TROPICAL LEGUMES

Accelerated breeding and seed delivery of critical legume crops in Africa and Asia

NIGERIA FACTSHEET

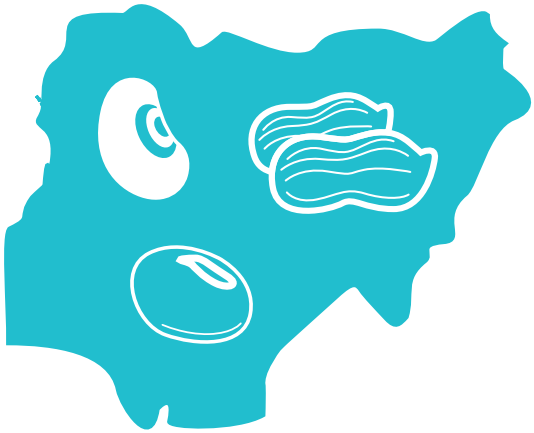
The Tropical Legumes projects were a series of initiatives that developed and distributed high-yielding, climate-resilient food legume varieties to millions of poor farmers across Africa and Asia. Implemented over a 12-year period with US$67 million in funding from the Bill & Melinda Gates Foundation, 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 Nigeria, the main partner was the Institute for Agricultural Research (IAR). The projects also collaborated with several other organizations to exchange knowledge and resources, including the Alliance for a Green Revolution in Africa (AGRA), the Kirkhouse Trust, and the Feed the Future Lab at the University of California, Riverside.

CONTEXT

In Nigeria, the Tropical Legumes initiatives prioritized improved high-yielding and climate-resilient cowpea, groundnut, and soybean varieties. These are three strategic crops for the country. In 2018, Nigeria produced 2,600,000 tons of cowpea grain, 760,000 tons of soybean grain, and 2,900,000 tons of groundnut grain, making it the largest cowpea and groundnut producer in Africa.[a] Although these crops contribute to household incomes and nutrition, more resilient and higher-yielding varieties could provide more substantial economic benefits and address widespread malnutrition.

Nigeria produced 2,600,000 tons of cowpea grain, 2,900,000 tons of groundnut grain, and 760,000 tons of soybean grain in 2018.[a]



APPROACH

STRENGTHENING BREEDING CAPACITY

Investments in new infrastructure, including the installation of irrigation facilities and storage facilities, were a key priority to improve the performance of Nigeria's crop improvement programs. The Tropical Legumes projects also prioritized training for crop breeders, introducing modern breeding techniques and other essential skills to meet future climate challenges. As a result of these changes, for instance, **Nigeria's cowpea crop improvement program was making 50 crosses per year by 2018**[b] – allowing future varieties to come down the pipeline much more rapidly.

[a] FAOSTAT: www.fao.org/faostat/en/

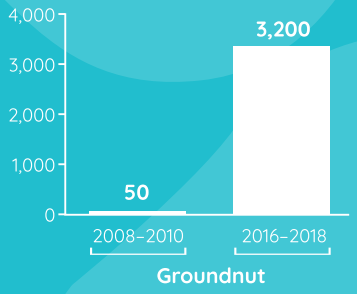
[b] Tropical Legumes III, Final Narrative: https://tropicallegumeshub.com/rc/tropical-legumes-iii-final-report/

CROP FOCUS:

Groundnut Cowpea

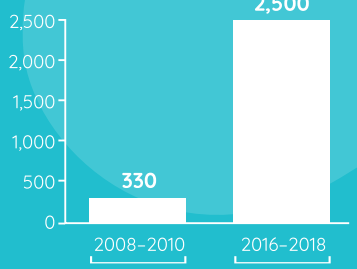
Soybean

Improved seed produced
(annual average tons/year)[b]



Groundnut

Improved seed produced
(annual average tons/year)[b]



Cowpea

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DEVELOPING FARMER-PREFERRED VARIETIES

