



**Asia-Pacific
Economic Cooperation**

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Agenda Item: 6

Prospects of Bt Eggplant in the Philippine Economy

Submitted by: University of the Philippines, Los Banos

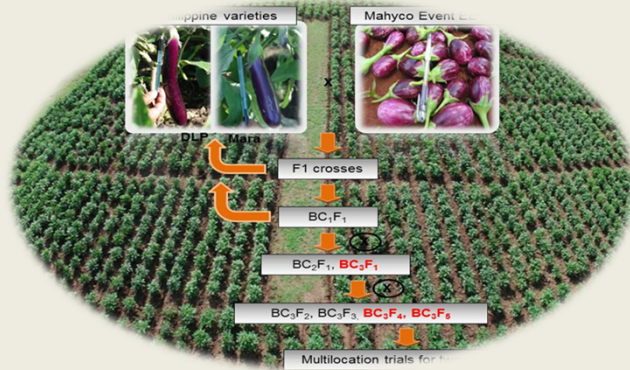


APEC
PHILIPPINES
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**Forum on the Global Alliance for Agriculture
Biotech Trade Model Policy on Low-level Presence
and Genetically Modified and Organic Farming
Co-Existence**

**Iloilo, Philippines
30 September 2015**

Prospects of Bt Eggplant in the Philippine Economy



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Eggplant Production Statistics (2005-2014)

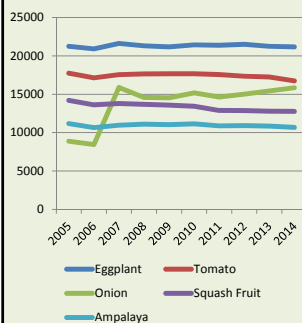
Eggplant is a very important vegetable in the Philippine economy

1st : 21,989.9 hectares

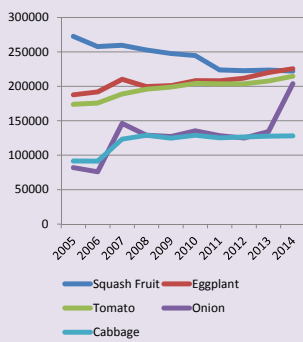
2nd: 206,399.2 metric tons

1st - PhP 2,491,980 billion

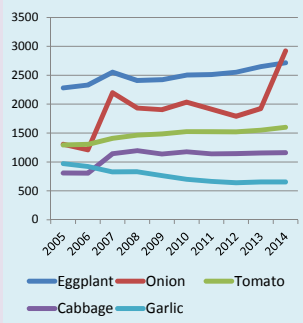
Area Planted/Harvested (hectares)



Volume of Production (metric tons)



Constant Price (Php, 000)



Source: Phil. Statistics Authority, CropStat, 2014 (<http://countrystat.psa.gov.ph/>)

Major Problem in Eggplant Production

Eggplant Fruit and Shoot Borer (EFSB)

➤ **most destructive insect pest of eggplant**



Adult moth



Destructive larva

Photo Source: Rao, 2010

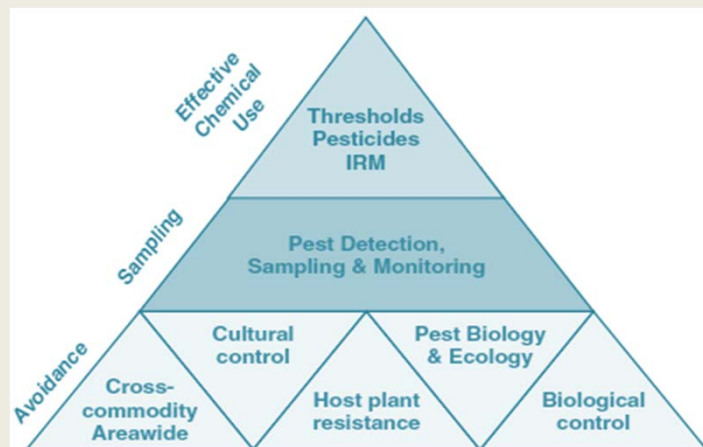
EFSB Feeding Damage

➤ **70-80% yield loss**



IPM Conceptual Diagram

IPM emphasizes the importance of the underlying foundation of pest avoidance through components such as insect-resistant GM varieties and biological control.



