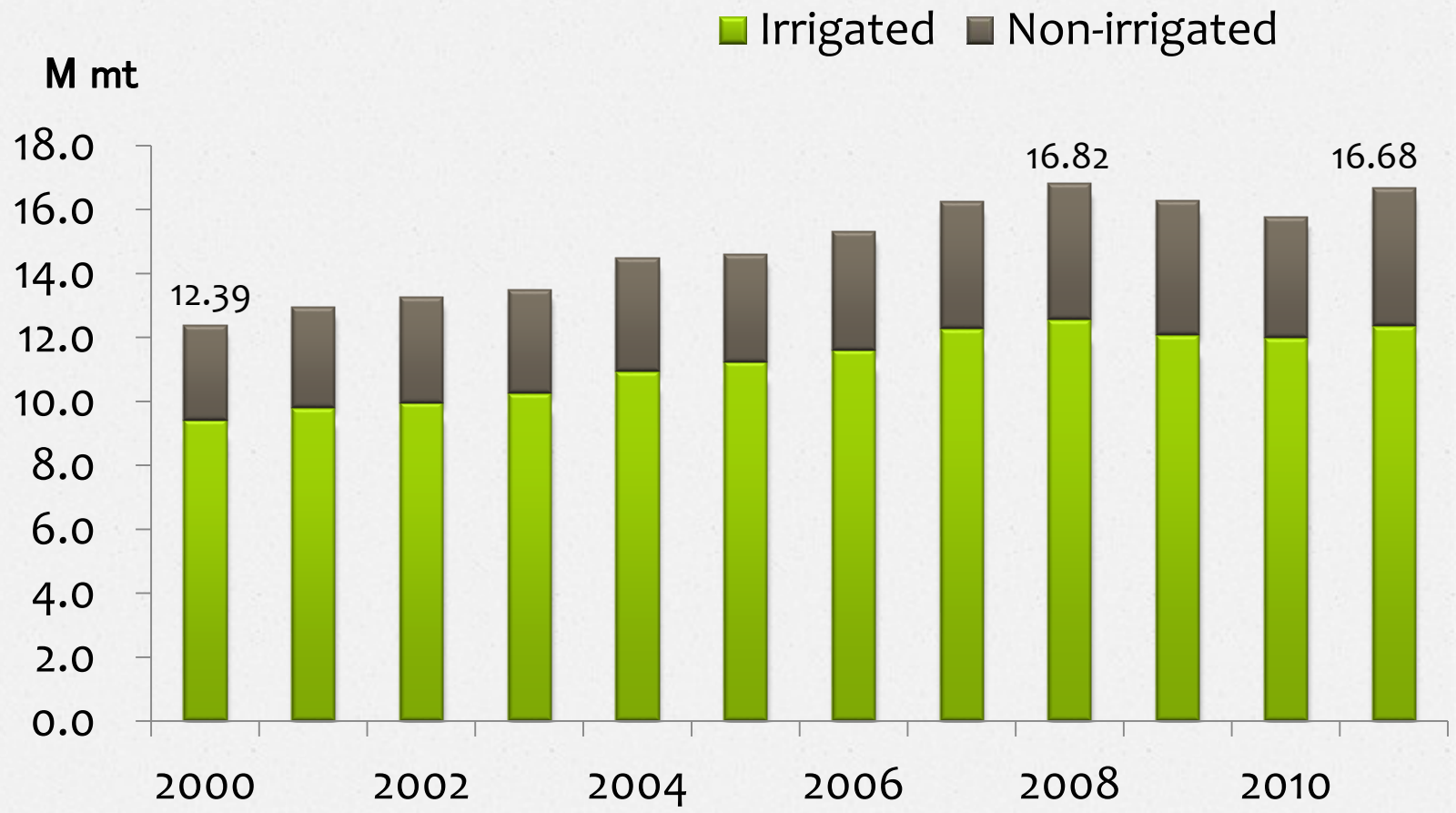
Paddy Production, 2000-2011



Production grew by 35% in the last 12 years.
Irrigated areas contributed 74%.

GROWTH IN PRODUCTION

Growth (in mt/year)	2000-2010	2010-2011
All Ecosystems	428,236	911,743
Irrigated	314,394	366,472
Non-Irrigated	113,842	545,271

Growth (in %)	2000-2010	2010-2011
All Ecosystems	2.96	5.78
Irrigated	2.88	3.06
Non-Irrigated	3.19	14.43

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PLANT VARIETY PROTECTION OFFICE

Thank you