

# Assessment of Common Bean (*Phaseolus vulgaris*) Genotypes for Farmers' Preferences and Acceptance through Participatory Bean Breeding Approaches

Papias H. Binagwa<sup>1</sup>. Magdalena William<sup>2</sup>. Julius P. Mbiu<sup>2</sup>. Eunice Zakayo<sup>1</sup>. Alex Kisamo<sup>1</sup>. Shida M. Nestory<sup>1</sup>

<sup>1</sup>Selian Agricultural Research Institute (SARI), P.O.Box 6024, Arusha Tanzania

<sup>2</sup>Maruku Agricultural Research Institute (MARI), P.O.Box 127, Bukoba, Kagera Tanzania

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## Introduction

Common bean (*Phaseolus vulgaris*) plays a principal role in the livelihoods of smallholder farmers in Tanzania as food security crop and source of income. It is the leading leguminous crop, accounting for 78% of land under legumes. It is estimated that over 75% of rural households in Tanzania depend on beans for daily subsistence. Recently, farmers have been increasingly looking for improved bean varieties which meet specific market demands and/or varieties which are adapted to local agro-ecologies. In order to ensure preferences and acceptance of developed bean varieties, farmers are involved in variety selection procedures through participatory research approach. Involvement of farmers confirms awareness, acceptance, adoption and spatial diffusion of the developed bean varieties. This approach gives farmers an opportunity to assess and select varieties from a range of near finished materials in the breeding process and gives researchers the chance to understand the criteria farmers use in the selection process and identify farmer and market preferences. Countries under East Africa agreed to implement new testing procedures to speed up the release process in second or third countries by considering trial data from both public and private sources. Therefore, Tanzania tested materials for adaptability, agronomic and yield parameters in bean growing regions and aimed on identifying farmers' criteria for acceptance of developed common bean.

## Methods

The Phaseolus bean research programme for the year 2015/16 embarked on evaluations of bean candidates released to EAC country (Burundi) in 2010 and 2015 of different genotypes from CIAT and KARI-Nairobi (KATB1, KATB9, MAC44 and RWV1129). The materials (Figure 1) were tested in north and lake/west zone Tanzania. Trials were laid out in RCBD of 3 replications with plot size was 4 rows each 5 metres long spaced 50 cm apart and 20 cm between plants within a row. Other management practices were followed as per recommendations. As part of the Farmers' participatory variety selection process, seventeen participants 46% being women were selected to participate for bean assessment in the field. Data were analyzed using GenStat 16th Edition and assessment data were evaluated using absolute, matrix and pair wise rankings methods.



Fig. 1 Bean genotypes fast tracked and preferred by farmers

## Results

Maturity and yield parameters were significantly different ( $P < 0.001$ ). KATB1 and KATB9 showed less number for days to 50% flowering and full maturity compared to JESCA and Lyamungu 85 as checks. Since these varieties are under fast tracking approach, basing on Burundi data the yield ranged from 1123 kg/ha – 1197 kg/ha while for Tanzania the yield average was 1244.88kg/ha and 1369.06kg/ha for KATB1 and KATB9 respectively Figure 2. For climbing bean genotypes, MAC 44 and RWV 1129 showed significant difference ( $P < 0.001$ ) and yield average was 2621.06 kg/ha and 2727.92 respectively while Burundi similar varieties ranged 2190kg/ha – 2287kg/ha. There were variation in agronomic data and yield across testing sites due to distribution of rainfall, drought spell to some locations and trial management. But generally both on farm and on station trials showed better adaptability and stability at both high and mid altitudes like what happened to advanced yield trials conducted in parts of Burundi. Farmers assessment criteria was early maturity, disease/pest tolerance, colour/type/size and structure, drought tolerance, high yielding, good market, culinary characteristics (palatability-low gas/flatulence tasty, and low in cooking time). Also, farmers revealed that beans and its by-products have multiple uses includes; source of food, cash for incomes, crop residues used as livestock feeds and improves soil fertility.

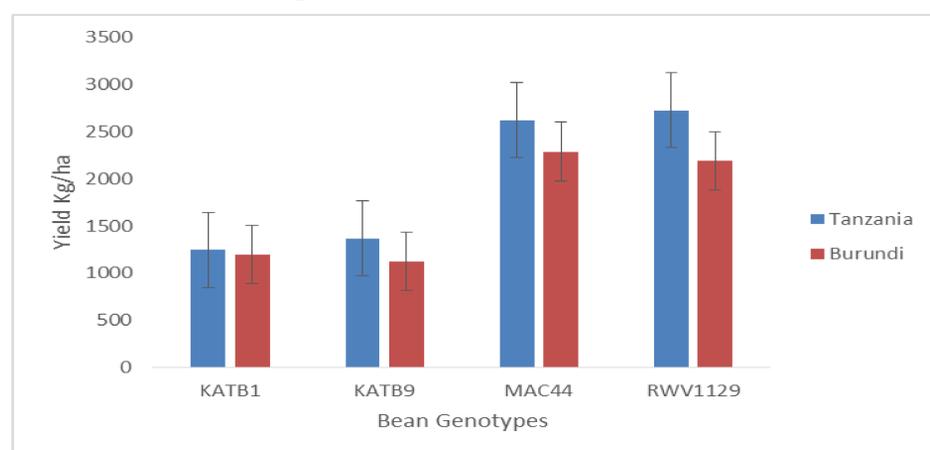


Fig. 2 Yield comparison per country

## Conclusions

The two genotypes of KATB1 and KATB9 basing to their early maturing, seed type/colour/structure and marketability are highly demanded by bean traders in Tanzania and neighbouring countries. The high yielding of MAC44 and RWV1129 will combat food insecurity both to households and at national level. This will complement already released and local bean cultivars in Tanzania and provide flexibility for both smallholder farmers and commercial to select variety of their choice as there has been no round yellow and red and high yielding climbing beans with better market released variety of beans in Tanzania. The release of the two selected bean genotypes by the national seed committee through national certifying institution will improve farmers' livelihood at large and other bean value chain actors.

### Contact:

Papias H. Binagwa,  
Selian Agricultural Research Institute,  
P.O.Box 6024, Arusha – Tanzania  
Cell: +255764951596  
Email: [hongera1984@yahoo.com](mailto:hongera1984@yahoo.com)

