

Meeting **World Food Needs**
with **GM Rice?**



**Overview of Philippine Rice and
GM Crops**

GM Rice Research Group
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University of Arkansas
October 8-9, 2012

UofA

DIVISION OF AGRICULTURE
RESEARCH & EXTENSION

University of Arkansas System

Overview of Philippine Rice and GM Crops

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GM Project Team First Meeting

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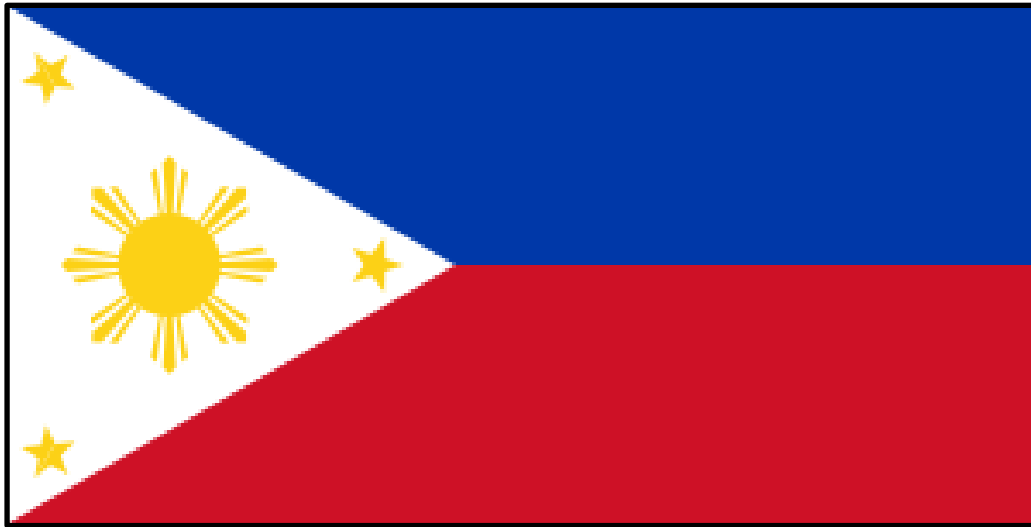
1. Ilocos Norte
2. Kalinga Apayao
3. Cagayan
4. Ilocos Sur
5. Abra
6. Mountain Province (Baguio)
7. Ifugao
8. Isabela
9. La Union
10. Benguet
11. Nueva Viscaya
12. Quirino
13. Pangasinan
14. Tarlac
15. Nueva Ecija
16. Aurora
17. Zambales
18. Pampanga
19. Bulacan
20. Bataan
21. Metro Manila (NCR)
22. Rizal
23. Cavite
24. Laguna
25. Batangas
26. Quezon
27. Camarines Norte
28. Camarines Sur
29. Catanduanes
30. Albay
31. Sorsogon
32. Occidental Mindoro
33. Oriental Mindoro
34. Marinduque
35. Romblon
36. Masbate
37. Northern Samar
38. Eastern Samar
39. Western Samar
40. Palawan
41. Antique
42. Aklan (Boracay)
43. Capiz
44. Iloilo
45. Negros Occidental
46. Negros Oriental
47. Cebu
48. Bohol
49. Leyte
50. Southern Leyte



51. Surigao del Norte
52. Agusan del Norte
53. Surigao del Sur
54. Zamboanga del Norte
55. Misamis Occidental
56. Zamboanga del Sur
57. Lanao del Norte
58. Misamis Oriental
59. Agusan del Sur
60. Lanao del Sur
61. Bukidnon
62. Davao del Norte
63. Davao Oriental
64. Maguindanao
65. North Cotabato
66. Davao del Sur
67. Sultan Kudarat
68. South Cotabato
69. Basilan
70. Sulu
71. Tawi-Tawi

