TROPICAL LEGUMES

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

MALI 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 Mali, the main partner was the Institute of Rural Economy (Institut d'Economie Rurale [IER]). The projects also collaborated with several other organizations to exchange knowledge and resources. These included 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 Mali, the Tropical Legumes initiatives prioritized improved high-yielding and climate-resilient cowpea and groundnut: crops that contribute significantly to household incomes and nutrition. In 2018, Mali produced nearly 160,000 tons of cowpea grain and more than 310,000 tons of groundnut grain.[a] However, production falls below its potential, often because of drought, disease, and pest infestations. Food legumes could play a far greater economic role. They could also be used more strategically to address widespread malnutrition in a country where 22% of children under the age of five are affected by stunting and half the women of reproductive age suffer from anemia.[b]

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APPROACH

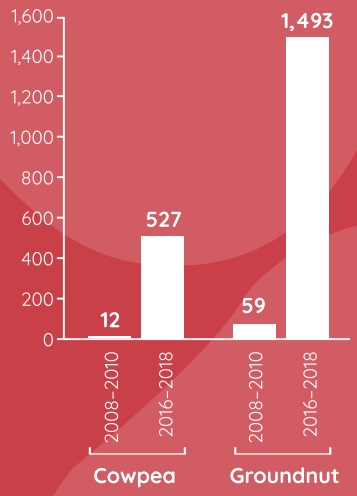
STRENGTHENING BREEDING CAPACITY

The Tropical Legumes projects invested in critical infrastructure to improve the performance of crop improvement programs, including new irrigation facilities and cold storage facilities. A training program – including sessions on genomics, molecular breeding, and data collection – also equipped crop breeders and technicians with the essential skills they will need to keep pace with environmental changes. These efforts meant that **by 2018 Mali's crop improvement program could make 51 crosses each year**,[c] accelerating the pace of future variety development.

CROP FOCUS:

Cowpea Groundnut

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



OVER **4,500** PEOPLE RECEIVED TRAINING IN SEED PRODUCTION, MANAGEMENT, AND MARKETING

[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/

MALI: FACTSHEET

DEVELOPING FARMER-PREFERRED VARIETIES

With support from the Tropical Legumes initiatives, Mali's crop improvement programs developed improved climate-resilient varieties of cowpea and groundnut. These varieties are high-yielding, drought-tolerant, and able to withstand crop diseases and pests. Between 2015 and 2018, **900 demonstration trials, field days, and exhibitions** were held to raise awareness of the new varieties among farmers.[c]

IMPROVING SEED DELIVERY SYSTEMS

Sustainable seed delivery systems were developed through public–private partnerships and a close relationship with local seed producers who helped to multiply the improved seed at the required scale. Over 4,500 people received training in seed production, management, and marketing.[c]

OUTCOMES

With the support of the Tropical Legumes initiatives, the production of quality cowpea seed increased from an average of **12 tons/year** (2008–2010) to **527 tons/year** (2016–2018), and groundnut from an average of **59 tons/year** to **1,493 tons/year** over the same period.[c]

The Tropical Legumes initiatives estimate[d] that enhanced seed production has been sufficient for an increasing number of households to plant seed. In 2008–2010, the amount of cowpea seed produced was sufficient for **2,900 households** per year on average, but by 2016–2018 this figure had grown significantly to **131,000 households**. Groundnut seed production was also notable, with the annual average increasing from **2,900 households** in 2008–2010 to **74,000 households** in 2016–2018.

Estimates[d] demonstrate the growing economic value of the improved varieties. In 2008–2010 improved seed was sufficient to produce cowpea grain worth an average **US$119,000 per year**, increasing to over **US$6 million** in 2016–2018. For groundnut, the equivalent figures were **US$248,000** in 2008–2010, rising to **US$5 million** in 2016–2018.

LOOKING AHEAD

Mali's crop improvement programs are continuing to work with partners across the country to build on the work of the Tropical Legumes projects to enhance the efficiency and effectiveness of breeding programs and seed systems. Challenges remain, including the limited availability of early generation seed, poor business-oriented variety development, and limited facilities to produce seed in the off-season. In response, the country's crop improvement programs will need to strengthen capacities, promote new agricultural techniques and mechanization, and increase the number of actors and seed companies involved in seed production.

OVER 4,500 PEOPLE RECEIVED TRAINING IN SEED PRODUCTION, MANAGEMENT, AND MARKETING

[d] 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 a price/ton of US$465.20 for cowpea and US$452.70 for groundnut. 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: IER

LED BY: ICRISAT, CIAT, IITA

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

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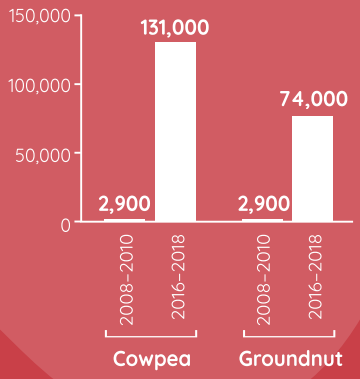
Households
(estimated number that could grow the improved seed annually, in thousands)[d]



Economic value
(estimated average annual value of grain produced from the improved seed, in US$ million)[d]

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.