

'Underutilized' species

Rich potential is being wasted



Nguni cattle (photo: A. Feldmann)

Trend towards uniformity

Until the beginning of the 20th century, a wide range of locally-adapted crop varieties and livestock breeds were available to farmers. This diversity contributed to the security of the food supply and helped to safeguard people's livelihoods. Nowadays, the bulk of the world's food is derived from just a few species. For example, the three major cereals – wheat, rice and maize – supply more than half of the global protein and calorie intake. Relatively few modern varieties are planted on every continent, accounting for almost three-quarters of the land under cultivation, where they have supplanted the diversity that once existed. Farm animals have been affected by a similar trend. The success of Holstein-Friesian cattle seemingly knows no bounds. This highly productive breed is now dominant, making up 60% of European and 90% of North American dairy cattle. Many developing countries are becoming increasingly reliant on industrial dairy production, and are supporting cross-breeding programmes using Holstein-Friesian and other exotic high-performance breeds.

But it will take more than a handful of species to feed the world population and secure its income in the long term. It is important to retain a *broad genetic base* of our major crops and farm animals, so as to allow for breeding activities to adapt plants and animals to changing environmental conditions, market requirements or new pests and diseases. At the same time, increasing the *number of species* in agricultural systems helps to raise their all-important buffer capacity.

The 1996 Global Plan of Action for the Conservation and Sustainable Utilization of Plant Genetic Resources makes specific reference to promoting development and commercialization of under utilized crops and species. The same goals were adopted by the World Food Summit (Rome, 1996), because underutilized species make an es- ▶

What are 'Underutilized' species ?

The term underutilized species – referring to animals, crop plants, wild or semi-wild plants – applies to those species which appear to have considerable potential for use yet whose potential is barely exploited, if not totally neglected, in agricultural production. For example, there are numerous plants which are particularly well adapted to specific sites and agricultural production systems. This category includes crops like yams, the 'Inca wheat' quinoa, and many species of tropical fruits and vegetables.

The reasons for the underutilization of such species vary: it may be that their useful traits are not well known; perhaps there is little processing or marketing capacity, or a lack of interest on the part of agricultural research. 'Taro', the tuberous root of *Colocasia esculenta* is an example of a species overlooked by science. Although it is one of the staple foods in Africa, Asia and Latin America, there has been less research on taro than on asparagus.

Instead of 'underutilized' species, the related terms 'minor', 'local', 'neglected', or 'orphan' species are also used in literature. These terms all focus on certain aspects which restrict a wider use, for example the fact that they have been 'neglected' by scientific institutions, or that they are of 'minor' economic importance. Other authors have suggested the terms 'alternative' or 'promising' species to highlight their potential.



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Balsam forests in El Salvador and balsam products (photos: N. Sabater)

El Salvador's balsam trees – Conservation through use

The balsam trees of *Myroxylon balsamum var. Pereirae* only grow in the western part of El Salvador. Long ago, the Mayan people knew of the tree's resin, which can be used for medicinal purposes, for cosmetics, and as an aromatic ingredient. During the colonial era, balsam was shipped to Spain via the port of Calao in Peru, which is why the name 'Peru balsam' is still in widespread use today. With the emergence of synthetic substitutes, balsam production has become less and less profitable over the years and balsam forests have increasingly been destroyed. In collaboration with local partners and the Centre for the Promotion of Imports from Developing Countries (CBI) in the Netherlands, GTZ is now working to strengthen El Salvador's balsam sector.

A sector strategy will be formulated and the production process of the natural product will be better documented. Other planned support measures include the establishment of a central quality control system and the development of a marketing concept. Furthermore, the project will explore how far an integrated 'balsam tourism project' is likely to help to improve the economic and social situation of the people living in the balsam production region, who are the guardians of this unique tropical forest.

