Plant Breeding Innovations in India: Employment, Economic and Social Benefits

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Cultivated species of Cotton

- *G. hirsutum*
- *G. barbadense*
- *G. arboreum*
- *G. herbaceum*
Changing cotton species pattern in India

Source: ICAR-CICR
Innovations in Cotton Breeding

Commercialization of world’s first cotton hybrid: H 4 (1971)

C. T. Patel (Father of Hybrid Cotton in India)
Timeline of technological innovation in cotton breeding

Beginning of hybrid cotton era

Approval of transgenic Bt cotton

Area In Million hectares

Production In Million bales (170 Kgs)

Yield kgs per hectare
Sixteen Years of Adoption of IR (Bt) Cotton in India, 2002 to 2017

Source: ISAAA, 2017
Hybrid Cotton Seed Production

Procedure (HEAP)
Use of nuclear male-sterility system

Male-sterile flower

Male-fertile flower
Male sterile

Male fertile
Employment generation

Land required for cotton hybrid seed production to meet demand at national level: **122,000 acres**

~ **1 million labourers**

~ **0.1 million persons** engaged in seed processing, marketing etc.
Area under cotton cultivation in India
2001: 8.7 m ha
2018: 12.2 mha

Average land holding per farmer: 1.3 ha

~ 3 million farmers have been added.
Production

2001: 14.8 m bales
2017: 36.1 m bales

Production of one ton lint engages 5 persons round the year.

Therefore, additional production of 2 million tons of lint has led to overall employment for 10 million persons.
Growth of Textile Industry

- Size of textile industry ($ Bn)
- Size of textile exports ($ Bn)
- Spun yarn production (M Kg)

1995-96:
- Size of textile industry: 20.78
- Size of textile exports: 10.69
- Spun yarn production: 2485

2000-01:
- Size of textile industry: 27.8
- Size of textile exports: 11.9
- Spun yarn production: 3160

2005-06:
- Size of textile industry: 51.6
- Size of textile exports: 17.01
- Spun yarn production: 3458

2010-11:
- Size of textile industry: 121
- Size of textile exports: 27.8
- Spun yarn production: 4712

2015-16:
- Size of textile industry: 36.75
- Size of textile exports: 137
- Spun yarn production: 5665
Proportion of farm cost to total cost

- Human labour cost: 52.7%
- Fertilizer cost: 10.8%
- Seed cost: 9.6%
- Pesticide cost: 8.9%
- Mechanization cost: 8.8%

Source: Haque et al (2014) Socio-economic impact assessment of Bt cotton in India
Many Thanks !
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International Cotton Advisory Committee

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