

# The Future of **Organic** cotton, **GM** Cotton and **Hybrid** Cotton

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# Organic Cotton

**No** GMO seed, **No** Synthetic fertilizers ,**No** pesticide, **No** hormones  
( IFOAM-2016)

- **Non-certified –Conventional cotton (*pre-industrial era*)**
- **Post Industrial –Conventional cotton- (*high inputs*)**
- **Better Cotton Initiative (*BCI*)**
- **Certified Organic cotton**
- **“In-Conversion “ cotton farmers**
- **Main Players:** Cotton Connect (CC), Fair Trade, Cotton Exchange (CE), Laudes Foundation, Organic Cotton Accelerator (OCA)

# Present Status- Certified Organic Cotton

- Only **1 % of global cotton** production-249,153 tons\*  
(\* Textile Exchange 2021-OC Market Report)
- **OC Farms-229,280 ; Land- 588,425 Ha; Countries: 21**
- **Main Players: India, China, Kyrgyzstan, Turkey, Tanzania, Tajikistan, USA**
- **New Entrants: African Union, Pakistan**
- **EU countries promoting OC in developing countries**
- ***“In-Conversion”* Farmers are rising**

# Challenges-Organic Cotton

- Supply of **Non-GMO** seed
- Availability & Quality of **Bio pesticides**
- Availability of Quality **Bio fertilizers**
- Higher **Certification Cost** of Third Audit Party ( Control Union,
- Issue of **Premium** (8-9% globally) to the farmers
- **Linkage of industrial sector** with farmers- (contract farming/Buy back guarantee)
- **National government policy framework lacking**

# GM cotton

- Genetically engineered, Biotech, GMO, LMOs, GM, Bt cotton
- **Land- 24 M Ha; Production 23.5 M tonnes; Countries-15**
- **Main Players:** USA, Australia, India, China, Brazil, Pakistan
- **New Entrants:** Sudan, Nigeria, Kenya
- **Technology developers: Private + Public Sectors**
- **Monsanto, Bayer Crop Sciences, Dupont, Poiner Hi-Bred, Syngenta, Mahyco, CAAS, Novartis**
- **Bollgard (I, II,III...), Roundup Ready (RR), Flex, Ingard, Wide strike**
- **67 Events** for Insect resistance, Herbicide tolerance, drought tolerance, fiber quality, oil quality (= no gossypol)

# Challenges of GM Cotton

- **Restricted Gene transformation technologies/monopolies**
- **Genotype dependent ( Coker, Acala..)**
- **Less understanding of complex traits of fiber production, higher productivity**
- **Long & tedious Process of Approval and commercialization**
- **Concerns about Human, Animal and Environment health**
- **Unintended gene flow to non-GM plants ( biodiversity)**
- **Development of Secondary pest, pest resistance, herbicide tolerance**
- **Potential Allergenicity**

# GM Approval & Commercialization in Kenya

- First Global Approval of GM cotton= 1996 (USA)
- Submission of Application in Kenya=2001
- Trials Completed= 2010
- Cabinet Approval= Dec 19,2019
- Full Commercial Roll out= April 2020

## ***Messages:***

- Capacity building of HR, Infrastructure
- Adopt Gene Editing (NBTs, CRISPR-Cas9 etc.)
- *Political Will* /Commitments- (More investments in R &D)
- Adopt uniform and consistent guidelines for commercialization
- Awareness among farmers, policy makers, general public (consumers)



# Hybrid Cotton

- Developed in India in 1970- Hybrid-4 (H-4)
- Based on *Heterosis*
- Slow adoption by farmers: 2002 < 50% ; 2011 >95%
- Productivity: base line of 122 Kg lint/ha to 290 (1992) to 500 Kg lint/ha (2011)
- *(Unlike of Corn and Rice----mega shift)*
- Highly labor intensive-25 M workers ( mostly women) to get hybrid
- Mostly suitable for rain-fed areas ( AP, MP, Karnataka )
- No prominent productivity edge in irrigated areas

# Challenges of Hybrid Cotton

- Sole survival of hybrid cotton-**India**
- 1128 hybrid cotton varieties (2012)
- China, Pakistan, USA quit- *Zero area under HC*
- Tall and bushy plants
- Can not be planted in large densities
- Low densities and prolong season
- Low harvest index
- **Lack of modern technologies for hybrid seed development**
- **With eviction/ expiry of patents—Hybrid cotton on exit path in India**
- Bleak future of hybrid cotton

# Way Forward

- Sole/ combination choice depends on prevailing situation
- **Prime task- Higher & Sustainable lint productivity**  
*(NF facing tough competition from MMF)*
- **3Ps- Profitability for People and Planet (Nature plus)**
- More investment in R &D by all governments
- Uniform and efficient approval system of GM cotton
- **Adoption of NBTs for better productivity**
- 2050- 9.6 billion people; double food production
- **Cotton – Food, Feed & Fiber** ‘ *a crop with multiple benefits and well placed in SDGs- global agenda*