

# Improving Tomatoes to Perform Better in a Changing Climate

A well-known Indian saying is “No tomato, no cooking.” Tomatoes are one of the three most important crops under the Indian Government “TOP (tomato, onion and potato)” horticultural priority list. As such, tomatoes are an important commercial vegetable crop for Indian farmers – India is the second largest tomato producer in the world<sup>1</sup>. However, climate change has challenged traditional vegetable growers in Eastern India, reducing overall agricultural productivity. This is due to higher temperatures, which tend to reduce crop yields and can increase weed growth and pests<sup>2</sup>. When temperatures rise, tomatoes may fail to “set” fruit, and can be damaged in the field (sun blistering, reduced shelf life, etc.). Higher temperatures can also mean more water, and India’s arable land is highly dependent on rainfall<sup>3</sup>.

While open field hybrid tomato cultivation in India has grown substantially since the 2010-11 season (Table 1), the average yields were not maintaining a similar pace<sup>4</sup>. The major areas representing tomato cultivation in smallholder geographies are West Bengal, Odissa, Jharkhand and parts of Eastern Uttar Pradesh. Farmers here were looking to maximize their harvest while decreasing inputs, but they didn’t have the tools to do this, especially with the added effect of climate change. Prior to the 2011-12 season there were few tomato hybrids on the market that provided a good fruit size along with productivity during the summer season (October-March), which is the main growing season.



Bayer’s tomato hybrid “Saksham” was introduced in 2011-12. In the regions identified above, Saksham variety cultivation has increased 900% between 2012 and 2019<sup>5</sup>. This variety is known for its excellent heat tolerance, giving it a key advantage for farmers, as it is well adapted to local growing conditions. It also has an attractive fruit size (90-110 gram). The Saksham tomato variety benefits from 8-10 day shelf life, compared to a typical 3-4 day timeframe within which tomatoes would normally spoil. Breeding hybrid tomato varieties like Saksham provides farmers with varieties that are well adapted to local growing conditions, which has the potential to enable a more abundant and affordable food supply.

Table 1: Tomato cultivated area in Eastern India (Odissa & Uttar Pradesh).

	Area (In ` 000 Hectare)							
Year	2010-2011	2011-2012	2013-14	2014-15	2015-16	2016-17	2017-18	2020-21
Total	96.6	103.4	105.1	107.1	111.66	111.98	112.25	118.17

Source : Ministry of Agriculture and Farmers Welfare, Govt. of India. <https://www.fao.org/faostat/en/#data/QCL>

<sup>1</sup> Tomato production per country - FAO: <https://www.nationmaster.com/nmx/ranking/tomatoes-production-fao>

<sup>2</sup> Impact of Climate Change on Agriculture, Press Information Bureau, Government of India, Ministry of Agriculture & Farmers Welfare, 19 July 2019: <https://pib.gov.in/newsite/PrintRelease.aspx?relid=191979>

<sup>3</sup> The state of the worlds land and water resources for food and agriculture - Published by: The Food and Agriculture Organization of the United Nations (FAO) and Earthscan: <https://www.fao.org/3/i1688e/i1688e.pdf>

<sup>4</sup> Ministry of Agriculture and Farmers Welfare, Govt. of India: <https://www.fao.org/3/i1688e/i1688e.pdf>

<sup>5</sup> WBCSD Food Affordability, p. 21: <https://www.wbcd.org/eng/contentwbc/download/14604/208448/1>