Funded by the European Union

Boosting coffee productivity in Kenya and Malawi

Consortium

Implementing partners:

- CAB International (CABI), *Kenya (Project Coordinator)*
- Lunyangwa Agriculture Research Services, Ministry of Agriculture (LARS), *Malawi*
- Coffee Research Institute, Kenya Agricultural and Livestock Research organisation (KALRO), *Kenya*

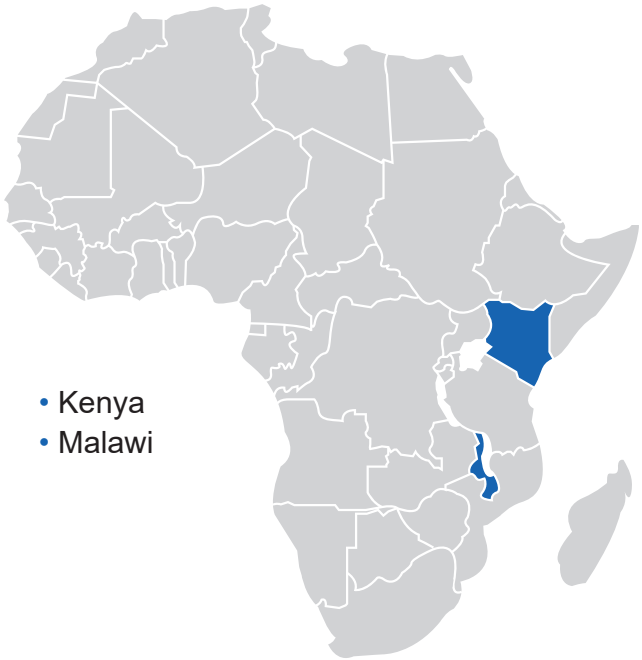
Budget

Total budget: €947,997.82
EU contribution: €804,447.82

Duration

March 2013 – August 2018

Countries of intervention



- Kenya
- Malawi

Development challenge

Smallholder coffee production in Africa is mainly unprofitable due to low productivity, pest losses, and high input costs. While Kenya and Malawi have developed varieties resistant to major coffee diseases such as Coffee Berry Disease and Coffee Leaf Rust, the access to these resistant varieties is constrained by conventional propagation methods. These methods are cumbersome and inefficient such as hand cross-pollination and rooted cuttings, rendering the coffee seed systems in the two countries non-competitive and unable to meet farmers' demand for seedlings of the improved hybrids.

Project approach

The COFFEE project approach was based on a public-private partnership agreement between the *Coffee Research Institute* (Kenya) and the *Lunyangwa Agricultural Research Station* in Malawi with the 4 cooperative coffee nurseries (Kenya) and farmer-owned nurseries in Malawi.

The COFFEE project followed a multisectoral and participatory strategy to implement its activities, based on the needs of the target groups. Thus, while in Kenya the project supported the modernisation of an existing laboratory, in Malawi a new tissue culture facility was established. A public-private partnership was formed between research institutions and commercial nurseries, allowing nurseries direct access to coffee plantlets produced through tissue culture.

Project results

Knowledge transfer on the improved tissue culture techniques to scientists, technicians, extension staff and nursery operators as well as small farmers on improved tissue culture techniques.

Kenya

From the *Coffee Research Institute* based in Ruiru

20

Scientists and technicians trained.

♂ 7 ♀ 13

4

Nurseries for wearing tissue culture plantlets were established in Kenya:

- **Mayekwe:** **3,028** members ♂ **1,120** ♀ **1,908**
- **West Pokot:** **600** members ♂ **500** ♀ **100**
- **Gitungi Farmers:** **1,500** members ♂ **650** ♀ **850**
- **Kipkelion:** **40,000** members ♂ **37,200** ♀ **2,800**

Malawi

From the *Lunyangwa Agricultural Research Station* in Malawi:

- **9** scientists ♂ **8** ♀ **1**
- **7** technicians ♂ **4** ♀ **3**
- **6** technicians trained on vitro TIS for mass propagation of coffee and banana tissue culture, and in soil testing protocols. ♂ **5** ♀ **1**

1,175

Farmer-owned nurseries were established in Malawi:

- **Misuku Cooperative in Chitipa District**
- **Phoka**
- **Viphaya North Nkhata**

45 Agricultural Extension Development Officers. ♂ **31** ♀ **14**

90 Farmers' representatives trained in soil and leaf sampling techniques. ♂ **31** ♀ **14**

4

Farmer Field Schools in Malawi (Misuku, Mphompha and Ntchisi) on Integrated Pest and Disease Management.

