

How ASARECA's climbing bean project has improved livelihoods in Rwanda, Burundi and eastern DR Congo

Introduction

"Intensification of Climbing Bean Agro-systems" is one of the projects the Association for Strengthening Agricultural Research in Eastern and Central Africa (ASARECA) is funding in Rwanda, Burundi, and eastern DR Congo.

This project is crucial because of the importance of beans in the diets of the populations of the three countries. The common bean (*Phaseolus vulgaris L*) is their primary source of proteins (21%), carbohydrates (60%), minerals (iron, zinc) and vitamins (19%) and other nutrients. The consumption of beans in the project area is estimated to be more than 60 kg per person per year.

Managed by the High Value Non Staple Crops programme, the project was initiated to identify and intensify cropping systems for climbing beans. Ultimately, this is expected to lead to increased productivity and improve the nutritional value of beans and household incomes of the rural poor.

Challenges of climbing bean production

The three countries face high population density and over exploitation of land. Scarcity of cultivable land therefore, is one of the challenges to the production of climbing beans. As a result, the populations are experiencing acute food deficits and low incomes.



Climbing bean variety next to mixed bush bean varieties

Climbing bean production is influenced by both biotic factors (pests and diseases) and abiotic factors (climate, soil fertility).

Despite the better yields of climbing bean varieties, farmers continue to grow poorly performing mixed bush bean varieties due to lack of staking materials for climbing beans. Besides, most farmers lack sufficient knowledge on the best staking methods.

This implies that although staking has been noted to lead to better yields, lack of appropriate staking materials is a key challenge to the adoption of the technology. The woody sticks, which are the strongest stakes, are susceptible to damage by termites. The sticks are also preferred by farmers for other alternative uses. These competing needs therefore, could lead to environmental degradation.

In the circumstances, sisal string stakes are a good alternative. However, sisal is expensive and not readily available.

Another option is banana fibre, which is readily available in the three countries and is relatively cheaper. However, banana fibre is not as strong as sisal and wood. Nevertheless, sisal and banana fibre offer the benefit of reduced utilisation of woody species.



Stakes (banana fibre, wood, sisal, pennisetum reeds and bamboo) used in the project area

In addition to the challenge of staking materials, incorrect market information and inadequate extension services have encouraged the wrong perception that beans are a subsistence crop not worth investing in.

The project seeks to uncover solutions to the scarcity of strong woody stakes so as to offer a solution to land scarcity and over utilisation of soils.

Scope of the research project

The crop is fairly new to the people in the project countries. This necessitated research into factors influencing its production. The project is testing new varieties on farmers' fields, evaluating alternative cropping systems and assessing the practicability of various staking methods.

Variety testing

There are three categories of common beans based on their growth habits namely; bush, semi-climbers and climbers.

The semi-climbers and climbers are more important for intensified production compared to the bush bean. The bush bean has a yield potential of only three (3) tonnes per hectare while climbing bean varieties yield two to three times more than the bush type. Climbing beans exhibit better resistance to fungal foliar diseases and root rot diseases.

Compared to bush beans, climbing beans have a higher potential to recover from the effects of drought, and have a longer life cycle. This in turn leads to more efficient land use, surplus harvest, increased household income, improved food security, and improved rural livelihoods.



ABOVE: Climbing bean at a site in Rwanda
 BELOW: Climbing bean at a trial site in Burundi

The national agricultural research institutions of the project countries Institut des Science Agronomique du Rwanda (ISAR), Institut des Sciences Agronomiques du Burundi (ISABU) and Institut National pour l'Etude et la Recherche Agronomique (INERA) have therefore recommended increased production of improved climbing bean varieties, and climbing bean varieties enriched with micronutrients and protein.

The promotion of these varieties is expected to provide a sustainable solution malnutrition and mineral deficiency in the diets of the populations.

In the first quarter of this year, ISAR released seven climbing bean varieties namely: MAC 9, MAC 44, MAC 49, RWV 2070, RWV 1129, CAB2, and Gasilida with a yield potential of 3.5-5.9 tonnes per hectare and two (2) semi-climbers namely: SER 30 and SER16 with a yield potential of 2.5 tons per hectare.

Evaluation of cropping systems and cultural practices

The project is also investigating intercropping systems. While climbing bean is grown in rotation with other important crops, mixed cropping is also practiced.



Banana and climbing bean intercropping in Burundi and pure stand climbing beans trial site in Rwanda

The crops used depend on the location. Some cereals like maize and sorghum produce strong stalks when grown on fertile soils and these provide good stakes for semi-climbers. In some locations farmers practice continuous cropping of climbing bean. Farmers keeping livestock as well as growing climbing bean benefit from farm yard manure acquired through zero grazing. Climbing bean residues are in turn used as animal feed.

The project has already registered a number of achievements in identifying a more productive farmer friendly climbing bean based intercropping system. Stakeholders'

workshops have been held to select trial sites, identify relevant partners, and set up demonstration sites and farmer field schools.

Farmers from the selected sites have received training on a number of technologies relevant for climbing bean production. They have also shared experiences through exchange visits at various levels. Monitoring and evaluation is being conducted at all project levels to ensure the project is on the right track.

Assessment of staking methods

The project is investigating factors which affect staking efficiency such as staking density, stake length, and quality of staking material utilised. The researchers studied different domestic materials also including tree species like *Eucalyptus*, *Grevillea*, Robusta coffee and some grass species like *Pennisetum* and bamboo. This type is usually planted along terraces at the borders of the farm.

The researchers have also studied forage shrubs (*Cedrella*, *Leucaena*, *Calliandra* etc) and non-forage shrubs and tree branches of woody trees. Some of the woody species are good for staking because they are strong and straight, which is good for the crop.

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