

Promoting Neglected and Underutilized Plant Species for improved Food Security

Visiting Scholar- *Balcha Abera Erena (Associate Professor, Ph.D.)*

Executive summary

For centuries, plants have been used as a source of food, medicine and material culture. The focus of modern research and technology developments on crop plants, however, has narrowed the number of utilizable crop plants. This study reports the cultural food significance of neglected and underutilized crop plants in southwest Oromia, Ethiopia.

A total of 180 rural elders above the 40-year age group were interviewed concerning the cultural significance of neglected and underutilized plant species. A quantitative method was used to calculate the cultural significance of individual plants in traditional contexts. Data were analyzed through a special index – the Cultural Food Significance Index (CFSI) using six variables: availability index, frequency of use index, parts used index, feeding appreciation index, food preparation index and nutraceutical role index. A total of 71 neglected and underutilized crop plant species were reported by informants of the study area. Of these, 13 (18%) plant species were domesticated under home gardens while the remaining species were under wild life. Of the plant species, 6 (8.5%) were recorded with very high significance value (≥ 300 and above) followed by 7 (9.8%) with high (200-299), 34 (47.8%) with moderate (100-199), 14 (21%) with low (50-99) and 9 (12.7%) with very low (> 49).

[(*Coccinia abyssinica* (Anchote) *Plectranthus edulis* (Dinnicha Oromoo), *Phaseolus lunatus* L. (Abbaa Coomaa) and *Vigna unguiculata* (L.) Walp. (Heppoo) were identified in the study area as “most appreciated” in cultural feeding of the rural community at large. [*Colacaceae esculenta* L. (Schott), Godarree)], and (*Dioscorea alata* (Qoccoo Oromoo), were the most common and drought resistant tuber crop plants identified with very high significance values. The application of this index makes it possible to identify the most important but neglected and underutilized crop plant species for the extension of agrobiodiversity to feed the increasing world population. The findings of this study recommend the establishment of small and medium enterprises to increase the value of NUPs in the region.

Introduction

Neglected and underutilized crop plant species (NUPs), which are plants whose use is localized, have generally received little or no attention from researchers and policymakers (IPGAR, FAO, 2009). They are wild or semi-domesticated varieties and non-timber forest species adapted to particular, often quite local, environments. Many of these varieties and species, along with a wealth of traditional knowledge about their cultivation

and use, are being lost at an alarming rate. Although neglected in terms of improvements, NUPs are important for strengthening the food security needs of rural communities. NUPs have multiple uses including as animal fodder, medicine and nutritional food sources able to fight malnutrition. Also, NUPS present tremendous opportunities for fighting poverty and hunger, and they can help make agricultural production systems more resilient to climate change (Engles, 1995; Bala et al., 2010). In Eastern Africa and Southeast Asia, selected traditional vegetables are becoming an increasingly attractive food group for the wealthier segments of the population and are slowly moving out of the underutilized category into the commercial mainstream. Attracted by the strong market demand, seed companies are beginning to explore and develop these popular crops, thus strengthening the formal seed sector (FAO, 2009).

In Ethiopia, like in many African countries, NUPs form an important part of the livelihoods of rural communities. However, there is a lack of information on many aspects including ethnobotanical studies. Most of the ethnobotanical studies in Ethiopia have focused mainly on the traditional use of botanicals in folk medical practices while few studies were reported on wild plant use among particular ethnic groups (Asfew and Tadesse, 2001; Gemedo-Dalle et al., 2005; Belamie and Kibebew, 2006; Feyessa et al., 2012; Matthew et al., 2013). The evaluation of food plants used in different geographical and cultural contexts has two advantages: 1) to facilitate an intercultural comparative analysis of quantitative ethnobotanical data, and 2) to argue on the cultural components of food acceptance and investigate phytochemical constituents (Pieroni, 2001; Bala et al., 2010).

Approaches and results

The source of information of this policy brief is the study conducted, from January to December 2014 in six Zones of southwest Oromia, Ethiopia under the sponsorship of UNU-INRA, through structured interviews with informants that have extensive knowledge of the food culture. The

informants were asked to provide specific information for each plant species including: the availability status, the types and number of plant parts used, how the plant part was used, the preparation methods, the frequency of use when it is available, feeding appreciation, and an eventual medicinal purpose attributed to its ingestion.

Data were analyzed using the Cultural Food Significance Index (CFSI), modified from Pieroni (2001), in the context of Ethiopia with focus on six factors: Availability Index (AI), Part used Index (PUI), Frequency of Use Index (when available (FUI), Food Preparation Use Index (FPUI), Feeding Appreciation Index (FAI), and Nutraceutical Role Index (NRI)]. These Indexes were multiplied and the sum was used to compare the CFSI of NUPs of individual plants.

$$\text{CFSI} = \text{AI} \times \text{PUI} \times \text{FUI} \times \text{FPUI} \times \text{FAI} \times \text{NRI}$$

In this study, the cultural food significance index (CFSI) of the 71 NUPs was calculated following the formula aforementioned in the methodology. The Index Cultural Significance (ICS) values were classified into six groups: plant species with very high significance (VHSV) = ≥ 300 and above), with high significance (HSV=200-299), with moderate significance (MSV=100-199), with low significance (LSV= 50-99), with very low significance (VLSV= ≤ 49) (Fig. 2). Of the plant species identified, 6 (8.5%) were recorded with very high significance value (≥ 300 and above) followed by 7 (9.8%) with high (200-299), 34 (47.8%) with moderate (100-199), 15 (21%) with low (50-99) and 9 (12.7%) with very low (≤ 4).