With support from the Tropical Legumes initiatives, Nigeria's crop improvement programs developed improved, climate-resilient varieties of cowpea, groundnut, and soybean. The varieties of all three crops are high-yielding, drought-tolerant, and disease- and pest-resistant, meeting the needs of Nigerian farmers. Over **1,000 awareness events** (demonstration trials, field days, and exhibitions) promoted the new varieties to farmers.[b]

IMPROVING SEED DELIVERY SYSTEMS

Public–private partnerships were key to the creation and development of sustainable seed delivery systems, and local seed producers ensured that seed could be multiplied at the required scale. Some 13,200 people were trained in good seed production, management, and marketing practices, as well as the safe use of pesticides, and harvesting and post-harvesting handling.[b]

OUTCOMES

Over the course of the initiatives, annual average groundnut seed production increased from **50 tons** (2008–2010) to **3,200 tons** (2016–2018), average cowpea seed production increased from **330 tons** (2008–2010) to **2,500 tons** (2016–2018), and average soybean seed production increased from **266 tons** (2008–2009) to **2,423 tons** (2013–2014). In project intervention areas, improved groundnut crops registered an overall adoption rate of 44% where yields reached an **average of over 220 kilograms per hectare and generated income increases of an estimated US$135 per hectare**.[b]

The Tropical Legumes initiatives estimate[c] that enhanced seed production has been sufficient for an increasing number of households to plant the seed. In 2008–2010, the amount of groundnut seed produced was sufficient for **2,400 households** per year on average, but by 2016–2018 this figure had grown to **162,000 households**. Over the same period, cowpea seed was potentially sufficient for **633,000 households** annually, up from **82,000**, while soybean seed was potentially sufficient for **121,000 households** in 2013–2014, up from **13,000** in 2008–2009.

Estimates[c] demonstrate the growing economic value of the improved varieties. In 2008–2010 improved seed was sufficient to produce cowpea grain worth an average **US$280,000 per year**, increasing to **US$14 million** in 2016–2018. For groundnut, the equivalent figures were **US$7 million** in 2008–2010, rising to **US$52 million** in 2016–2018. For soybean, these figures rose from **US$1 million** in 2008–2009 to almost **US$15 million** in 2013–2014.

LOOKING AHEAD

The gains of the Tropical Legumes initiatives are now being consolidated by a new project, the Accelerated Varietal Improvement and Seed Delivery of Legumes and Cereals in Africa (AVISA), which is building on the experience of its predecessors to continue enhancing the efficiency and effectiveness of breeding programs and seed systems in Nigeria. Challenges that remain include limited interest and investment by private seed companies, limited availability of early generation seed, a lack of mechanization, and weak publicity for the newly released varieties. Future work will focus on several areas, such as enhancing training on seed production, promoting mechanization, and improving links between agro-input providers and community seed production.

[c] Calculations are based on an average plot size of 0.2 hectares per household; seeding rate of 0.02 tons/hectare for cowpea and 0.10 tons/hectare for groundnut and soybean; and a price/ton of US$465.20 for cowpea, US$452.70 for groundnut, and US$704.90 for soybean. These prices are averages taken from FAOSTAT figures for 2007–2017.

TROPICAL LEGUMES HUB

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

PARTNER: Institute for Agricultural Research, Samaru

LED BY: ICRISAT, CIAT, IITA

SUPPORTED BY: Bill & Melinda Gates Foundation; CGIAR Research Program on Grain Legumes and Dryland Cereals

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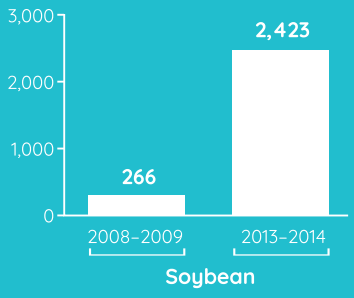
OVER **24,000** AWARENESS EVENTS PROMOTED NEW VARIETIES TO NIGERIAN FARMERS

Improved seed produced
(annual average tons/year)[b]



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.