# The Rise & Fail of Rice Research & Development On Production Technology in the Philippines: An Afterthought 2009

*By: Adolfo C. Necesito, PhD*

## 2 What Experts *Say* & *Sigh* About the Rice Situation in the Philippines

**A. The Filipino Experts:**

**2006.** Balisacan, A., economist, ex- Director of SEARCA

**The rice sector in the Philippines is a conundrum. Its performance in the past 25 years has been that of most developing countries in Asia. … absolute poverty and malnutrition high, their reduction …far slower than its neighbors. … The country hosts the International Rice Research Institute and … world class … rice research arm, the Philippine Rice Research Institute. What has gone wrong?**

**2002.** VBJ Tolentino, economist, on governance as constraints to rice productivity in the Philippines, described the situation as follows:

**Since 1990 rice usage outstripped rice production,… domestic rice prices rose quickly from a low of P8 per kg in 1990, P12 in 1994, P16 in 1998, …shifted from a state of marginal self-sufficiency to that of a growing importer of rice.**

## 3What Experts *Say* & *Sigh* About the Rice Situation in the Philippines

2008.S. Obien, ex-official of Phil Rice, as discussant to a paper of IRRI on sustainability of rice production system, lamented sighing:

**If only we could produce rice as well as the Egyptians –10 tons/ha-**

2009.Cuyno and Bernardo et.al. in their commissioned external review to assess the impact of Phil Rice performance, found the flagship version, "Rice Check", of Phil-Rice under the FAO Rice Commission World Program, as follows:

**…lacked solid research backbone based mainly on conventional wisdom, indigenous knowledge, and best practices of the consultants and participants.**

## 4What Experts *Say* & *Sigh* About the Rice Situation in the Philippines

**B. The Expat Experts**

**2000**, Cantrell, R. of IRRI in the book preface "Redesigning Rice Photosynthesis to Increase Yield" stated:

**…10 tons per hectare, has remained the maximum achievable yield of inbred cultivars of irrigated rice in the tropics, a value long regarded as a yield barrier.**

**2002**. IRRI economists, Barker,R and Dawe, D. stated :

**The success of the green revolution caused rice supply worldwide to grow rapidly than the demand and the slow down in rice production since 1985. The world price of rice that remained stable at 800 to 1000 US$ per ton since 1950, dropped to 500US$ after 1985, export demand fell in 1994; price deteriorated to 400US$ by year 1998.**

## 5 What Experts *Say* & *Sigh* About the Rice Situation in the Philippines

**B. The Expat Experts…cont'd**

**2008**. Mohanty, S. economist. IRRI. Rice Crisis: The Aftermath.

**From 2001 to 1007, rice prices nearly doubled because of drawing from stocks to meet the deficit… although stocks grew steadily from 2004 to 2008". …,, declining investments in all areas of rice, research among others … responsible in the slowing down of yield growth.**

**2008**. Zeigler, R. in the IRRI background paper, "The rice crisis; What needs to be done", admitted.

**The annual growth in yield is slowing over the last 10-18 years, at a rate of 2.14% decrease in southeast Asia from 1970 to 90 and 1.4% from 1990 to 2000**.

## 6 Why Philippines Import Rice

- **1996. The Philippines chose for rice the *Quantitative Restriction* clause of the GATT-WTO, which mandated the country to import annually certain percent (5 %?) of its domestic rice requirement**
- **2006. David Dawe discussed the issue "*Why Does the Philippines Import Rice?"* , and argued:**

  **Rice importing countries including the Philippines, are island nations that do not have the natural advantages of the Himalayan river system of rice exporting Asian countries like Vietnam or Thailand**

## 7 Why Philippines Import Rice…cont'd

- **2002. VG Tolentino: "Since 1990 rice usage outstripped rice production,… shifted from a state of marginal self-sufficiency to that of a growing importer":**
  - **Largest customer for Vietnam's low quality rice**
  - **Regular customer for the better quality rice exports of the US …under the soft loan term of US Public Law 480**
- **2008. Global rice crisis pushed prices beyond $1200/ton. The Philippines forced to import rice much higher price than previous at <$400/ton**

## 8 The 1995 GATT Uruguay Round Agreement on Agriculture

- The Philippines chose to maintain "Quantitative Restriction" on import of rice while replacing quantitative restriction with tariff on critical agricultural commodities like corn, livestock and poultry products. The Philippines was bound to import initially 59,000 metric tons in 1996 and over a 10 year period increase to 4% of its domestic consumption.

