



Crops

Establishing the International Mungbean Improvement Network

Overview

Mungbean is an important food and cash crop in the rice-based farming systems of South and South-East Asia. The pulse grows quickly, requires few inputs and boasts a high global demand, making it an ideal rotation crop for smallholder farmers.

The crop generates a triple benefit: income, nutrient-rich food and increased soil fertility (through the nitrogen fixed by this leguminous crop). Until now, investment in improving mungbean varieties has been very low, leading to the crop's narrow genetic base. Consequently, current mungbean varieties lack key traits to cope with emerging pests, diseases and seasonal variability, which constrain production in South and South-East Asian countries, as well as in Australia.

The International Mungbean Improvement Network and its outcomes will help to unlock the potential of mungbean to improve system productivity and livelihoods. The network will coordinate and perform research resulting in the development and release of new mungbean varieties, boosting the profitability of smallholder farms and the sustainability of local production systems.

The network collects and analyses the results from trials of the mungbean genetic diversity mini-core collection, assembled by the World Vegetable Center. The trials are performed by the network participating breeding programs. To facilitate the joint research, the breeding programs are adopting modernised breeding methods and a common data management system.



KEY FACTS

ACIAR Project No. CIM/2014/079

Duration: January 2016 to June 2020 (4.5 years)

Target areas: Myanmar, Bangladesh and India

Budget: A\$2,508,982

Project Leader

Ramakrishnan Nair, The World Vegetable Center (WorldVeg)

Key partners

- Queensland Department of Agriculture and Fisheries (DAF)
- Myanmar Department of Agricultural Research
- Bangladesh Agricultural Research Institute (BARI)
- Indian Institute of Pulse Research (IIPR)

ACIAR Research Program Manager

Dr Eric Huttner

Objective

The project's goal is to build a successful network that will attract new members and investors in mungbean research and continue beyond the timeframe of the project.

The project's three main objectives are to:

- Establish and coordinate an International Mungbean Improvement Network.
- Characterise and improve access to mungbean genetic diversity for breeders to source traits required for future elite varieties.
- Develop improved mungbean germplasm and elite lines.

Expected scientific results

- Access to mungbean genetic diversity mobilising disease and abiotic stress resistance traits for pre-breeding.
- Multilocation evaluation of a biodiverse germplasm set providing a unique opportunity to obtain quantitative crop performance data for a range of environments, facilitating the identification of genetic loci contributing to crop resilience and yield under various conditions.
- Knowledge of the function of mungbean genes in specific stress environments leading to a better understanding of abiotic and biotic stress resistance mechanisms.
- Information about mungbean stress tolerance mechanisms and genes contributing to yield under stress conditions and transferred to and from other legumes of the genus *Vigna*.
- Validated screening protocols for disease and abiotic stresses to facilitate the detection of genetically-based traits conferring resistance to biotic/abiotic stress.
- Synergies mobilized between mungbean research groups, enhancing strengths and addressing weaknesses of the participating institutions.

Expected outcomes

- More resilient mungbean varieties requiring less labour per tonne harvested than current varieties.
- Adoption of improved varieties by farmers expected to lead to an expansion of the mungbean growing area and an increase in crop yields, resulting in an increase in mungbean revenues.
- Improved varieties resistant to biotic and abiotic stresses helping to stabilize yield variability and market prices.
- Adoption of improved mungbean varieties increasing intensification and diversification in the tropical cropping systems of South and South-East Asia.
- Mungbean production providing various environmental benefits, and mungbean residues serving as good source of livestock feed.
- Improved capacity in crop evaluation and breeding.