Creation of a global hub

In order to promote international exchange on species with high potential and to strengthen existing initiatives and networks, a dedicated global hub – the Global Facilitation Unit for Underutilized Species, GFU – was created in 2002. The project, which was initiated by the Global Forum for Agricultural Research (GFAR), is being financed by the German Federal Ministry for Economic Cooperation and Development (BMZ) and is based at the International Plant Genetic Resources Institute IPGRI in Rome. Its main function apart from providing information is to offer a forum for discussion, of support concepts for the sustainable use of underutilized species, for instance. Initially the GFU will confine itself to the sphere of plant species.

What underutilized species can offer

Greater food security: Local crops and animal breeds can increase food security, particularly if they are adapted to specific marginal agricultural conditions. Diversification is a means of risk reduction.

Healthy nutrition: Many underutilized crops have important nutritional qualities, such as a high fat content, high quality proteins (essential amino acids), a high level of minerals (such as iron), vitamins, or other valuable nutrients which have not yet been described satisfactorily. They are therefore a significant complement to the 'major' cereals and serve to prevent or combat the *hidden hunger* – a diet deficient in vitamins, minerals and trace elements – which is prevalent in developing countries.

- ▶ sential contribution to food security and poverty reduction. If a proportion of the major food crops in production were replaced or supplemented with underutilized plants and breeds, this would not only increase the number of species in production but would also result in a healthier and more diverse nutritional base.

Setting a good example

A range of initiatives are already in hand to investigate potentially profitable uses of underutilized plants and animals. These activities are taking place both nationally and internationally, in some cases involving cooperation between the private and the public sectors.

Adding value to local breeds – Nguni cattle in Southern Africa

The Nguni breed of cattle is uniquely adapted to the harsh Southern African environment. Nevertheless, during the first half of the 20th century, it was crossed with exotic breeds over an extended period, causing the original Nguni cattle population to decline substantially. The local breed was deemed unproductive, but in fact the animals possessed valuable traits which had been overlooked. Not only is the Nguni breed resistant to ticks, it is also extremely tolerant of heat and drought, and relatively undemanding in terms of feed quality or veterinary care. Its hides are highly prized among the local population for their attractive markings. For all these reasons, Nguni cattle have become the stuff of numerous poems and myths.

In cooperation with the private sector, GTZ is seeking to improve processes within the production chain. It envisages supporting the organization of local smallholders and their herd management practices. Additional issues are marketing, meat quality, hide treatment at the time of slaughter, transportation conditions and secondary processing. Joint efforts will be made to seek new markets for the high quality leather and the 'organic' meat produced. Both can be expected to do well in niche markets.

Income generation: Underutilized species are capable of supplying both foodstuffs and industrial raw materials, which will offer new opportunities for income generation if their market potential is successfully recognized and developed.

Poverty reduction: Many underutilized plant species and breeds require few, if any, external inputs for production. This is an incalculable advantage, especially for poor sections of the population. For example, local cattle breeds can thrive without fodder supplements and preventative veterinary treatments. While they may be less productive, their performance remains consistent when conditions are less than ideal. Local crops produce lower but stable yields even on marginal land and without additional inputs of mineral fertilizers and pesticides. If the land in question does not belong to the farmers, it may still be possible to use wild or semi-cultivated species (such as medicinal herbs, dyes, etc.).

Sustainable use of natural resources: Locally adapted crops and animal breeds offer potential for the sustainable use of more challenging sites, such as semi-arid or mountain regions. A well-known example is that local cattle breeds are often less destructive to the vegetation cover on slope land than (heavier) high performance breeds. Local crop species and varieties fit easily into traditional sustainable farming systems geared towards maintaining or restoring soil fertility, like mixed cropping and agroforestry.

Indigenous knowledge and cultural identity: Many smallholders possess very specific knowledge of cultivation and processing techniques for underutilized species and their diverse uses. It is not unusual for certain plant or animal species to be of great spiritual importance for the people and their cultural identity.

What are the limitations on use?