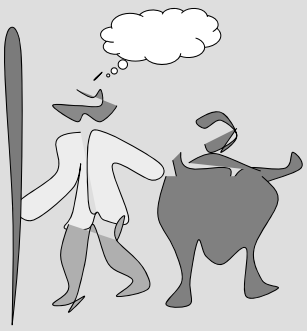
## 9AFTERTHOUGHTS ON:
**What Experts Say & Sigh About Rice Situation in the Philippines**

- ***The*** **assessment coming from the experts**

  **indirectly supposes certain shortcomings and causes from 50 years of research activities at IRRI and PhilRice that limited social scientists in transforming scientific and technical research information into a self-sufficient rice production technology in the Philippines?**
- ***Then*** **what agro-ecological aspects of rice research attributed to inability of the Philippines to attain self sufficiency in rice production?**

## 10The Quest: don adolfO

The Search



11 THE QUESTS: SEARCH
PHILOSPHY AND FOCUS

**PHILOS0PHY**

**There are nuggets of wisdom buried in tons and volumes of rice research studies to be sifted as miners would in search for gold; but not all that glitter are gold.**

**FOCUS**

**Relevant agro-ecological aspects of rice researches, past and present**

## 12 TheNational Rice Program Focus for 2009 - 2010

**Two land use priority focuses:**

**1. Irrigated rice for:**

**A. certified seeds, 2,108, 675 hectares**

**B. hybrid seeds, 201,123 Has. `**

**2. Rainfed, certified seeds,1,196, 098 Has.**

## 13National Rice Program Plan 2009-2010

**PROGRAM COMPONENT AND BUDGET ALLOTMENT**

- To Rehabilitate irrigation infrastructure P 6Billion
- Subsidy production of hybrid seeds P 1.5B
- Certified seed production P 3.096B
- Production of breeder seeds P 20M
  Man-month incentives of technicians assisting certified seed production- P120/ha and P200/ha for hybrid seed
- Acquisition of post harvest facilities P 500M
- Acquisition of supplies for MOET, LCC, Bio-N, and micronutrients P 844M
- Improve farmer education P 1.32B
- Research and Development P 500M
- Acquisition of extension kits to farmers P 25M
- Planning and policy Coordination P 413M

## 14Rice Hybrid Developed and Released in the Philippines, 1997 - 2007

| HYBRID VARIETY | YEAR | BREEDING INSTITUTION | LOCAL NAME |
|---|---|---|---|
| 1. PSBRC 7 | 1997 | IRRI | MESTIZO |
| 2. PSBRC 7 | 1998 | MONSANTO | PANAY |
| 3. NSICRC 114H | 2002 | IRRI | MESTIZO 2 |
| 4. NSICRC 116H | 2002 | IRRI | MESTIZO 3 |
| 5. NSICRC 124H | 2004 | BAYER | BIGANTE |
| 6. NSICRC 126H | 2004 | MONSANTO | MESTIZO 5 |
| 7. NSICRC 132H | 2004 | SL TECH | MESTIZO 6 |
| 8. NSICRC 136H | 2006 | IRRI | MESTIZO 7 |
| 9. NSICRC 162H | 2007 | BIOSEED | BIO 401 |
| 10. NSICRC 164H | 2007 | HYRICE | RIZALINA |

15 Memorandum of Agreement
IRRI & Partner Institution. 2005

- PROJECT TITLE 1. **Enhancing farmer's income and livelihood through integrated crop resource management in *RICE-WHEAT SYSTEMS* in South Asia**

PARTNER INSTITUTION:

1. Philippines, ADB
2. Bangladesh, BARI
3. India, BHU
4. India HAU
5. Mexico,CYMMT
6. Nepal, NARC
7. Pakistan, PARC

- PROJECT TITLE 2. **Survey on farmers and consumers**
- **acceptance of *RICE BIOTECH PRODUCTS*.**

**A USDA funded project: Participatory assessment of social and economic impacts of biotechnology**

PARTNER INSTITUTION.