Source: Romeis, J., A.M. Shelton, G.G. Kennedy. (2008) *Integration of Insect-Resistant Genetically Modified Crops within IPM Programs*. Springer, New York.

Current Farm Practices of Eggplant Farmers

Farm Practice	Provinces					
	Pangasinan		Batangas		Quezon	
	Yes	No	Yes	No	Yes	No
IPM	6.48	93.6	0.0	100.0	0.0	100.0
Crop rotation	57.4	42.6	50.0	50.0	7.4	92.6
Cover cropping	46.81	53.19	0.0	100.0	3.7	96.3
Chemical pest control	95.7	4.3	96.7	3.3	100.0	0.0
Mulching	4.5	98.3	3.3	96.7	0.0	100.0
Biological pest control	8.5	91.5	43.3	56.7	0.0	100.0

Source: Quicoy, 2010

Pesticide Use in Eggplant Production, Health and Environmental Effects

Active Ingredient	Type of Insecticides	Toxicity Class	Freq.	%	Amount Used/application (in L)
Malathion	Organo-phosphate	Insecticide IV	9	90	0.13
Chlorantraniliprole	Anthranilic diamide	Insecticide IV	10	100	0.20
Cypermethrin	Pyrethroid	Insecticide IV	3	30	0.33
Chlorpyrifos	Organo-phosphate	Insecticide II	2	20	0.48

Health effects related to pesticide exposure

- itchiness of the skin (63.8%), redness of the eyes (29.3%),
- muscle pains (27.6%), headaches (27.6%)

Environmental effects - insecticide residues detected in

- soil samples (42%) - profenofos, triazophos, chlorpyrifos, cypermethrin, and malathion.
- eggplant fruit samples (20%) - cypermethrin and chlorpyrifos

Source: Del Prado-Lu, J. Environ Health Prev Med 2015 Jan 21;20(1):53-62. Epub 2014 Nov 21.

Rationale for Developing Bt eggplant

- ☑ Significant yield loss due to insect damage
- ☑ Excessive use of pesticides and potential harm to human health and environment
- ☑ Higher cost of production due to pesticides
- ☑ No effective resistance in conventional varieties

1ST 'PINOY' GM VEGETABLE

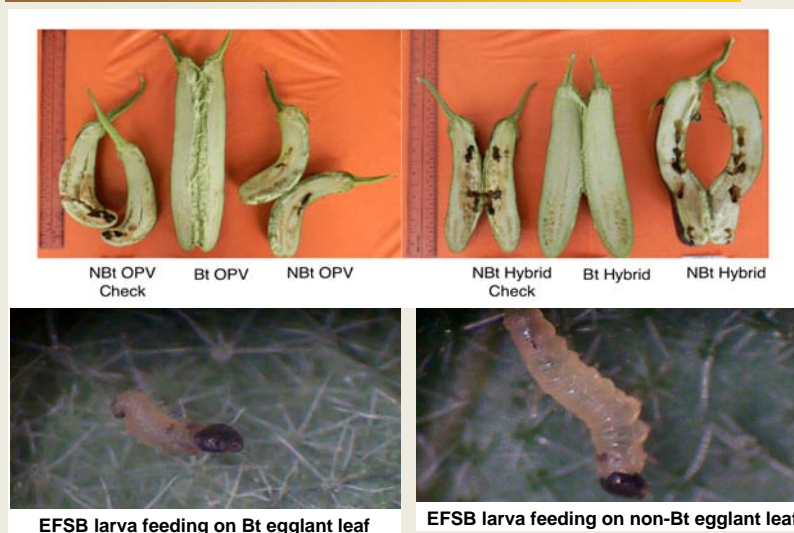
UPLB's Bt eggplant

- ✓ High yielding
- ✓ Reduce cost of production
- ✓ Safe to eat
- ✓ Safe to animals & environment