Lack of market infrastructure: Many underutilized crops and animal products are used almost exclusively for the farmers' own subsistence, even where the potential exists to market them more extensively. This is due to the lack of infrastructure for marketing products of suitable quality and in appropriate quantities to potential customers.



Different varieties of egg plant at a market close to the Akagera National Park, Rwanda (photo: G. Ulutunçok)

Lack of technologies: Traditionally, underutilized plant and animal products have been processed manually on farms, often using labour-intensive and time-consuming methods. To expand the scale of production, efficient technologies must be developed for manufacturing, storage and processing, to ensure that quality standards can be met.

Lack of knowledge and erosion of cultural diversity: Often, neither scientists nor consumers are aware of the nutritional value, medicinal properties or other special characteristics of these products. Indeed, fundamentally negative attitudes may prevail towards local traditions. In extreme cases, indigenous culinary traditions and local specialties may be dismissed as 'old-fashioned' or 'paupers' food'.

Lack of political support: The food security programmes in many developing countries are based on agricultural policies which favour the 'green revolution crops' and focus exclusively on maize, wheat or rice, and export crops. In animal production, the emphasis has long been on promoting the use of high-performance breeds, even though they only produce high yields in ideal production conditions. Incentives, subsidies and loan programmes for this type of agricultural production distort the market, to the detriment of traditional crop varieties and animal breeds. Complicated authorization procedures can also be an obstacle to accessing new international markets. One example is the Novel Food Regulation of the European Union, which requires extensive safety-testing of novel foodstuffs on public health grounds before they can be introduced to the European market.

In addition to the reasons mentioned, there are certainly other causes of underutilization which are not so easily remedied, at least not in the short term; for example, low yields, unpalatable flavours or poor keeping qualities.

New strategies to promote use

Before strategies can be developed to promote use of a species, careful analysis is needed of its potential and the factors constraining its use. Essentially, two different approaches are possible:

- The *commodity chain approach* aims to develop the *market potential* of a particular species or product by strengthening weak points in the value chain.
- The *livelihood approach* is an effort to exploit the full *livelihood potential*. It seeks to find better uses for the species in relation to the producers' life situation, e.g. for their nutrition, for their health, to strengthen their cultural identity, and to conserve natural resources.

Both approaches can combine various strategic steps to promote their product: optimizing production and storage methods, improving quality standards, processing and marketing, strengthening organizational structures, lobbying, awareness-raising and public relations work.

Essentially, promoting the use of underutilized species is most successful when it does not concentrate on one product in isolation but forms part of a regional development concept. Of course, the technologies and social structures deployed within the project must be sustainable. In the case of export products, it often makes sense to team up with Fair Trade and organic initiatives.

In the long term, the promotion of underutilized species must be mainstreamed into regional and national development strategies, and research and advisory work must take up the cause of species with high potential. The main point is not to carry out isolated projects, but to make a lasting impact by reversing the loss of agricultural diversity.

Further information

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Win-win solutions are possible

In recent years, a growing interest in exotic foods has been noticed among consumers in the northern hemisphere. Products made from underutilized species could satisfy this desire for variety, encouraging greater agricultural diversity and benefiting producers in the South – as long as those who have developed the previously neglected species into lucrative ones are not forced out of the market later by more powerful producers.

The promotion of high-potential species will only result in higher agrobiodiversity if their increasing commercial use does not simply displace other crops or breeds from production. Hence it is necessary to monitor and document the precise impacts of export-oriented promotion on agrobiodiversity, on opportunities for income generation, and on social structures.



'Naranjilla' (*Solanum quitoense*) is used in Ecuador to make juices, preserves and ice cream (photo: M. Hermann)

The **People and Biodiversity** issue paper series aims to:

- arouse interest in the topic of conservation and sustainable use of biodiversity,
- present in a concise manner concrete approaches for action and experience,
- explain new terms and concepts in the thematic area of biodiversity,
- encourage and stimulate readers to mainstream biodiversity issues in development cooperation projects.

We would welcome your comments and experience. They will help us to improve this series step by step.

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