Philippine Travel Destinations Guide
<http://www.philsite.net>

Philippine Flag



The **National Flag of the Philippines** is a horizontal flag bicolor with equal bands of royal blue and scarlet red, and with a white equilateral triangle at the hoist; in the center of the triangle is a golden yellow sun with eight primary rays, which represent the country's first group of provinces that started the 1896 Philippine Revolution against Spain; and at each vertex of the triangle is a five-pointed golden yellow star, each of which represent the country's 3 main regions - Luzon, Visayas and Mindanao (a.k.a. "LUZVIMINDA"). This flag can indicate a state of war if it is displayed with the red side on top. (Source:

http://en.wikipedia.org/wiki/Flag_of_the_Philippines)

Basic Country Info

- Area: 300,000 sq. km. (115,830 sq. mi.)
-(slightly larger than Arizona)
- Arable Land: 19%
- Irrigated Land: 152,500 sq. km. (58,880 sq. mi.)
- Made up of 7,107 islands
- Coastline: 36, 289 km. (22,548 mi.)
- Natural resources: timber, petroleum, nickel, cobalt, silver, gold, salt, copper

Basic Country Info

- Economy is projected to grow at 4.8% annually.
- GDP is composed of 12.8% agriculture, 31.5% industry, and 55.7% services.
- Labor force: 40 million (33% agriculture, 15% industry, and 52% services)
- Per capita income: \$4,100
- Population: To increase from 101.8 million in 2011 to 121.3 million in 2021 or an annual growth of 1.8%.

