FARMER PARTICIPATORY EVALUATION OF BEAN (*P. vulgaris L*) VARIETIES FOR SEED PRODUCTION IN TESO-KARAMOJA SUB-REGION

S. N. Kayongo[1], P Andersson[2], P. Rutger[2], H.A Okurut[3], A.D. Aleper[3], V. Nsabiyera[3]

[1,3]Nabuin Zonal Agricultural Research Development Institute (NabuZARDI-NARO)

[2]Svalof Consulting AB, Swedish International Development Agency (SIDA)

© 2012

Abstract

The need for smallholder farmers to understand the benefits and value of growing pure quality bean variety seeds instigated from seed status survey analysis. The analysis highlighted farmer's lack of knowledge and access to improved seed varieties and absence of Seed companies in the Teso-Karamoja sub-region. The situation left farmers with no choice but growing farm-saved seed recycled from subsequent cropping seasons. Farmers were therefore involved in participatory evaluation of 10 improved bean varieties obtained from NaCRRI, to identify adaptable varieties that posses farmer desired attributes for seed and food production. A research-farmer participatory process for evaluating bean varieties was therefore carried out to: Equip farmers with knowledge of producing and maintaining good quality seeds; Identify varieties with desired traits and adaptable to the local dry mid-altitude environment; Create awareness and popularizing the existence and demand of improved bean seeds. Achieved results indicated that most varieties were highly affected by drought, however, variety Nabe15 and Nabe4 performed exceptionally well in maturity periods with relative yield of 1.32 and 1.29 MT Ha-1 respectively. Both varieties expressed traits for resistance to diseases and were selected for seed production in the semi-arid region of Teso-Karamoja sub-region.

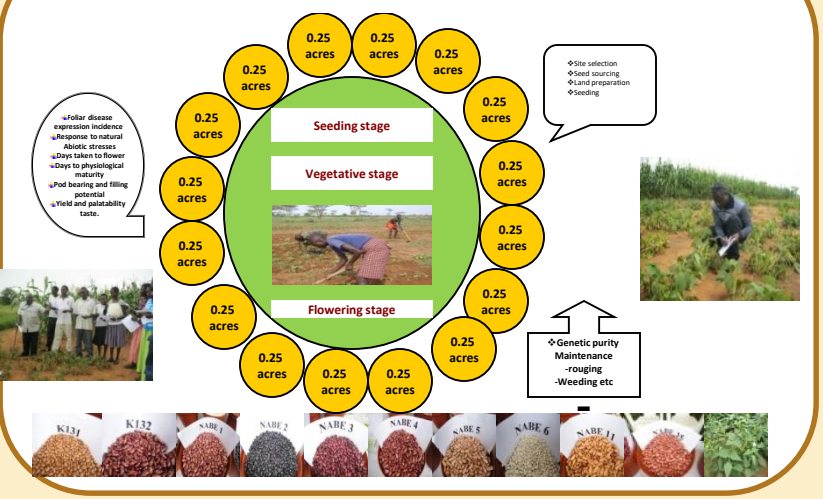
Introduction & Background

Sixteen improved bean varieties, bred and released by beans Program at National Agricultural Crops Resources Research Institute (NaCRRI) were during the first season, 2011A tested at on-farm for adaptability at NabuZARDI in Karamoja sub-region. The varieties were in series of 'NABE' from 1-16, with variation in seed texture, colour, size, crop maturity, cooking time and other agronomic traits. Varieties were assessed for performance in yield, maturity period, tolerance to drought, resistance to pests and diseases among others. Ten varieties out of sixteen were selected given their good performance and advanced to testing for seed suitability and quality. Most farmers have no access and knowledge about good quality bean seeds or its values and benefits. Often they use "farm-saved" seed or that produced by neighbours. Whilst, few seed companies (formal sector) are keen to produce bean seeds resulting in the little available certified seed being expensive and less accessible to most rural farmers. In order farmers to sustainably access bean seeds, the venture for seed multiplication was sought with farmer involvement to enhance choice and production of bean varieties with desired farmer attributes. Therefore, to support farmers, a program of change (POC) study was designed to conduct a participatory evaluation of the varieties to allow farmers exploit the chance of selecting varieties with designed attributes for advancing into seed production system. The evaluation could help in reducing the cost of seed and bean production; enhance accessibility of good quality seed in a timely manner and facilitate faster dissemination of improved and local varieties.

Objectives

1. **Evaluate the performance of bean varieties for farmer adoption to produce & access seeds.**
2. **Equip farmers with knowledge of producing and maintaining good quality seeds.**
3. **Create awareness and popularizing the existence of improved bean varieties.**

Materials & Methods



Findings

Table 1. **Bean seed physiological traits**

Variety	Seed Colour	Seed Shape	Weight seeds 50 seeds :	1 seed	Seed Size	Seed Brilliance	Acceptance (Desirability)
K131	Brown (orange flecked)	Round	8.9	0.178	Small	Opaque	Fair
Nabe2	Black	Oval	8.8	0.176	Small	Opaque	Fair
Nabe3	Purple-wish Brown	Oval	10.1	0.202	Small	Opaque	Fair
Nabe6	White	Oval	10.0	0.200	Small	Brilliant	Good
Tapara	White	Oval	8.8	0.174	Small	Opaque	Fair
Nabe15	Dark Brown (red flecks)	Oval	19.3	0.386	Med	Brilliant	Excellent
Nabe1	Dark-Red (Brown flecks)	Fastiate	22.6	0.452	Large	Opaque	Fair
K132	Dark-Red (Brown flecks)	Kidney	23.1	0.462	Large	Intermed	Good
Nabe11	Brown (Dark-red flecks)	Kidney	21.7	0.434	Large	Brilliant	v. good
Nabe4	Dark red (Brown flecks)	Cuboids	17.7	0.354	Large	Intermed	Good
Nabe5	Cream Brown (red flecks)	Kidney	22.3	0.446	Large	Intermed	Fair

