Second RUFORUM Biennial Meeting 20 - 24 September 2010, Entebbe, Uganda
Research Application Summary

Strategic repositioning of African indigenous vegetables in the Horticulture Sector

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Abstract

African indigenous vegetables that formed an integral part of African diets lost popularity with introduction of exotic crops including vegetables. With over half the populace living below the poverty line, there is need for paradigm shift in production patterns. To raise their status, a multi disciplinary programme was initiated at two universities in Kenya in early 1990's. Strategies used included advocacy, outreach, capacity building, conservation, seed supply systems, value addition and engaging actors along the value chain. Up-scaling these strategies, breeding and commercialization is recommended for health improvement and wealth creation in Africa.

Key words: Africa, capacity building, indigenous vegetables, strategic repositioning, sustainable development

Résumé

Les légumes indigènes africains qui ont constitué une partie intégrante des régimes africains ont perdu de sa popularité avec l'introduction d'espèces exotiques. Avec plus de la moitié de la population vivant en dessous du seuil de pauvreté, il est nécessaire de changement de paradigme dans les modes de production. Pour améliorer leur statut, un programme multidisciplinaire a été lancé dans deux universités au Kenya au début des années 1990. Les stratégies utilisées incluent la plaidoyer, la sensibilisation, le renforcement des capacités, la conservation, les systèmes d'approvisionnement en semences, la valeur ajoutée engager les acteurs le long de la chaîne de valeur. Mise en valeur de ces stratégies, l'élevage et la commercialisation sont recommandés pour améliorer la santé et la création de richesses en Afrique.

Mots clés: Renforcement des capacités, les légumes indigènes, repositionnement stratégique, le développement durable

Background

African indigenous vegetables have been consumed for centuries by cultivation, semi-cultivation or collection from the wild (Schippers, 2000). They have contributed significantly to

food security, nutrition and health (Abukutsa-Onyango, 2003). The introduction of exotic vegetables like cabbage led to neglect, stigmatization and "looking down" upon the indigenous vegetables which were largely referred to as weeds (Abukutsa-Onyango 2002). Although these vegetables have high nutritional and medicinal value, agronomic advantages and income generation potential, their role in health improvement and wealth creation have not been exploited yet over half of the population in Africa live below the poverty line of less than $1 a day (AICAD, 2003). The research programme described in this paper aimed to raise the status of African indigenous vegetables and strategically reposition them in the horticulture sector for nutrition, health improvement and wealth creation.

Literature Summary

African indigenous vegetables (AIVs) are micronutrient dense and are a valuable source of nutrition in rural areas where they contribute substantially to protein, mineral and vitamin intake (Mnzava, 1997). They contain high levels of calcium, iron and phosphorus and significant amounts of vitamins and proteins (Abukutsa-Onyango *et al.*, 2010; Habwe *et al.*, 2009). In most cases the mineral and vitamin contents is equivalent or higher than that found in popular exotic vegetables like cabbage and spinach (Abukutsa-Onyango, 2003). Most of these vegetables have medicinal properties, for instance spiderplant has been reported to relieve constipation, while African nightshade has been reported to cure stomachache (Maundu *et al.*, 1999). Another area that could be exploited is phyto-chemicals or Nutraceuticals which are biologically active, non-nutrient compounds found in AIVs that provide health benefits like anti-oxidants which scavenge and remove radicals and toxins from the body (Makokha and Ombwara, 2005). Some of the indigenous vegetables are well adapted to harsh climatic conditions and disease infestation and are easier to grow and produce seed under tropical conditions (Schippers, 2000). Most of them have an in built ability to tolerate some abiotic and biotic stresses (Mwai *et al.*, 2004) and perform well in soils with low fertility (Abukutsa-Onyango, 2007).

African indigenous vegetables have considerable income generation potential (Schippers, 2000). In a survey carried out in western Kenya, it was observed that over 70% and 10% of the traded vegetables in rural and urban markets, respectively were indigenous (Schippers, 2000; Abukutsa-Onyango, 2002). Despite these advantages indigenous vegetables have largely been neglected and stigmatized. There has been inadequate

awareness of their value and potential, lack of quality seed and technical information on their production, utilization, preservation and processing (Abukutsa, 2010). Poor marketing strategies and the fore mentioned challenges have led to low production and poor distribution and consumption of indigenous vegetables in Kenya and other African countries (Abukutsa, 2010). There is dire need to raise the status of indigenous vegetables using a multi-sector approach that can ensure value addition at strategic steps along the value chain.