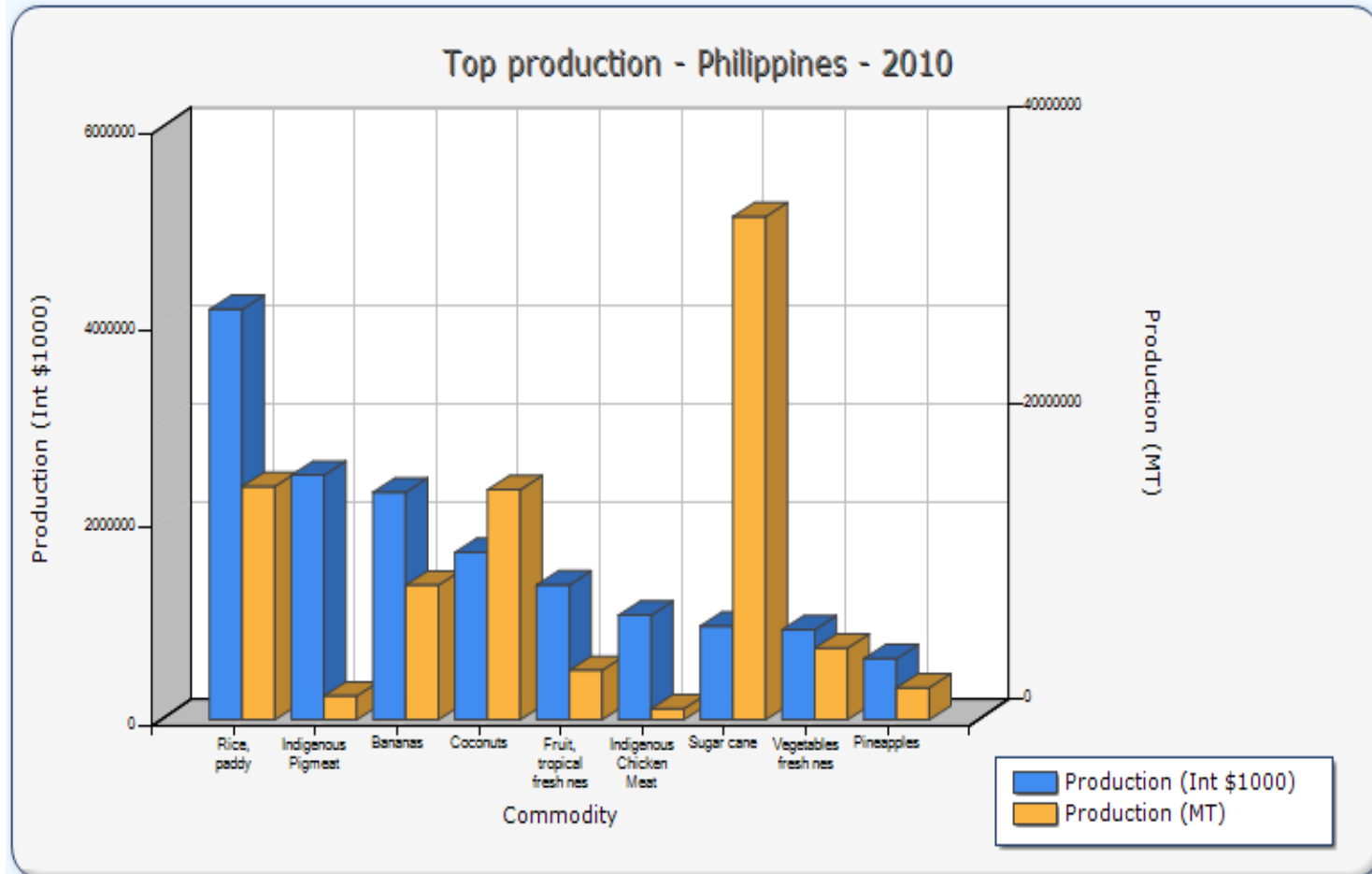
Basic Country Info

- Local currency (Philippine pesos, PHP): To depreciate slightly relative to the US dollar, from 43.70/\$ in 2011 to 45.14/\$ in 2021.
- Agricultural products: Sugarcane, coconuts, rice, corn, bananas, cassavas, pineapples, mangoes; pork, eggs, beef; fish
- Industries: Electronics assembly, garments, footwear, pharmaceuticals, chemicals, wood products, food processing, petroleum refining, fishing

