

# Underutilized plant species: what are they?

Stefano Padulosi and Irmgard Hoeschle-Zeledon

The use of the term underutilized to refer to categories of wild and cultivated plants invariably gives rise to a discussion of what the word actually means. In general it is commonly applied to species whose potential has not been fully realized. Fair enough. Unfortunately such an interpretation is *all-inclusive* and may also refer to local varieties of major crops and commodities currently abandoned by farmers or in decline but which could be revived through specific interventions such as adding value or marketing.

Many of us who are engaged in promoting the better use of plant biodiversity to deal with problems of poverty, food and nutritional security, income generation and environmental health, prefer a more specific definition. Here we define underutilized species as “those non-commodity crops, which are part of a larger biodiversity portfolio, once more popular and today neglected by users’ groups for a variety of agronomic, genetic, economic, social and cultural factors.”

Farmers cultivate them less than in the past because these species are no longer competitive with the crops that have come to dominate the world food supply and that are supported by seed supply systems, production and post-harvest technologies and extension services. In addition, their markets are well-established and consumers are accustomed to using them. In order to bring underutilized species back into cultivation, their competitiveness has to be addressed and new opportunities such as new food and lifestyle trends and the developments taking place in production and post-harvest technologies have to be explored.

This is, however, not the whole story. A lack of competitiveness may be an important factor for underutilization but, in itself, this tells us little about the geographical (underutilized where?), social (underutilized by whom?) and economic (underutilized to what degree?) reasons associated with the decline of local crops. For instance, with regard to geographical distribution, a species might be underutilized in some regions, but not in others. Cowpea (*Vigna unguiculata*) is a good example. It is a staple for many people in Sub-Saharan Africa, but considered underutilized in Mediterranean countries where it was once widely used and is now grown only in some restricted areas. Similarly, chickpea (*Cicer arietinum*) is considered an underutilized species in Italy, but is a main pulse in Syria and many other countries in West Asia. Other examples are leafy vegetables. From a social point of view it is hard to define leafy vegetables, a group of several species used by millions of people in Sub-Sahara Africa, as being underutilized. Yet, poor marketing conditions make them largely underutilized in economic terms.

Time is another factor that must be taken into consideration. Underutilized crops may suddenly become popular in one country while in another they continue to be poorly researched, marketed and managed. A good example of this is the dark green salad vegetable known as rocket – the collective name for the species *Eruca sativa*, *Diplotaxis tenuifolia* and *D. muralis*. Rocket has become a highly priced vegetable in Europe through innovative cultivation and commercial practices, while in Egypt it remains one of the country’s cheapest vegetables and a rich source of micronutrients for the poor.

Underutilized crops are often presented as ‘new crops’, not because they are ‘new’ but because they have been taken up by

commercial companies and researchers for a new market. In reality, local communities have used these species for generations but the current loss of local knowledge means that their traditional uses are being forgotten. Many underutilized species can make an important contribution to a better diet for local communities. Oca (*Oxalis tuberosa*), ulluco (*Ullucus tuberosus*) and mashwa (*Tropaeolum tuberosum*), three traditional Andean tuber plants are all much richer in Vitamin A and Vitamin C than the well-known potato (*Solanum tuberosum*). Quinoa (*Chenopodium quinoa*), cañahua (*Chenopodium pallidicaule*) and amaranth (*Amaranthus caudatus*), all underutilized grains in the Andean region, contain far higher amounts of certain essential amino acids than wheat. The leaves of black nightshades (*Solanum nigrum*) provide appreciable amounts of minerals including calcium, iron and phosphorous, Vitamins A and C as well as proteins and amino acids such as methionine, scarce in other commonly marketed vegetables.

In categorizing a species as underutilized, we should also consider the level of underutilization: when can a species be said to be underutilized and when does utilization become unsustainable over-utilization?



Photo: N. McClintock

Harvested green calyces of roselle.

## Common understanding

Orphan, abandoned, new, underutilized, neglected, lost, under-used, local, minor, traditional, forgotten, alternative, niche, promising, underdeveloped: these and other terms are often used as synonyms for underutilized species. Perhaps the best way to understand what the term really means is to identify the features underutilized species have in common and show how these relate to our lives. Underutilized species are:

- **important in local consumption and production systems:** they are an integral part of local culture, present in traditional food preparations and are the focus of current trends to revive culinary traditions;
- **highly adapted to agroecological niches and marginal areas:** they have comparative advantages over commodity crops because they have been selected to withstand stressful conditions and can be cultivated using low input and biological techniques;
- **ignored by policy makers and excluded from research and development agendas:** special efforts are needed to improve

the cultivation, management, harvesting and post-harvesting of underutilized species and studies are needed on issues such as marketability, nutritional status and policies and legal frameworks to regulate their use;

- **represented by ecotypes or landraces:** most underutilized species require some degree of improvement;
- **cultivated and utilized drawing on indigenous knowledge:** cultivation and use can be enhanced by using farmer-based knowledge and by introducing innovative cultivation practices. Unfortunately, processes such as urbanization and changing farming methods are contributing to the rapid erosion of traditional knowledge;
- **hardly represented in *ex situ* gene banks:** efforts are needed to rescue and conserve the genetic diversity of underutilized species. Without characterization and evaluation the useful variation of these species will remain poorly understood. It is important to combine *ex-situ* with *in-situ* (on-farm) conservation efforts as large-scale conservation efforts are unlikely to be made for these species. A “conservation through use” approach, therefore, becomes particularly important;
- **characterized by fragile or non-existent seed supply systems:** efforts need to be made to provide planting material to farmers in order to make the cultivation of underutilized species more feasible and sustainable over time.

