

The Tropical Legumes projects were a series of initiatives that developed and distributed high-yielding, climate-resilient food legume varieties to millions of poor farmers across Africa and Asia. Implemented over a 12-year period with US\$67 million in funding from the Bill & Melinda Gates Foundation, the projects were led by three international CGIAR research organizations – the International Crops Research Institute for the Semi-Arid Tropics (ICRISAT), the International Center for Tropical Agriculture (CIAT), and the International Institute of Tropical Agriculture (IITA) – and executed by national and regional partners.

In India, the main partner was the Indian Council of Agricultural Research (ICAR). The projects also collaborated with several other organizations to exchange knowledge and resources.

CONTEXT

In India, the Tropical Legumes initiatives prioritized improved high-yielding and climate-resilient chickpea, groundnut, and pigeonpea. All three are important crops that contribute significantly to household incomes and nutrition. In 2018, India produced 11,300,000 tons of chickpea grain, 7,000,000 tons of groundnut grain, and 4,300,000 tons of pigeonpea grain.^a Worldwide, the country is the largest producer of chickpea and pigeonpea and the second-largest producer of groundnut. However, the contributions of these crops to household income and nutrition could be greatly enhanced. In a country where stunting currently affects 38% of under-fives, and 51% of women of reproductive age suffer from anemia, the essential proteins and nutrients that food legumes provide could help lift the burden of malnutrition.^b

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APPROACH

STRENGTHENING BREEDING CAPACITY

In order to enhance the efficiency and effectiveness of India's crop improvement programs, the Tropical Legumes initiatives targeted new infrastructure, such as new irrigation facilities, and training for crop breeders and research technicians, including on genomics, molecular breeding, and the adoption of modern data collection tools. As a result, 78 elite chickpea breeding lines were successfully evaluated in national performance trials.^c

CROP FOCUS:

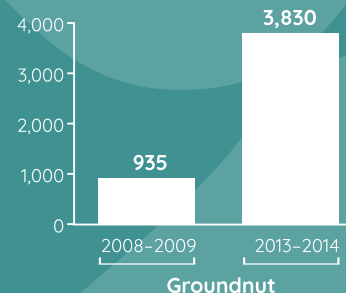


Chickpea Groundnut

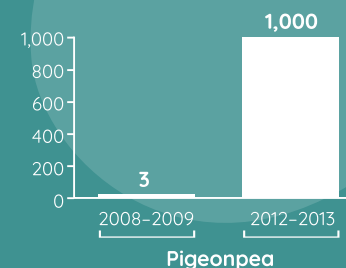


Pigeonpea

Improved seed produced
(annual average tons/year)^c



Improved seed produced
(annual average tons/year)^c



^a FAOSTAT: www.fao.org/faostat/en/

^b Global Nutrition Report 2020

^c Tropical Legumes III, Final Narrative: <https://tropicallegumeshub.com/rc/tropical-legumes-iii-final-report/>

INDIA: FACTSHEET

DEVELOPING FARMER-PREFERRED VARIETIES

With support from the Tropical Legumes projects, India's crop improvement programs developed new, improved varieties of chickpea, groundnut, and pigeonpea. These varieties were high-yielding, drought-tolerant, and able to withstand destructive pests and diseases. Farmers played a key role in their development: **in the case of groundnut alone, more than 4,300 farmers participated in varietal trials between 2011 and 2015.**^c

IMPROVING SEED DELIVERY SYSTEMS

Efforts to roll out sustainable seed delivery systems involved public-private partnerships and collaborations with local seed producers, such as farmers, farmer groups, and informal seed companies.

OUTCOMES

The projects were able to achieve notable increases in the production of seed for groundnut and pigeonpea. Groundnut seed production increased more than four-fold from an annual average of **935 tons** for the two-year period 2008–2009 to **3,830 tons** in 2013–2014. There was also a huge increase in pigeonpea seed production from an annual average of just **3 tons** in 2008–2009 to over **1,000 tons** in 2012–2013.^c

The Tropical Legumes initiatives estimate^d that enhanced seed production has been sufficient for an increasing number of households to plant seed. In 2008–2009, the annual average of groundnut seed produced would have been sufficient for **46,000 households**, but by 2013–2014 this figure had grown to **190,000 households**. For pigeonpea, the annual average increased from **1,600 households** in 2008–2009 to more than **500,000 households** in 2012–2013.

Estimates^d demonstrate the growing economic value of the improved varieties. In 2008–2009, improved seed was sufficient to produce groundnut grain worth an average **US\$4.5 million per year**, increasing to **US\$28 million** in 2013–2014. For pigeonpea, the equivalent figures were **US\$162,000** in 2008–2009, rising to an impressive **US\$50 million** in 2012–2013.

Between 2011 and 2015, 207 training sessions were conducted for 12,604 farmers and 4,137 extension personnel on pigeonpea, chickpea, and groundnut production technologies, and 320 seed entrepreneurs were trained in chickpea seed production. Over 135,000 farmers participated in farm fairs organized by the University of Agricultural Sciences based in Dharwad and Raichur, Karnataka.^e

LOOKING AHEAD

India's crop improvement programs are continuing to work with partners across the country to build on the work undertaken with the Tropical Legumes projects to enhance the efficiency and effectiveness of breeding programs and seed systems.

^d Calculations are based on an average plot size of 0.2 hectares per household, seeding rate of 0.10 tons/hectare (groundnut) and 0.01 tons/hectare (pigeonpea), and a price/ton of US\$452.70 (groundnut) and US\$667.30 (pigeonpea). These prices are averages taken from FAOSTAT figures for 2007–2017.

^e Tropical Legumes II, Final Report: <https://tropicallegumeshub.com/rc/tropical-legumes-ii-final-report/>

**TROPICAL
LEGUMES HUB**

Find out more about the
Tropical Legumes projects at
www.tropicallegumeshub.com

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78 ELITE
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**MORE THAN
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Find out more: Varshney, R.K., Ojiewo, C., Monyo, E. A decade of Tropical Legumes projects: Development and adoption of improved varieties, creation of market-demand to benefit smallholder farmers and empowerment of national programmes in sub-Saharan Africa and South Asia. *Plant Breeding* 2019; 138: 379–388.