1. Philippines, Phil Rice.

16 **PROJECT TITLE 3. Developing a system of temperate and tropical aerobic rice**

PARTNER INSTITUTION :

1. Lao PDR, NAFRI
2. Philippines, NIA
3. Philippines, PhilRice
4. China, CAU
5. India, IARI

**PROJECT TITLE 4. Post Harvest Technology**

PARTNER INSTITUTION :

1. Bangladesh
2. Cambodia
3. Lao PDR

**PROJECT TITLE 5. Integrated Rice Research Consortium**

PARTNER INSTITUTION :

1. Indonesia, NPK Mgt
2. Indonesia, Labor Productivity
3. Lao PDR, Post Harvest
4. Lao PDR, Labor Productivity
5. Myanmar, Post Harvest
6. Myanmar, Labor Productivity
7. Philippines, Labor Productivity

## 17 Philippines Rice Production Technology & Fertilizer Management Plan

| REGION | Dry Season N-P-K+ 5 bags OF | Wet Season N-P-K+ 6 bags OF |
|---|---|---|
| I. 1,2,3,5 (8 provinces) | 90-14-14 | 90-14-14 |
| II. 2,3,4,5,6,7,8,10,11,12, CAR (38) | 93-20-0 | 90-14-14 |
| III. 3 (Nueva Ecija only) | 93-20-0 | 90-14-14 |
| IV. 4,9,ARMM, CARAGA (5 prov) | 86-20-0 | 80-24-14 |
| V. CAR, 4,9,CARAGA (9 prov) | 93-30-0 | 90-14-14 |
| VI. 1,2,3,4,5,6,8,9,10,13 RMM, CAR ,(23 prov) | 246-20-0+20Zn | 231-30-0+20Zn |
| VII. 1,2,35,6,11,flood-prone, saline | 94-27–7 | 91-24-14+10Zn |

## 19 Problem Riceland Soils in the Philippines, IRRI. 1978

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1. Zn Defficient: 1,000,000 Ha
2. Saline: 400,000 Ha
3. Acid Sulfate: 20,000 Ha
4. Alkali: 5,000 Ha
5. Peat Soils: 5,000 Ha

## 19 The Early Years of Rice Research in the Philippines

### Researches on Rice Before IRRI

Before the establishment of IRRI, the BPI Maligaya Rice Research Station had developed the varieties BPI 76, Milfor and from UPCA the

C-4. But in lowland rice culture, the introduction in the early 50s of the Margate system of transplanting seedlings in straight rows made easier weeding and cleaner rice culture that replaced the random method of transplanting.

## 20 The Establishment of IRRI in 1960 Its Philosophy and Direction

1. **Its mission:**
   *"Break the grain yield barrier an*
   *Raise the level of low rice production"*

2. **Recruitment of IRRI rice scientists:**
   *"…promising young scientists still to make a name for themselves, rather than mature and renowned persons who might tend to rest on their laurels"*

3. **Design Concept: The agro-eco-physiological basis of increasing rice leaf efficiency of harvesting solar energy**

4. ***Major Accomplishment:***
   *Raised rice yield beyond 5 tons/ha*
   *Broke the yield barrier of 1.2 t/ha.*

## 21 The establishment of Phil Rice in 1986

A. Main recruits, Filipino scientists, retirees, and consultants from IRRI
B. PhilRice Manpower Strength , 2005.
   1. Breeding: PhD 10; MS 10; BS 22
   2. Agronomy/Soils: PhD 2; MS 6; BS 12
   3. Crop Protection: PhD 2; MS 6; BS 8
   4. Engineering: PhD 2; MS 3; BS 3
   5. Chemistry: MS 5; BS 8
   6. Others: PhD 2; MS 17; BS 34

