

Research Application Summary

Farmers' own evaluation criteria in the continued use of adopted improved maize seed varieties

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Abstract

Use of improved maize seed varieties has been continuously recommended to farmers by the government of Tanzania to increase crop productivity. Maize varieties are developed at research centres and seed companies like SEEDCO and PANNAR. In Tanzania, farmers grow both open pollinated and hybrid varieties, in addition to local unimproved varieties. The objective of this study was to assess the evaluation criteria used by farmer to make decisions whether to continue growing an improved maize variety. A total of 286 farmers from eight wards and 11 villages selected through a multistage sampling technique were interviewed in this study. Data were analyzed using SPSS. Results show that high yield, early maturity, drought resistance, resistance to pests and disease, and large grain size were the main considerations by farmers for selecting a variety to grow the next season.

Key words: Hybrid, local variety open pollinated varieties, PANNAR, SEEDCO, Stuka, Staha, TMV

Résumé

L'utilisation de variétés améliorées de semences de maïs a constamment été recommandée aux agriculteurs par le gouvernement Tanzanien en vue d'augmenter la productivité des cultures. Les variétés de maïs sont développées dans des centres de recherche et sociétés semencières. En Tanzanie, les agriculteurs cultivent en plus des variétés locales non améliorées, des variétés hybrides et à pollinisation libre. L'objectif de cet article était d'analyser les critères d'évaluation considérés par les agriculteurs pour prendre des décisions concernant la culture d'une variété de maïs améliorée. Au total, 286 agriculteurs provenant de 8 quartiers et 11 villages sélectionnés à travers une technique d'échantillonnage à plusieurs niveaux ont été interviewés. Les données ont été analysées avec le logiciel SPSS. Les résultats ont montré que les critères comme rendement élevé, maturité précoce, résistance à la sécheresse,

résistance aux ravageurs et aux maladies; et grande taille des grains étaient été les principaux critères considérés par les agriculteurs pour choisir une variété à cultiver la saison suivante.

Mots clés: Hybride, variétés locales à pollinisation libre, PANNAR, SEEDCO, Stuka, Staha, TMV

Background

Maize production is practiced by many farmers in many African countries because it is a major staple food. Tanzania, like other African countries recommends use of improved maize seed varieties to increase crop productivity. In Tanzania, both hybrid and open pollinated varieties are grown. These improved maize varieties are produced by breeders and accessed by farmers from agro-input suppliers or local markets. Of the two types of improved seed, open pollinated varieties are the most grown as these are cheaper and can be recycled. On the other hand, hybrid seed is expensive and cannot be recycled beyond their first offspring (F1 generation). In addition, many varieties don't meet farmers' expectations and are therefore quickly abandoned a few years after their release. This is said to be due to breeders concentrating more on agronomic productivity of these varieties while ignoring other attributes of importance to farmers. Farmers often generate their own evaluation criteria depending on the circumstances in which they produce the crops. The study in Tanzania by Kaliba *et al.* (1998) shows that 46% of farmers in the intermediate zone discontinued Ilonga Composite White variety because it no longer met the criteria for farmers to continue growing it. This signifies the need for farmers and breeders to work hand in hand to ensure that the varieties produced are sustained. This can be done through participatory evaluation research which ensures that farmer concerns are accommodated. Farmers strongly believe that they are knowledgeable through their long farming experience and that this has sometimes been violated by researchers and breeders. In some cases however, farmers are thought not to have a uniform evaluation criteria because they operate in different conditions.

Literature summary

Farmers' evaluation of technology is a tool through which farmers express their perception or views on a given set of alternatives and potential technologies which are designed to provide options to solve farmer felt-needs. The main objective of farmer evaluations is to provide feedback to researchers or technology designing process about farmers' criteria for deciding whether and how to use a potential innovation in order to increase the possibility of having the technology used for a long time. Therefore the earlier farmer evaluations are conducted; the more likely it is that farmers' and researchers' ideas about desirable features of a technology will coincide.