naturally occurring diseases

Variety	B. ALS	B. Anthr	B. Mosaic	CBB	L/Rust
K131	2.5 ± 0.1^{c}	1.3 ± 0.7^{c}	1.0 ± 0^{d}	2.3 ± 0.2^{c}	1.4 ± 0.1^{b}
K132	3.5 ± 0.1^{a}	3.7 ± 0.2^{a}	4.4 ± 0.3^{a}	3.7 ± 0.2^{a}	1.9 ± 0.1^{a}
Nabe1	2.8 ± 0.2^{bc}	1.1 ± 0.0^{c}	1.0 ± 0^{d}	1.8 ± 0.2^{d}	1.5 ± 0.1^{b}
Nabe11	3.2 ± 0.2^{ab}	2.4 ± 0.2^{b}	2.8 ± 0.2^{b}	3.0 ± 0.1^{b}	2.0 ± 0^{a}
Nabe15	2.9 ± 0.1^{abc}	2.3 ± 0.9^{b}	1.5 ± 0.1^{d}	2.3 ± 0.1^{c}	1.6 ± 0.1^{b}
Nabe2	2.8 ± 0.1^{bc}	2.1 ± 0.1^{b}	2.0 ± 0.2^{c}	3.1 ± 0.2^{b}	2.0 ± 0^{a}
Nabe3	2.4 ± 0.2^{c}	1.7 ± 0.1^{c}	1.0 ± 0^{d}	1.6 ± 0.1^{d}	1.0 ± 0^{c}
Nabe4	3.0 ± 0.1^{abc}	3.5 ± 0.2^{a}	1.0 ± 0^{d}	3.0 ± 0.1^{b}	2.0 ± 0^{a}
Nabe5	2.0 ± 0.1^{d}	1.5 ± 0.1^{c}	1.0 ± 0^{d}	2.3 ± 0.2^{c}	1.8 ± 0.1^{a}
Nabe6	3.0 ± 0.2^{abc}	2.2 ± 0.1^{b}	1.0 ± 0^{d}	2.4 ± 0.1^{c}	

Discussion of findings

The attributes considered by farmers in selection of varieties for seed production included drought & disease tolerance, days to flowering and maturity, seed briliance, weight & yield (Tab. 3). Farmers identified varieties Nabe15, K131 and Nabe4 to adapt well in Karamoja based on their expression of avoidance mechanisms for survival during drought. The same varieties also exhibited superior traits of early flowering particularly Nabe15 at 32 DTF and 62 DTM respectively (Fig. 1) which are good mechanisms for drought escape. Farmers were rational in choosing hence enhancing projection of planting time, management practices and planning effective harvesting and marketing. Other attributes that farmers considered to adopt varieties include yield where var. Nabe15, Nabe4 & K132 yielded yielded highly at 1.3 MT Ha^{-1}, 1.2 MT Ha^{-1} and 1.1 MT Ha^{-1} respectively when planted early (Fig. 2) leading to abundant bean seed and food supply for subsequent production and consumption. Seed shape, brilliance and weight (Tab. 1) were considered to determine commercial value for marketing beans for food. Similar traits were also found important in beans evaluation by Teshale *et al.,* (2005). Large seeded varieties were more preferred due to ease in raising productivity and marketing for better income (Tab. 1). Natural effect of foliar diseases were low particularly on var. Nabe1,3, 5,15 and K131 (Tab. 2). The low severity and incidence rates were attributed to variety tolerance and hence led to a suggestion that the tolerant varieties were favourable for seed production. Varieties that exhibited tolerance to pest attack include Nabe 6, Nabe 4, Nabe15 and Nabe 1 at severity rate ranging from 1.9-2.3 justifying the suitability of tolerant varieties for continued production given low level of pest damage.

General conclusion & recommendations

- ❑Prior to the study start up,
  - o Farmers lacked knowledge btn seeds & food grains since grains were used both for food & growing new crops.
  - o Lacked knowledge of accessing seeds & the production sys.
- ❑Currently
  - o Farmers are aware of difference between seeds and food grains & their production. &sources.
  - o Farmers are aware of the Values (seed avail.,) & Benefits (good yield, income, & food) of growing seeds.
  - o Farmers feel appraised & own the technology
- ❑Varieties therefore selected for seed production include Nabe15, Nabe4 & K131.

Acknowledgement

Table 3. **Attributes considered by farmers in selection of variety for seed production**

Attribute	Variety selected
1. Drought Tolerance (DT)	Nabe15: K131: Nabe4
2. Early Flowering (DTF)	Nabe15: Nabe4
3. Physiological maturity (DTM)	Nabe5: Nabe4
4. Seed Brilliance(SB)	Nabe15
5. Disease Tolerance (DzT)	Nabe15:1: S: 6: K131
6. Insect Tolerance (IT)	Tapara: Nabe15:1:5 :6: K131
7. Seed wgt (SW)	Nabe1:3:15 :K132
8. Yield	Nabe15:Nabe4: K131

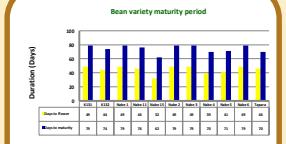


Figure 1

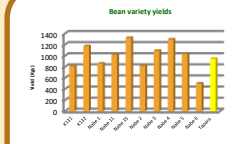


Fig. 2