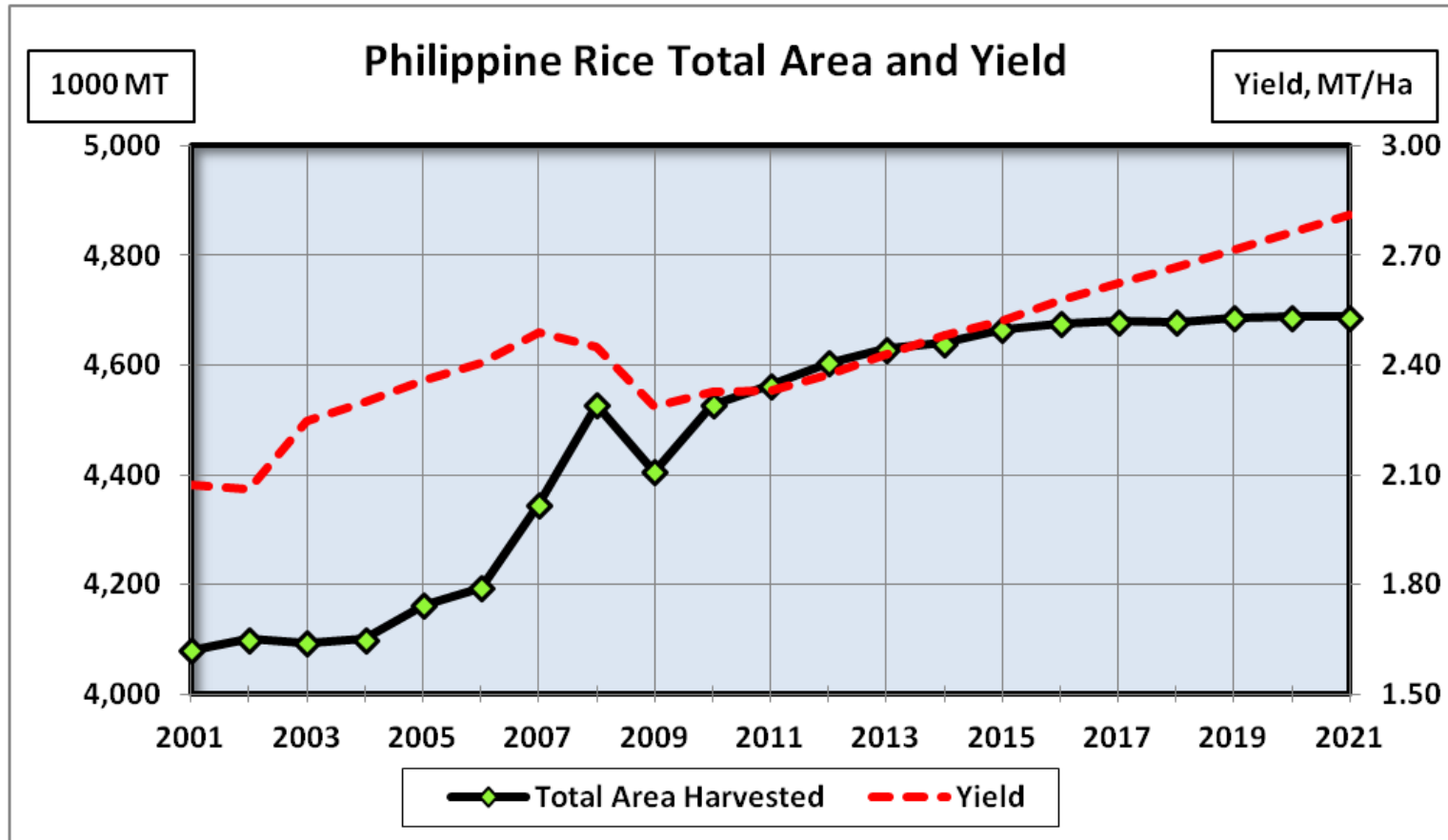
Basic Country Info

- Commodity Exports: Semiconductors and electronic products, transport equipment, garments, copper products, petroleum products, coconut oil, fruits
- Commodity Imports: Electronic products, mineral fuels, machinery and transport equipment, iron and steel, textile fabrics, grains, chemicals, plastic