Study Description

A multi-disciplinary African indigenous vegetable research programme was initiated at the Jomo Kenyatta University of Agriculture and Technology and Maseno University in 1991 and 1996, respectively. The goal was to contribute to alleviation of food insecurity, malnutrition and poverty in Kenya and other African countries by raising the status of African indigenous vegetables. The aim of the programme was to promote sustainable production and utilization of African indigenous vegetables for health improvement and wealth creation. In this study several strategies were used to reposition indigenous vegetables in the horticulture sector as outlined below;

- Identification of African indigenous vegetables with health improvement and wealth creation potential was done through household, market and institutional surveys using a structured questionnaire, interview schedules, check lists and focus group discussions. This was conducted in central and western Kenya, Uganda, Tanzania, South Africa, Core d' Voire, Benin and Senegal.

- Germplasm collection, evaluation, characterization and multiplication of the priority vegetables identified in the survey study were carried out. A total of 224 accessions from western Kenya, 95 accession from Uganda, 59 accessions from Tanzania and 50 accessions of African nightshades from Kenya were collected, evaluated and characterized using both morphological and cytological methods. The selected accessions were multiplied, evaluated, bulked, packaged and distributed to contact farmers in Western and Central Kenya.

- Agronomic, physiological and nutritional studies were conducted. These included intercropping, organic and inorganic fertilizer application, seed quality, salinity, micro-nutrient and protein content analysis, recipe and product development, evaluation and sensory testing.

- Advocacy, promotion and outreach was done using various methods that included orature, song and dance and narratives, demonstration plots, the print media, leaflets and brochures, posters and newspaper, lectures, seminars and workshops, exhibitions and shows, radio, television, and cooking competitions.

- Curricula development and training at the two Universities was done to include AIVs in the Bachelors and Masters programs and in research projects conducted by undergraduate and post graduate students.

- Community capacity building was done by selecting contact farmers in western and central Kenya who were trained on seed production, processing and packaging and were provided with seed of AIVs of their choice for regeneration and bulking.

- Thirty five (35) policy makers from 7 African countries were trained from January 23rd to 26th 2008 at Rhodes University, South Africa in a policy dialogue workshop titled "The promotion of African indigenous vegetables in urban and peri-urban agriculture in African cities"

- *In situ* and *ex-situ* conservation of African indigenous vegetables at two at the Botanic gardens, Maseno University, Jomo Kenyatta University of Agriculture and Technology farm and at the community level with selected contact farmers.

- Recipe and product development and evaluation for nutrient content and acceptability was done for the selected priority AIVs in the Lake Victoria region.

Research Application

Ten African indigenous vegetables with health improvement and wealth creation potential were identified. These included vegetable cowpea, vegetable nightshade, vegetable amaranths, spiderplant, pumpkin, slenderleaf, African kale, Jute mallow, Vine spinach and moringa. In addition, a total of 427 accessions of priority African indigenous vegetables collected were evaluated, characterized, and promising ones selected and seed multiplication, processing and packaging carried out. Quality seed of the 10 priority AIVs have been made available at JKUAT, Maseno University, Kenya Seed Company and at community level with some of the trained contact farmers.

Table 1. Percentage BSc. students who undertook research projects at two universities in Kenya.

Year	Number of students researching on AIVs in their final year of study			
	Maseno University		JKUAT	
	No. in Class	AIV projects (%)	No. in Class	AIV projects (%)
2001	10	20	-	-
2002	29	34	-	-
2003	14	28	-	-
2004	14	71	39	31
2005	-	-	41	29
2006	25	70	36	20
2007	14	42	32	20
2008	6	50	32	40

There was also development of agronomic technical information for the 10 priority indigenous vegetables and several dissemination materials like farmer leaflets and DVDs were produced and continue to be disseminated up to today. The programme developed 20 micro-nutrient dense recipes and 10 other products.

Through the programme, BSc Horticulture and MSc Horticulture programmes were established at Maseno and JKUAT in Kenya.

This resulted in increased number of undergraduate students researching on AIVs, from 20% to 70% at Maseno University and from 30% to 40% at Jomo Kenyatta University of Agriculture and Technology between 2001 and 2008.

These strategies have directly and indirectly contributed to increased production, popularity, availability and consumption of African indigenous vegetables in schools, hotels and super markets leading to improved nutrition and health, increased incomes and livelihoods for some contact farmers.

Recommendation

Based on the results, it is recommended that African indigenous vegetables be repositioned as high profile horticultural commodities in the horticulture sector, in agricultural training institutions, commercial production, marketing and value addition to contribute more to health improvement and wealth creation in Kenya and other African countries.

Acknowledgement

The studies undertaken since 1991 and ongoing have been supported by funding from various agencies including Bioversity

International, International Foundation of Science, SIDA-SAREC under the Lake Victoria Research Initiative (VicRes) of the Inter-University Council of East Africa, European Commission, Jomo Kenyatta University of Agriculture and Technology and Maseno University and Kenya government.

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