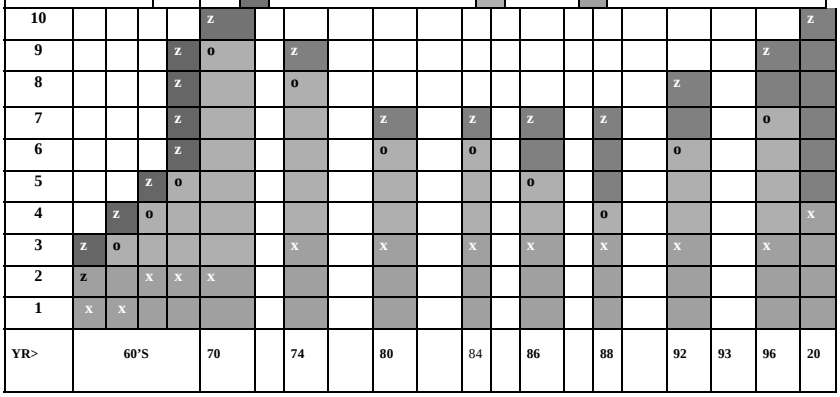
## 22 50 Years of Rice Research Past and Present

**THE 60S':Broke the Yield Barrier of Tropical Rice**
- >Development of short stature high yielding varieties (HYV)
- >Launching of the first rice green revolution

**THE 80S': Decline and Stagnation of Rice Grain Yield**
- >The shift in donors emphasis for environmental conservation and sustainable agriculture
- >The IPM focus, pest and disease resistance

**The 90s' : Improvement in Grain Yield**
- > Increase fertilizer rates on modern varieties; new entries
- > Launching of the second Green Revolution in the 90s
- > New strategy of changing the rice plant morpho-physiological structure in the New Plant Type (NPT)

## 23Philippines Rice Production , HYV IR8 , and High Yielding Entries From Year 1968 to the New Millennium.




## 24Status of Rice Production in the Philippines (1948-2005)

| PERIOD | PRODUCTION Million Ton | AREA Million Ha | AVE YIELD Ton/Ha |
|---|---|---|---|
| • 1948-68 | 3.4 | 2.8 | 1.2 |
| • 1969-83 | 6.6 | 3.5 | 1.9 |
| • 1988 | 8.9 | 3.3 | 2.64 |
| • 1993 | 8.6 | 2.64 | 2.70 |
| • 2000 | 12.3 | 4.03 | 3.06 |
| • 2005 | 13.2 | 4.20 | 3.47 |

## 25Philippines Rice Production vs Tropical, Subtropical, and Sub-Temperate Environment and Sunshine Hours

| COUNTRY | PRODN MIL. TONS | YIELD T/HA | LAT deg | SUN HR |
|---|---|---|---|---|
| • Philippines | 14.6 | 3.47 | 4 – 21'N | 12 - 13 |
| • Indonesia | 53.9 | 4.57 | 11'S –6'N | 12. 07 |
| • Vietnam | 35.7 | 4.88 | 8 - 27'N | 12 - 14 |
| • Myanmar | 25.3 | 3.61 | 16- 29'N | 12.5 -14 |
| • Brazil | 13.1 | 3.37 | 5 – 33'S | 12 -14 |
| • India | 136.5 | 3.14 | 8 - 37'N | 12 -13 |
| • China | 162.0 | 6.25 | 18- 54'N | 12.5 -17 |
| • Japan | 11.3 | 6.64 | 20- 54' N | 12.5 -17 |
| • Egypt | 6.1 | 9.98 | 22 – 32'N | 12.5 -14 |

## 26My Views : Agro-eco-physiology in Rice Production and Yield Gaps

| CAUSES & FACTORS | GRAIN YIELD T/Ha | YIELD GAP T/Ha |
|---|---|---|
| **A. Geography** | | |
| Philippines vs. Tropical Asia | 3.5 vs 4.5 | 0.50 to1.5 |
| vs. Subtropical Asia | 3.5 vs 6.0 | 2.5 to 3.0 |
| vs. Sub-temperate | 3.5 vs 10.0 | 5.0 to 7.0 |
| **B. Agro-climate** | | |
| Dry Season vs. Wet Season | 4.5 vs 3.0 | 0.5 to 1.5 |
| Latitude & Weather distribution | 4.5 vs 3.0 | 0.5 to 1.5 |
| **C. Cultural** | | |
| Irrigated Dry S vs Irrigated Wet S | 4.5 vs 3.0 | 0.5 to 1.0 |
| Lowland vs. Upland | 3.5 vs 2.0 | 0.5 to 2.0 |
| Transplanted vs. Direct seeded | 3.5 vs 3.0 | 0.5 to 1.0 |