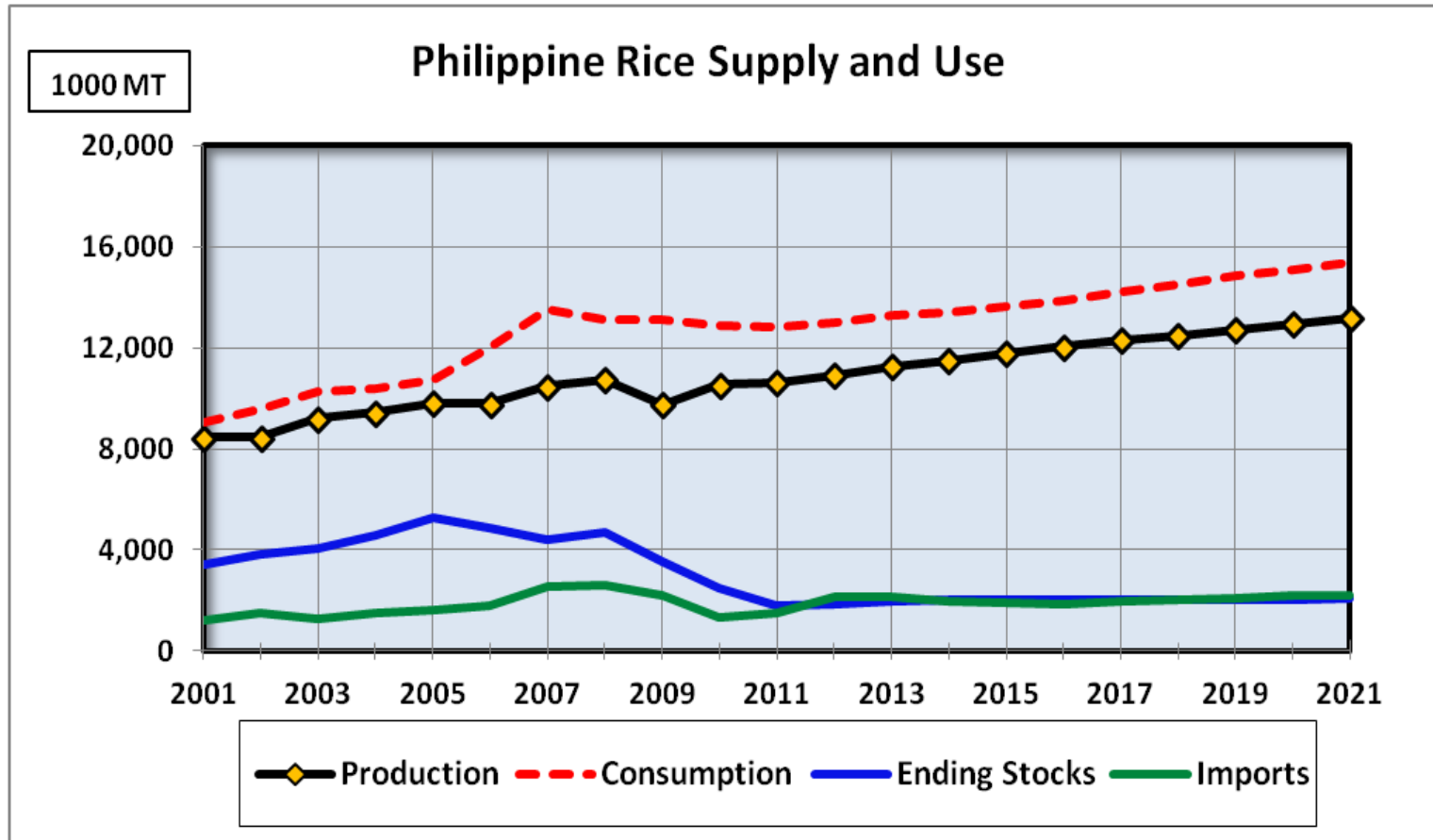
Agricultural Production, Philippines (FAO)



Philippine Rice, 2001-2021



Philippine Rice, 2001-2021



Background on GM Crops

- A genetically modified (“GM”) crop contains a gene from a different species that gives the crop new traits such as resistance to certain insects or herbicides, increased drought tolerance, or enhanced nutritional value. Such crops are referred to as GE crops, transgenic crops, biotech crops, or simply genetically modified organisms (“GMOs”).
- Supporters of agro-biotechnology argue that it could reduce the amounts of pesticide, fertilizer, and water needed to produce foods, potentially leading to greater crop yields and improvements in food security.

Background on GM Crops

- Critics of the technology warn of potential dangers, including threats to the ecosystems in which GM crops are introduced, decreased genetic biodiversity of crops, and unknown effects to humans from consuming GM foods.

(Richmond, 2006)

Global Regulation of GM Crops

- The two international treaties that regulate GM crops—the Cartagena Protocol on Biosafety (“Cartagena Protocol”) and the World Trade Organization’s (“WTO”) Agreement on the Application of Sanitary and Phytosanitary Measures (“SPS Agreement”)
- The SPS Agreement requires scientific justification for imposing higher standards on imported items, such as GM plant material, while the Cartagena Protocol only relies on the precautionary principle, which does not require scientific justification.
- The Cartagena Protocol takes socio-economic considerations into account, while the SPS Agreement does not (Richmond, 2006).

Overview of GM Crops in the Philippines

- The Philippines has reportedly become a pioneer in South East Asia in planting the GM Asiatic corn borer-resistant Bt corn since its approval in 2002.
- In Isabela, the largest corn-producing province, Bt corn yields 6.5 to 7.0 MT/Ha vs. 5.0 MT/Ha from conventional corn varieties.
- There are indications that the country could possibly lead the way again for a new GM crop with the anticipated release to the market of the pro-Vitamin A-rich Golden Rice in 2013 or 2014.

