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Research Application Summary

Conserve and screen premium value indigenous plant biodiversity and products on women smallholder farming systems of East Africa

Namutebi, A.[1] & Akundabweni, L.S.M.[2]
[1]Department of Food Science & Technology, Makerere University, P .O. Box 7062, Kampala, Uganda
[2]Department of Plant Science and Crop Protection, and Institute of Nuclear Science and Technology, University of Nairobi, P.O. Box 30197-00100 Nairobi, Kenya
Corresponding author: asnamutebi@agric.mak.ac.ug, asnamutebi@yahoo.co.uk

Abstract

Various interventions for promoting the premium value of indigenous plants (IPs) are being adopted to enhance their status in the food sub sector. The project aims to enhance women smallholder farmers' capacity in target Lake Victoria Basin sites of Kenya and Uganda, to conserve and promote premium indigenous plant biodiversity for value added processes, and provide a basis for policy formulation on promoting IPs with a potential market value. The project involves mapping IPs in relation to land-use types, and characterization of physico-chemical and nutraceutical attributes of screened IPs. The study involves a survey; rural participatory appraisal; focused group discussions; laboratory methods viz.: Near Infrared Reflectance spectroscopy and Energy Dispersive X-ray Fluorescence Spectroscopy, as rapid techniques for screening the IP germplasm and soil samples; and high performance liquid chromatography and UV spectroscopy reserved for establishing the nutraceutical value of the screened IPs.

Key words: Indigenous plants, nutraceutical, premium value, women smallholder farmers

Résumé

De diverses interventions pour favoriser la valeur de haute qualité des plantes indigènes (IPs) sont adoptées pour augmenter leur statut dans le sous-secteur alimentaire. Le projet vise à augmenter la capacité de femmes de petites exploitations agricoles dans des emplacements du bassin du Lac Victoria au Kenya et en Ouganda, de conserver et promouvoir la biodiversité de la plante indigène pour des processus à valeur ajoutée et de fournir une base pour la formulation de politique sur la valorisation des IPs en valeur marchande potentielle. Le projet comporte la cartographie des IPs par rapport aux types d'utilisation de terre et la caractérisation d'attributs physico-chimiques et nutritionnels des IPs examinés. L'étude implique un aperçu : évaluation participative rurale ,discussions en groupe et méthodes de laboratoire à savoir : spectroscopie de réflectivité

de proche infrarouge et spectroscopie de fluorescence de rayons X dispersifs d'énergie en tant que techniques rapides pour examiner le support génétique des IPs et les échantillons de sol et la chromatographie liquide de haute performance et celle des ultraviolets (UV) réservées à l'établissement de la valeur nutritionnelle des IPs examinés.

Mots clés: Plantes indigènes, nutritionnel, valeur de haute qualité, femmes de petites exploitations agricoles

Background

Indigenous plants (IPs) have a relegated place in the food sub sector due to small acreage production and insignificant marketing. Indigenous plants have gradually been replaced by market-driven crops (Babu, 2000) and in many cases there is unsustained production of IPs. Loss of IPs in part is attributed to farmer land use practices where emphasis is geared towards more utilization than conservation since seed of farmer preferred plants can always be acquired from elsewhere, and national efforts have focused on market-driven crops. Declining hectarage of smallholding units and increased population pressure are rapidly contributing to loss of IP biodiversity. Women smallholder farmers are the main custodians of IPs since they depend on them for their livelihood. Women smallholder farming activities/ operations feature across various land-use types/plot-use types (Akundabweni *et al*., 2009) and often apportion their land to produce a diversity of plants for multiple uses (Kimiywe *et al*., 2007). This study will establish the premium value (with respect to nutrient quality and potential market value) of screened IPs in two sites, Jinja in Uganda and Kisumu in Kenya with the aim of singling them out for value addition processes.

Literature Summary

A number of factors have been attributed to the declining production of African indigenous plants: (i) erosion of culture and breakdown of traditional systems of plant resources management (ii) the world market has been tailored to focus on only a few crops, which has resulted into the global industrial growth globally to be dependent on continued supply of these few crops at the expense of the traditional varieties; (iii) deforestation, salinization, desert encroachment and soil erosion lead to land degradation with concomitant loss of the plant genetic resources that the land supports; (iv) natural disasters, including droughts, floods, pests, and diseases, which have led to widespread losses of plant diversity from both farmers' fields and natural habitants; (v) climatic changes have posed a threat

to diversity as many plants are unable to adapt; (vi) the research mandates of most institutions focus on the routinely cultivated species at the expense of the indigenous species; (vii) African governments are not making adequate investment in conservation of their indigenous plants heritage; and (ix) the ever-increasing population, greater competition for natural resources and some interplay of natural resources (CTDT, 2006). Mainstreaming indigenous vegetables into national programmes is critical for food security and for promoting vegetables that provide vitamins and contain medicinal properties (Njugi *et al.*, 2006). Biodiversity conservation includes landscapes used for farming. Rural communities use and manage plant biodiversity for sustainability of their livelihoods and maintenance of natural and modified ecosystems (Eilu *et al*., 2003). Various conservation techniques (*ex-situ* and *in-situ*) in addition to genetic resources conservation are being promoted (Yedu, 2008).

Study Description

The project entails two main aspects, mapping IPs in relation to land-use types to establish their premium value and characterization of the physico-chemical and nutraceutical value of screened IPs across two project study sites, i.e., Jinja in Uganda and Kisumu in Kenya. Structured surveys to gather information on indigenous knowledge pertaining to IPs and an array of laboratory methods (Near Infrared Reflectance spectroscopy and Energy Dispersive X-ray Fluorescence Spectroscopy) have been selected for rapid screening of IP germplasm and soil samples; and UV spectroscopy and High performance liquid chromatography to establish the premium value (nutraceutical properties). Research information obtained will be packaged as tailor-made messages for dissemination at various fora (brochures, journal articles of scientific data and articles for a relevant newsletter).

Research Application

The project hinges on socioeconomic setting and livelihood issues that cut across and beyond the East African region where women smallholder farmers are the custodians of plant biodiversity and managers of household food and nutrition security. Identified IPs on these farms and attaching a premium value is of utmost relevance for these farmers. Women smallholder farmers, as project beneficiaries will be enabled to identify premium value of IPs they produce, and feasible value added products that can be adopted. Conservation efforts at various levels will inform policy implementers.

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