Policy options

It is anticipated that the output of this research will be useful in fulfilling four policy options, all of which are geared towards improving access and sustainable utilization of NUPS. They include:

- 1) Domestication. Key issues under domestication include the development of appropriate propagation methods, and the development of high quality disease free planting materials.

- 2) Commercialization. It is acknowledged that most NUPS are accessed and used in small local areas. Their use is tied to local culture and customs and rarely found in national or regional markets. Consequently they do not contribute significantly to income generation activities despite having a high nutritional content. In order to promote commercialization and local value addition (to reduce high postharvest losses), there is need to promote access.
- 3) Eco-tourism. Eco-tourism has been successfully used to encourage ecologically safe consumption of potentially fragile ecosystems. Outsiders are encouraged to visit and consume the products in their local or home areas.
- 4) Conservation. Due to limited work on how to domesticate NUPS, increased utilization comes with the risk of loss of biodiversity and therefore any attempts to increase use must be accompanied by accelerated conservation.

Recommendations

Effective policy development can only be made possible if it is based on credible information. The following policies and related activities will be critical.

1. Research

- 1.1. Promote research into the various roles NUPS can play in alleviating poverty, ensuring food security and adapting to climate change.
- 1.2. Establish lists of priority NUPs on which to focus national research activities, and create inventories of cultivated and wild plant species, using a range of both scientific and traditional information sources. This should be done through processes that allow key stakeholders, including farmers' organizations and the private sector, to participate fully.
- 1.3. Identify areas of similar climatic conditions and soil types in the region and distribute germplasm to farmers.

2. Technology dissemination

- 2.1. Organize the transfer and sharing of knowledge among ethnic groups with differing traditional knowledge with respect to the cultivation, processing and utilization of different types of NUPs.
- 2.2. Develop a manual or handbook of traditional knowledge based on cultivation, processing and utilization of NUPs to serve as an information resource to be used by experts and development agents working within communities.
- 2.3. Strengthen knowledge-sharing platforms at national, regional and global levels to facilitate access to tools, methods, information and databases, and linkages between scientific and traditional knowledge.

3. Domestication

- 3.1. Establish community-based plant propagation facilities such as nurseries, greenhouses and laboratories with necessary facilities where propagation techniques could be carried out and developed for individual plant species.
- 3.2. Promote the cultivation of NUPs through campaigns to raise awareness on the commercial opportunities they offer and their agronomic and nutritional benefits.
- 3.3. Support the development of NUP-focused value chains and small agribusinesses, for example, by facilitating multi-stakeholder processes involving both public and private actors to identify constraints in value chains and agree on strategies to overcome them. Also, by providing support, incentives and an enabling environment for organizations that provide services to NUPs value chain actors.
- 3.4. Strengthen collaboration and information sharing between research, extension, and end-users such as farmers and farmer organizations.

4. Conservation

- 4.1. Promote conservation through increased support for conservation of NUPs on

farms, in situ and ex situ, and strengthen seed systems.

- 4.2. Develop long-term conservation strategies for NUPs and their wild relatives that combine ex situ, in situ and on-farm conservation.
- 4.3. Support the collection of germplasms, cultivation and domestication of wild food plants under home garden, nursery and greenhouse conditions.
- 4.4. Empower custodian farmers and support farmers' rights to share the benefits from NUPs; empower farmers by providing information and training on the benefits of NUPs and ecologically sustainable farming practices and ensure NUPs are included in the category of 'principal foods'.

References

Asfaw, Z. and Tadesse, M. 2001. Prospects for sustainable use and development of wild food plants in Ethiopia. *Economic Botany* 55(1):47-62.

Bala, R.S., Hrideek, T.K., Kishore Kumar, A.T., Prabhakaran, T.R., Bhag, M. and Padulosi, S. 2010. Mobilizing neglected and underutilized crops to strengthen food security and alleviate poverty in India. *Indian Journal of Plant Genetic Resources*, 23(1): 110–116.

Balemie, K. and Kebebew, F. 2006. Ethnobotanical study of wild edible plants in Derasheand Kucha Districts, south Ethiopia. *Journal of Ethnobiology and Ethnomedicine* 2:53-61.

FAO. 2009. FAO and traditional knowledge: the linkages with sustainability, food security and climate change impacts. 2009. FAO, Rome, Italy.

Feyessa, D.H., J.T. Njoka, Z., Asfaw, Z. and Nyangito, M.M. 2012. Comparative analysis of Indigenous knowledge on use and management of wild edible plants: The case of central east Shewa of Ethiopia. *Ethnobotany Research and Applications* 10:287-304.

**Sponsored by United Nations University-
Institute in Natural Resources for Africa, 2014
Mineral Resources Unit
The University of Zambia**



**UNITED NATIONS
UNIVERSITY**

UNU-INRA

Institute for Natural Resources in Africa

About The Authors

Balcha Abera Erena is a Research Fellow at the Department of Plant Science, Faculty of Agricultural Sciences, University Of Zambia.

This Policy Brief is prepared from a UNU-INRA Working Paper entitled:

EVALUATION OF THE CULTURAL FOOD SIGNIFICANCE OF NEGLECTED AND UNDERUTILIZED PLANT SPECIES IN SOUTHWEST OROMIA, ETHIOPIA

This policy brief and the working paper are available at collection.unu.edu

Contact

United Nations University for Natural Resources in Africa (UNU-INRA)

Location: Second Floor, International House, Annie Jiaage Road, University of Ghana, Legon, Accra, Ghana

Tel: +233-302-213850. Ext 6318

Email: inra@unu.edu

Website: www.inra.unu.edu

@UNUINRA

@UNUINRA

United Nations University-INRA