Overview of GM Crops in the Philippines

- GM Crops in the Philippines: : 600,000 Has.
- Bacillus thuringiensis (Bt) corn area grew by 20 percent in 2011.
- World's 10th largest GM producer
- Current trials for Bt eggplant, Golden Rice, Bt cotton are being monitored by the country's Bureau of Plant Industry (BPI).

Overview of GM Crops in the Philippines

- The Bureau of Plant Industry (BPI) reported that recent GMO applications include those for soy beans, potatoes, cotton, alfalfa, canola and sugar beet.

<http://www.philstar.com/Article.aspx?publicationSubCategoryId=77&articleId=774372>

Regulation of GM Crops, Philippine Style

The Philippines Regulates GM Crops Through Executive and Administrative Regulations

1. The National Committee on Biosafety of the Philippines (NCBP) provides technical recommendations regarding biotechnology (created in 1990 by Executive Order No. 430)

The NCBP:

- Identifies potential hazards involved in genetic engineering experiments;

Regulation of GM Crops, Philippine Style

The NCBP (cont'd):

- Formulates and reviews national policies and guidelines on biosafety and risk assessments;
- Develops working arrangements with the NCBP-member government agencies;
- Develops technical expertise and facilities; and
- Holds public deliberations on proposed national policies

Regulation of GM Crops, Philippine Style

2. The Department of Agriculture's Bureau of Plant Industry (BPI) regulates the release of GM crops (Administrative Order No. 8)

- Establishes guidelines for using GM crops for contained use, field testing, propagation, and for feed, food, or processing.
- Assures GM product safety through review by its Scientific and Technical Research Panel, which conducts a risk assessment prior to release of the product into the environment in order to determine whether the product poses significant risks to human health and the environment

Regulation of GM Crops, Philippine Style

The BPI (cont'd):

- If the regulated article passes the risk assessment, the BPI issues a biosafety permit, which could be for (1) import for contained use; (2) field testing; (3) propagation; or (4) import for direct use as food, feed, or processing.

State of GM Rice

Rice (*Oryza sativa* L.) GM Events (8 Events)

Event Name and Code	Trade Name
Name: 7Crp#10 Code: not available	not available
Name: 7Crp#242-95-7 Code: not available	not available
Name: GM Shanyou 63 Code: not available	BT Shanyou 63
Name: Huahui-1/TT51-1 Code: not available	Huahui-1
Name: LLRICE06 Code: ACS-OSØØ1-4	Liberty Link™ rice
Name: LLRICE601 Code: BCS-OSØØ3-7	Liberty Link™ rice
Name: LLRICE62 Code: ACS-OSØØ2-5	Liberty Link™ rice
Name: Tarom molaii + cry1Ab Code: not available	not available

General Information on GM Crops

Online Reference on GM Crops

- International Service for the Acquisition of Agri-biotech Applications

ISAAA is a not-for-profit international organization that shares the benefits of crop biotechnology to various stakeholders, particularly resource-poor farmers in developing countries, through knowledge sharing initiatives and the transfer and delivery of proprietary biotechnology applications.

(<http://www.isaaa.org/inbrief/default.asp>)n

Potential Expansion of GM Crops

- ISAAA targets 40 countries to plant GM by 2015, from 29 countries in 2011
- Translates to 20 million farmers using biotechnology by 2015, from 16.7 million farmers in 2011

Source: <http://mb.com.ph/articles/350993/rp-plants-more-gm-crops>

Potential Expansion of GM Crops

- “A 94-fold increase from 1.7 million hectares in 1996 to 160 million hectares in 2011 makes biotech crops the fastest adopted crop technology in recent history.”

<http://www.interaksyon.com/article/24005/gm-crops-cultivation-expanding-worldwide-says-report>

Thank You!