## 27My Views : Agro-ecological Role in Rice Production and Yield Gaps, cont'd

| | | GRAIN YIELD | YIELD GAP |
|---|---|---|---|
| D. Problem Soils | Flood Prone | | 1.5 to 2.0 |
| | Acidic, Saline | | 1.5 to 2.0 |
| | Nutritional Deficiency | | 2.5 to 2.0 |
| | Nutritional Toxicity | | 1.5 to 2.0 |
| E. Varietal | Modern cv vs. Traditional | 3.5 vs 1.5 | 1.0 to 1.5 |
| | Modern inbred vs. Modern cv | 4.0 vs 3.5 | 0.5 to 1.0 |
| | Modern Hybrid vs. Inbred | 5.0 vs 4.0 | 0.5 to 1.0 |
| | Early vs. Late Maturity | | 0.3 to 0.5 |
| | High Tillering vs. Low Tillering | 0.5 to 1.0 | |
| F. Nutritional | No Fertilizer vs. Fertilized | 3.0 vs 5.0 | 1.0 to 2.0 |
| | Non-Balance vs. Balance NPK + | 4.5 vs 6.2 | 2.0 to 2.5 |

G. ***Yield gaps due to effects of differences in geographical agro-ecological environment should be emphasized to policymakers and politicians as natural limitations to achieving high yield***

## 28My Thought on 2nd Green Revolution and NPT

**The current view of rice science that with NPT (new plant type), higher grain yield is associated more with increase biological yield, appears to favor the subtropical- sub temperate ecosystems in the international scope of research interest.**

## 29AFTERTHOUGHT AT HIND SIGHT

1. **Recent joint international programs conducted by IRRI with important rice exporting countries like Laos, Cambodia, Vietnam, Myanmar, or Indonesia, emphasized intensive research works designed for integrated and holistic approach to rice production technology.**

**Book reports described the intensity of work done that systematically classified each country into agro-ecological productivity grids in terms of soil, water, and climate.**

*1. Linquist, Bruce and Pheng Senghua.2004 Nutrient management in rainfed lowland rice in the Lao PDR.*

*2. Rice Industry, culture and environment. 2006. By: Indonesian Center for Rice Research*

## 30AFTERTHOUGHT At HIND SIGHT Continued

2. **Indonesia and other rice exporting countries now emphasized on nutrient formulation management studies**
3. **The Philippines rely mainly on breeding and variety development. There is no effort to consolidate a comprehensive technical research information database into one national guideline.**
4. **Research highlights intended for donors' satisfaction is of little value for consolidating database for evaluation, until results of technical studies are published in international journals that carry the "all rights reserved" of publishers.**

## 31 2. The Indonesian Experience

**Dr. Roland Buresh of IRRI described the partnership with Indonesia.**

**IRRI and partner organization within the Indonesian Agency for Agricultural Research and Develop- ment worked together to consolidate divergent soil testing, soil mapping, and plant-based approaches into one concise national nutrient management guideline…"*Rice Fertilization for a Specific Location*"**

## 32 How Prepared is the Philippines to Overcome the Rice Crisis

From "Rice Almanac 1993", IRRI.

- 1990, Per Capita Consumption of Rice:
  - Philippines : 99 kg/yr
  - Myanmar : 199 kg/yr
  - Indonesia : 138 kg/yr
  - Thailand, : 120 kg/yr
- 2008, DA estimate of Philippine daily consumption was 33,000 metric tons. (Ref: PDI, 11 April 2008).This comes out 10.8 mt/yr or 120 kg/cap/yr

# 33 QOU VADIS

- THE CURRENT INTERNATIONAL COMMITMENTS IN RICE RESEARCH ARE MOSTLY BEYOND THE PHILIPPINE APPLICATION
- IT MAYBE WELL FOR THE PHILIPPINES TO LOOK MORE INWARD ON WHAT IT NEEDS OTHER THAN BEING AN ECOLOGICAL NICHE OF RESEARCH INTERESTS.