Photo: Anita Ingevall



Field intercropped with peas, beans and quinoa, Pitumarca, Peru.

### New approaches

There are several strategic factors that need to be taken into account if we are to successfully promote underutilized species and, at the same time, ensure that benefits are equally shared among community members. These include:

- **focusing on local values, indigenous knowledge and uses:** such an approach will strengthen the link between diversity and sustainable uses and is important in considering marketability;
- **recognizing underutilized species as a public good** to ensure the continued availability and accessibility of plant genetic material to present and future generations;
- **focus on groups of species as models through case-study approaches** to make the best use of limited resources and facilitate for scaling-up and mainstreaming results;
- **promote cooperation among stakeholder groups and create national, regional and international synergies:** this is not an option but a necessity, isolated efforts and success stories need to be linked and disseminated;
- **analyze and enhance demand using market-oriented strategies:** such an approach will create sustainable markets and reduce the risk of over-estimating economic potential;
- **empower rural poor and strengthen their capacity to negotiate with the private sector and government:** such interventions will ensure that the poor and underprivileged receive their rightful share of the benefits resulting from our promotion process. This is an important part of the livelihood approach and essential because many underutilized species are cultivated in poor areas where they represent one of the few - if not the only - asset of the local community;
- **mainstream gender-sensitive approaches in management and use:** these will allow groups like women - who are too often marginalized - to enhance their capacity to manage, conserve and use underutilized species in a sustainable way and - in doing so - strengthen their economic status;
- **inter-disciplinary work:** such an approach is critical if the opportunities of underutilized species - including nutritional, economic and social aspects - are to be tapped at all levels.

The tools and methods used to pursue such an agenda must be relatively simple and inexpensive given that underutilized species have a low priority amongst policy makers and that there are

limited resources for their development. Partnerships need to be built amongst stakeholders involved in the collection, conservation, use, enhancement, marketing and commercialization of underutilized species. A participatory approach is essential in ensuring that local actors' needs are adequately addressed. In this process policy makers should be involved because they have an important contribution to make in institutionalizing work on underutilized species and in helping to protect local communities trying to realize benefits from local agrobiodiversity.

### Moving forward

The *International Plant Genetic Resources Institute* (IPGRI) in close cooperation with the *Global Facilitation Unit for Underutilized Species* (GFU) is actively engaged in several initiatives aimed at enhancing the use of underutilized species to realize social and economic benefits that will improve the living conditions of people worldwide. More information on these activities can be accessed through IPGRI's web page on neglected and underutilized species at [www.ipgri.cgiar.org/nus/](http://www.ipgri.cgiar.org/nus/) and the GFU website [www.underutilized-species.org/](http://www.underutilized-species.org/)

Stefano Padulosi, IPGRI-CWANA, PO Box 5466, Aleppo, Syria.  
Tel: (963) 21-2231412, Fax: (963) 21-2273681. E-mail: [s.padulosi@cgiar.org](mailto:s.padulosi@cgiar.org)  
Irmgard Hoeschle-Zeledon, Coordinator, Global Facilitation Unit for Underutilized Species, Via dei Tre Denari, 472a, 00057 Maccarese, Italy.  
Tel: (39) 6-6118292, Fax: (39) 06-61979661. E-mail: [i.zeledon@cgiar.org](mailto:i.zeledon@cgiar.org) ; [irmgard.hoeschle-zeledon@giz.de](mailto:irmgard.hoeschle-zeledon@giz.de)

### References

- InWEnt/GFU, 2003. **Proceedings of the International Workshop on Underutilized Plant Species.** Leipzig, 6-8 May 2003. InWEnt, Leipzig, Germany.
- IPGRI, 2002. **Neglected and Underutilized Plant Species: strategic action plan of the International Plant Genetic Resources Institute.** International Plant Genetic Resources Institute, Rome, Italy.
- Padulosi, S.; T. Hodgkin; J.T. Williams and N. Haq, 2002. **Underutilized crops: trends, challenges and opportunities in the 21st Century.** In: "Managing plant genetic resources" J.M.M. Engels *et al.* Eds. pp. 323-338. CABI-IPGRI.
- Pimpinì, F. and M. Enzo, 1997. **Present and future prospects for rocket cultivation in the Veneto region.** pp. 51-66, In: Rocket: an old Mediterranean crop for the world (S. Padulosi and D. Pignone, eds.). Report of the II International Workshop on Rocket 13 December 1996, Padova, Italy. International Plant Genetic Resources Institute, Rome, Italy.
- Vietmeyer, N., 1990. **The new crops era.** pp. xviii-xxii, In: Advances in New crops. Proceedings of the First National Symposium on New Crops: Research, Development, Economics. (J. Janick and J. Simon Eds.). Indianapolis, Indiana, 23-26 October 1988. Timber Press, Portland, Oregon.