Vitro bank of mother plants and in vitro nodal cultures were established generating micro-shoots and leaves as explants, which derived plantlets have rapid development and reduction of contamination.

6

Nursery attendants trained on nursery management techniques and weaning of pre-germinated tissue culture seedlings.

Standard operating protocols for the 'temporary immersion system' (TIS) were developed for the 2 modernised tissue culture laboratories.

1

MSc student trained in in vitro techniques and protocol development for TIS.

Project results (2)

Improved technology transfer and use by modernising 2 tissue culture laboratories and nursery infrastructure.

At the Coffee Research Institute (CRI), Ruiru, Kenya:

900

RITA (automated temporary immersion system) units were installed in Kenya.

At Lunyangwa Agricultural Research Centre, Mzuzu, Malawi.

- **280** RITA units were installed in Malawi
- **1** laminar flow hood
- **1** standby electricity generator

103,000

Coffee plantlets created in the labs.

130,024

Plantlets processed at the end of the implementation period.

3

Weaning nurseries in Kenya and 3 other nurseries transformed in Kenya to wean tissue culture pre-germinated seedlings.

Mapped the fertility status of coffee soils in Central and Northern Malawi were determined and the information as well as fertiliser advice made available to coffee stakeholders.

1 research publication on “Effects of auxins and cytokinins on callus induction in leaf cultures of Coffee arabica F1 Hybrid”.

Impact

The COFFEE project has strengthened the capacities of coffee research institutions in Kenya and Malawi by transferring knowledge and technology in propagating’s seedings of improved varieties in quantities that match farmers’ demand. This was accomplished by modernising tissue culture laboratories, installing and utilising the RITA®-based 'temporary immersion system' (TIS) of tissue culture (Kenya and Malawi). The project also developed and disseminated a mapping of the fertility of the soil and the integration of coffee pest management techniques (Malawi) and the advice on the proper use of fertiliser in coffee production by Lunyangwa Agriculture Research Services, Ministry of Agriculture (LARS), Malawi.

The project has facilitated the renovation of coffee farms using agronomic practices, including the rehabilitation of abandoned farms. Also, the establishment of laboratories using TIS culture systems has improved Kenya and Malawi's ability to participate in high-level research on in vitro propagation of perennial and woody crops.

Sustained Impact

The COFFEE project sustained impact is reflected by the adoption of the knowledge and technical transferred by the project, with sustained income and increased revenues.

The tissue culture laboratories in Kenya and Malawi have reached commercial production levels and have been sustaining their operations costs by selling seedlings for more than 3 years.

The cooperative nursery in Gitungi due to the achieved impact has secured a vehicle to overcome their transport challenges and opened a M-Pesa mobile money outlet.

20 temporary staff and 27 students on attachment (3rd and 4th) year students undertaking BSC Biotechnology have received training since the project ended.

Demand for seedlings depends on market environment and weather, currently the demand is for 700,000 seedlings this season (2022). While currently the laboratories are being run on maintenance basis of 5,000 seedlings per season and several thousands of plantlets at various stages of development, the actual total production capacity of the Kenyan Lab is 500,000 coffee seedlings per year.

The soil and leaf analysis has assisted policymakers in understanding the efficient use of fertilisers and soil amendment products, that had been incorporated into national fertiliser policy in Malawi.

The Tissue labs had extended their pallets production to other crops such as banana, aloe vera, and flowers.

Key lessons learned and best practices

The importance of an efficient management of the nurseries so they work satisfies the market demand, and the jobs are maintained.

Advantages of Coffee and Banana intercropping, such as reduction of risk and increases food security during dry seasons.

Importance of create/update national policy on pesticide testing and recommendation for use in coffee and related crops.

The importance of commercialising the activities of the labs in Kenya and Malawi as well as the nurseries in the selling of produced seedlings at market prices.

Incorporate renewable sources of energy (like solar panels) to run the labs and nurseries.