Farmers are more likely to assess a technology with criteria and objectives that are different from criteria used by scientists. However, farmers' and scientists' criteria for technology assessment are complementary and essential for effective research and technology development. Farmer evaluations help scientists to design, test and recommend new technologies in light of information about farmers' criteria for usefulness of the innovation

(Ashby, 1991). Farmers use a combination of many but similar criteria in selecting the maize varieties they grow. Some of the evaluation criteria used by farmers are high yields, maturity period, tolerance to drought, cob size, resistance to field pests and diseases, grain size, grain longevity, tastes and color (De Groote *et al.*, 2002; Obaa *et al.*, 2005). It is, therefore, important to establish from farmers their preferred qualities in maize varieties or include farmers in variety selection processes. This enhances the potential for continuing utilizing the varieties in their respective communities.

Study description

The study assessed the evaluation criteria farmers employ to make a decision whether to continue growing a given adopted improved maize variety. The study was carried out in eight wards namely Ulaya, Zombo, Masanze, Chanzuru, Rudewa, Msowero, Kitete and Magole in Kilosa District. These wards have a favourable climatic condition that favour maize production. Adoption of improved maize varieties in these areas goes back to the early 1960s when Ilonga Composite White variety was firstly released at Ilonga Research Centre. Subsequently, varieties Kito, Katumani, Kilima and later Staha, Stuka and TMV1 were released from the centre. These have been grown by farmers in varying degrees according to their own suitability criteria. Other varieties in use by farmers in these wards are PANNAR, SEEDCO, DELCALB803.1, NATA 205- AMINATA, CP 201 Yellow, TANH600 and TAN 250.

A multistage sampling technique was used to select farmers for interviews. Four divisions were purposively sampled. From these, eight wards were purposively sampled, from which 11 villages were selected. From the selected villages, maize farmers were selected using the Simple Randomly Sampling technique to constitute a sample of 286 farmers.

Research application

An evaluation criterion for continued use of a total of 14 varieties was carried out in this study. The most preferred varieties were Staha, Stuka, and TMV1. The other preferred varieties are presented in Table 1. The top two criteria for selection of a variety were given as high yield (35.1%, 28.7%, 24.1%) and early maturity (2.3%, 34.7, 36.1%) for Staha, Stuka and TMV1 maize varieties, respectively. The other evaluation criteria for the variety to be grown in the subsequent season were drought tolerance, resistance to pest and disease, large grain size, white color, big cob, strong grain, high germination, good taste, adaptability, easy to get seed, good for sale, good cooking quality, and number of cobs per plant (Table 1). A high yielding variety promises high return to farmers with respect to the investment. Early maturing varieties enable farmers to quickly come out of famine, escapes drought and for areas with a bimodal rainfall pattern, allows farmers to prepare land early so that the variety can be planted again (Obaa *et al.*, 2005). It is recommended that these varietal attributes be considered when candidate varieties for release are being considered.

Table 1. Farmers' evaluation criteria for selection of varieties for the continued use of maize varieties

Evaluation criteria	Maize varieties													
	Saha n=85	Stuka n=108	TMV n=61	PANNAR n=10	SEEDCO n=14	DELALB 803.1n=1	Local n=29	Katamani n=1	Ilonga White Comp n=1	Kilima n=1	NATA n=1	CP201 n=10	TANH600 n=2	TAN250 n=1
High yield	46	43	20	9	4		11	1	1	1	1	5	2	1
Early maturity	3	52	30		4		5							
Drought resistant	28	33	14	1	5		8						1	
Resistant to pest and disease	6	5	9				5							
Large grain size	24	4	2	2	3	1	3				1	1		
White colour	13	1	1											
Big cob	1						3							
Strong grain	1													
High germination		1	4											
Good taste	2													
Adaptation	5	2			1	1				1	1			
Easy to get the seed		4					4							
Good for sale		2										2		
Good for cooking	1		1									2		
2 cob/plant	1	1	2		1		4					1		
2-3 cob/plant		1												
Short plant							1							
Total	131	150	83	12	18	2	44	1	1	1	3	12	3	1

n = Number of responses. Note: The total sum exceeds 286 because some respondents gave multiple responses. Source: Survey data 2016.Tanzania

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