

Economic profitability and adoption of Bt cotton and Non-Bt cotton in North India

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Background: Bt Cotton is the first genetically modified crop introduced in India during 2002, currently dominates more than 75% area to the total cotton area. The adoption of Bt cotton in India is higher than other countries. In spite of higher adoption rate, Bt cotton is not fully accepted by all sections of the population because few studies showed Bt cotton is profitable and few studies showed Bt cotton is not profitable for Indian farmers.

Research goals : To compare the profitability of Bt cotton with Non Bt cotton and identify the adoption factors of Bt cotton in North India.

Methodology:

Study area : Haryana, Punjab State (200 Farmers), India

(i) Partial Budgeting: It is a method of making a comparative study of costs and returns resulting from a change in a part of the farm business.

(ii) Logit Model: If $U_i BT > U_i C$ then Bt cotton will adopt

So $P_i = f(\beta, X_i)$

where X is explanatory variables related to adoption

Where,
$$Y(P = 1 / X_i) = \frac{1}{1 + e^{-(\beta + \beta_i X_i)}}$$

Y = Adoption of Bt cotton (1,0)

β_i = Coefficient of explanatory variables

X_i = Explanatory variables – Expenses on insecticide, cotton revenue, Network dummy, education, experience in cotton, No of information source, family size, annually off-farm income and state dummy.

Results:

a) Increase in costs in Rs./acre

I) Seed cost = 1364.52-256.48=1108.04

II) Fertilizer cost=1739.49-915.13=824.36

III) Irrigation cost=1256.24-734.45=521.79

IV) Picking cost = 2468.75-1846.25=622.50

Sub total = 1108.04+824.36+521.79+622.50=3076.69

b) Decrease in cost in Rs.

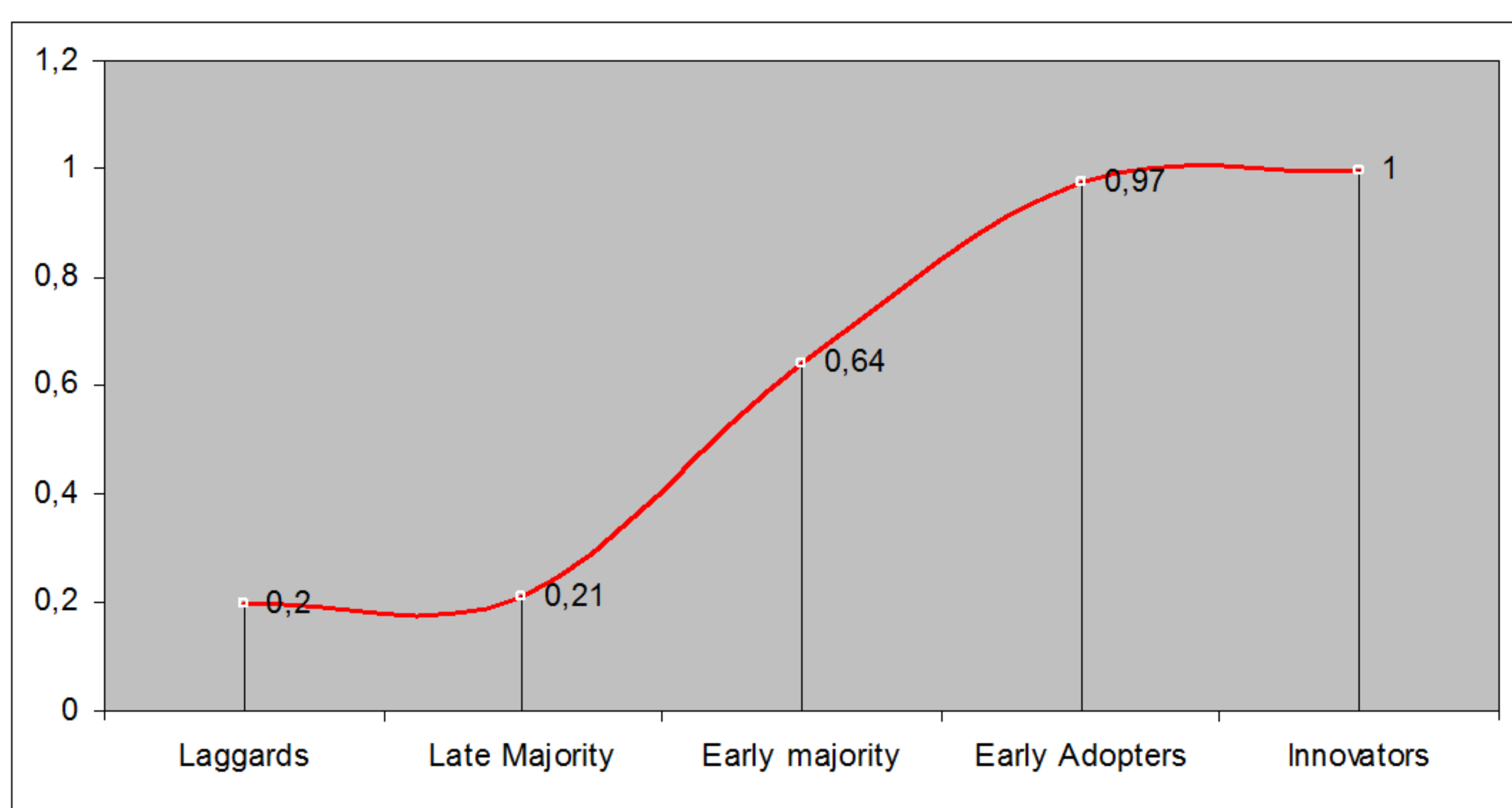
Insecticide cost=1690.29-867.28=823.01

Sub total = 823.01

c) Decrease in Returns in Rs.: 0

d) Total Increase in Returns in Rs.: 22328.13 -14799.25 =7528.88

Net return with Bt cotton = (b+d)-(a+c) = (823.01+7528.88) – 3076.69 = 5275.20 Rs.



Y	Coeff.	S.E.	P> z
Insecticide expenses (Rs./acre)	-4.248	.931	0.000
Total cotton revenue (in Rs.)	2.515	.622	0.000
Annually off-Farm income (in Rs.)	.026	.061	0.664
Education (in school years)	.886	.365	0.015
Network dummy	2.184	1.158	0.059
Family size	-.032	1.065	0.976
Experience in cotton farming (in yrs.)	-1.328	1.253	0.289
No. of information source	.669	.850	0.432
State dummy (if state Haryana=1)	-2.070	.912	0.023
Constant	5.486	8.628	0.525
Log likelihood		-34.881	
Pseudo R ²		0.6515	

Conclusion :

- Bt farmers are comparatively profitable than Non-Bt farmers.
- Revenue from Bt cotton, reduction of insecticide expenses are main reason to adopt Bt cotton. Educated, networking and Punjab farmers are more likely to adopt than other farmers.

References: Thirtle, C., Beyers, L., Ismaël, Y. and Piesse, J. (2003). Can GM-technologies help the poor? The impact of Bt cotton in Makhathini Flats, KwaZulu-Natal. *World Development*, 31: 717–32.

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