

## PARTICIPATORY ORGANIC COTTON BREEDING APPROACH TO ACHIEVE SUSTAINABLE DEVELOPMENT GOALS

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At present, about 33 million ha of cotton are grown worldwide, which gives about 82 million tons of seed cotton (FAO 2021) only 0.5% is the share of organic cotton. Organic cotton cultivation on 418'935 ha in 19 countries grown by 222,134 farmers and results in 239,787 tons of organic lint (Textile Exchange 2020). Importance of cotton for rural farmers' livelihood is evident from the number of smallholder farmers involved in cotton production e.g. 51% of the global organic cotton is produced in India by 166,767 families (Textile Exchange 2020) with an average of 2 ha only (Riar et al., 2017). Challenges for organic cotton are more pronounced than ever. The introduction of GM cotton in 2002 has radically changed the cotton species grown in India, affecting the organic (non-GM) seed market, which led to depleted supply and poor quality of available non-GM seed. Also, Bt-cultivation (Genetically modified; GM) has also shifted the natural balance of pest by worsening non-Lepidopteran pests' predation due to increased fertilizer use coupled with pink bollworm Bt resistance has a spilled-over effect on organic cotton cultivation. To tackle these challenges, the organic cotton sector is in the dire need of non-GM seed with improved agronomic performance, high fiber quality, adapted to the various local organic growing conditions, and high resilience towards climate change. To achieve this Participatory Organic Cotton Breeding approach was introduced to organic cotton growers in India in 2011, to improve the availability of non-GM cotton seeds of improved cotton cultivars suited explicitly for organic farming systems. This is fundamental to guarantee the integrity and credibility of the organic value chain. Moreover, this will enhance the competitiveness of organic cotton and the income security and autonomy of smallholder cotton farmers. In this paper, we briefly evaluate the role of Participatory organic cotton breeding (POCB) to achieve the U.N. Sustainable Development Goals — also known as Global Goals or the SDGs. POCB can contribute to all 17 SDGs due to their interlinkages; however, a thorough evaluation of methodology indicates the POCB directly contributes to 6 SDGs, and six more SDGs can be contributed indirectly. POCB potential and approach toward resilience will improve choice and access to adapted seed, fast adoption of new cultivars, create

more income in rural areas, and empower farmers (SDG 1). POCB will support the transition to more sustainable textile production by reducing the application of toxic pesticides. This is of significant importance as cotton still demands lots of labour in the field for spraying and picking mainly done by female farmers. Risk of pesticide residues will be reduced on neighboring food crops. Furthermore, POCB will promote organic cotton textile growth with much stricter rules on chemicals allowed for textile dyeing and finishing. It will ensure healthy lives and promote the well-being of farmer families and textile workers (SDG 3). POCB is a knowledge-intensive process involving many stakeholders like farmers, extensionist, breeders, seed companies, ginners, spinners and textile trade, as well as socio-economists. After a trust-building process, POCB fosters mutual learning among the partners and contributes to capacity building in rural areas (SGD 4). Active involvement of female farmers in POCB and seed saving has proven to be especially rewarding, as they show a different perception of breeding goals and greater endurance. Their active engagement improves their social status and at the same time, improve the breeding process (selection for easy picking traits) and seed security (SDG 5). Decentralized POCB for high resilience and robust cultivars and breeding for locally adapted more diverse farming systems and different agroecological zones will reduce the risk of crop losses due to climate change. The large number of on-farm trials in the scope of POCB allows identifying new challenges (like emerging pests and diseases) as well as selection for extreme weather conditions (e.g., delayed or interrupted monsoon rains, flooding, cool temperature). Reduced fertilizer input will also mitigate greenhouse gas emissions (SDG13). Participatory Organic Cotton Breeding can become a model for the closer collaboration of government, private sector and civil society. Defining breeding as a societal challenge will shift relations between the different actors of society. In order to allow biodiversity to enter the market, political and legal changes are required (SDG 17).

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