Bt eggplant

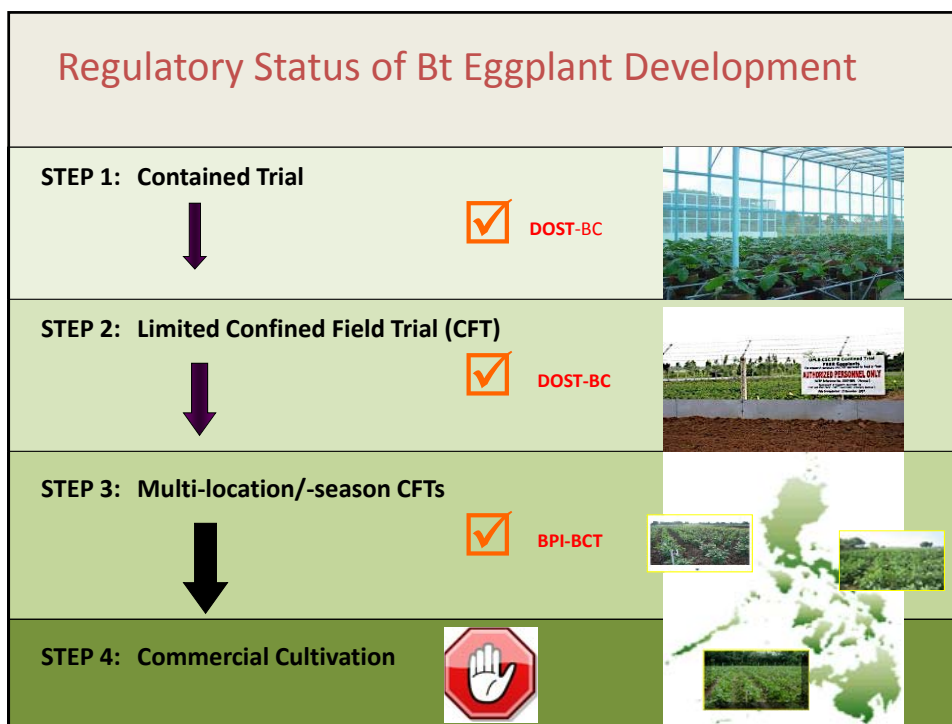
Bioefficacy of UPLB's Bt Eggplants



Projected changes in cost and income of eggplant production, with and without Bt

Item	Without Bt	With Bt	Difference
RETURN			
Total Cash Return	561,691	678,579	116,888
Total Non-Cash Return	12,273	12,273	-
TOTAL RETURN	573,964	690,852	116,888
COSTS			
Total Cash Costs	141,209	134,037	(7,172)
Total Non-Cash Costs	53,708	47,544	(6,164)
TOTAL COST	194,917	181,581	(13,336)
NET CASH INCOME	420,482	544,542	124,060
NET FARM INCOME	379,046	509,271	130,225

Source: Quicoy, 2015



Bt brinjal (eggplant) approved for cultivation in Bangladesh economy



- Four (4) Bt brinjal varieties approved for propagation on October 30, 2013
- Two planting seasons (2014/15)
 - 1st season- 20 farmers, 4 districts;
 - 2nd season - 108 farmers, 19 districts
- FSB Damage: < 1% Bt brinjal vs.48-57% non-Bt brinjal
- 40 to 100% higher yield in Bt brinjal
- Bangladesh Agricultural Research Institute (BARI) set to release three more Bt brinjal varieties this year (2015)

Sources: banglabiotech.org, bteggplant.wordpress.com;
 ISAAA Brief 47 <http://www.thefinancialexpress-bd.com/2015/07/29/101915#sthash.x4P3k8YO.dpuf>

Acknowledgement



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UPLB website –for official UPLB logo

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