



Neglected and underutilized crop

Neglected and underutilised crops are domesticated plant species used for food, medicine, trading, or cultural practices within local communities but not widely commodified or studied as part of mainstream agriculture.^{[1][2]} Such crops may be in declining production.^[3] They are considered underutilised in scientific inquiry for their perceived potential to contribute to knowledge regarding nutrition, food security, genetic resistance, or sustainability.^[4] Other terms to describe such crops include minor, orphan, underused, local, traditional, alternative, minor, niche, or underdeveloped.^[5]

Overview

Three crops: maize, wheat, and rice, account for approximately 50% of the world's consumption of calories and protein,^[6] and about 95% of the world's food needs are provided by just 30 species of plants.^[7] Despite this, the list of crop species compiled as edible extends to around 12,650.^[8] Among these are plants that have been used for food and other uses on a larger scale historically, but whose usage has dropped in modern times.

Reduction in use is due to supply or consumption constraints, poor shelf life, unrecognised nutritional value, poor consumer awareness, and perception as famine food ("poor people's food"), partially due to the modernisation of agricultural practices. Some crops experienced genetic erosion of their gene pool due to this neglect, which resulted in them becoming regarded as lost crops.^[9]

As the demand for plant and crop attributes changes (reappraisal or discovery of nutritional traits, culinary value, adaptation to climate change, etc.), some previously neglected crops, such as oil palm, soybean, and kiwifruit, have overcome such constraints via more large-scale production and use, becoming regarded as globally significant crops.^{[10][11]} Alongside their commercial potential, many underused crops such as sorghum provide essential environmental services as they have adapted to marginal soil and climate conditions.^[12]

Underutilised crops continue to play a vital role in the subsistence and economy of people in low and middle-income countries, particularly in the agro-biodiversity rich tropics. For example, chirimoya and bambara crops produced in Colombia and Mozambique respectively, aid the local population in food security, allowing them physical and economic access to sufficient food for meeting their dietary needs, even during a famine.^{[13][14]}



Cherimoya (*Annona cherimola*) on sale in Cali, Colombia. In left background: domestically produced mangosteen (*Garcinia mangostana*)



Bambara groundnut (*Vigna subterranea*) from Buzi district in Mozambique

Definition

There is no consensus on what defines an underutilised crop, but they often display the following attributes:

- Linkage with the cultural heritage of their places of origin
- Local and traditional crops whose distribution, biology, cultivation and uses are poorly documented
- Adaptation to specific agroecological niches and marginal land
- Weak or no formal seed supply systems
- Traditional uses in localized areas
- Produced in traditional production systems with little or no external inputs
- Receive little attention from research, extension services, policy and decision-makers, and consumers^[15]
- May be highly nutritious and/or have medicinal properties or other multiple uses

Neglected crops are primarily grown by traditional farmers. These species may be widely distributed beyond their centers of origin but tend to occupy unique niches in the local production and consumption systems. They are critical for the subsistence of local communities yet remain poorly documented and neglected by mainstream research and development activities.^[16] Many staple crops, especially in the developing world, are poorly studied by researchers. For example, the Green Revolution saw massive changes in agricultural productivity in Asia, but African crops saw little benefit.^[17]



Landscape with quinoa (*Chenopodium quinoa*), Cachilaya, Bolivia, Province La Paz, Lake Titicaca seen in background.

Examples

Determination of the underutilized status of a crop varies among researchers. Different criteria and approaches are used to define this particular group of crops.

Neglect refers to the lack of attention a crop may receive through research and development and can be evaluated by how well national and international policy or legal frameworks and research and development programs can support the conservation and sustainable use of a crop. Underutilisation is particular to the geography and potential for a crop to contribute to better diets and production systems. In cases where exotic or diversified species are underutilised in a particular region, these may not necessarily be underutilised in other parts of the world.^[9] Below is a non-exhaustive list of neglected and underutilised species.



Village chief of Boula Téné, [Senegal] Theodore Mada Keita, holds up the fonio grain (*Digitaria exilis*) that helps feed his family.

It is important to recognise the potential negative impact on communities that historically use so-called underutilised crops. For example, as quinoa came into international focus, its price in South America surged by 600%, pushing the grain outside the reach of traditional use communities. [18]

Cereal and pseudocereal crops

- *Amaranthus caudatus*
- *Chenopodium quinoa*
- *Chenopodium pallidicaule*
- *Digitaria exilis*
- *Echinochloa frumentacea*
- *Echinochloa utilis*
- *Eleusine coracana*
- *Eragrostis tef*
- *Fagopyrum esculentum*
- *Panicum miliaceum*
- *Panicum miliare*
- *Paspalum scrobiculatum*
- *Pennisetum glaucum*
- *Setaria italica*
- *Sorghum bicolor*
- *Triticale*

Fruits and nuts species

- *Adansonia digitata*
- *Aegle marmelos*
- *Anacardium occidentale*
- *Annona cherimola*
- *Annona muricata*
- *Annona squamosa*
- *Artocarpus heterophyllus*
- *Averrhoa carambola*
- *Bactris gasipaes*
- *Canarium indicum*
- *Carissa edulis*
- *Carya cathayensis*
- *Casimiroa edulis*
- *Ceratonia siliqua*
- *Choerospondias axillaris*
- *Citrus grandis*
- *Cornus mas*
- *Crataegus monogyna*
- *Cydonia oblonga*
- *Dimocarpus longan*
- *Diospyros kaki*
- *Durio zibethinus*
- *Elaeagnus angustifolia*



Ziziphus mauritiana (dry fruits) for sale at the Luangwa turn-off on Great East road, Zambia.

- *Emblica officinalis*
- *Eriobotrya japonica*
- *Ficus carica*
- *Garcinia mangostana*
- *Hippophae rhamnoides*
- *Hovenia dulcis*
- *Irvingia gabonensis*
- *Juglans regia*
- *Lagenaria sphaerica*
- *Litchi chinensis*
- *Manilkara zapota*
- *Nephelium lappaceum*
- *Passiflora edulis*
- *Pistacia lentiscus*
- *Pouteria sapota*
- *Prunus amygdalus*
- *Psidium guajava*
- *Punica granatum*
- *Ricinodendron heudelotii*
- *Salacca zalacca*
- *Tamarindus indica*
- *Terminalia kaernbachii*
- *Vaccinium meridionale*
- *Vitis spp.*
- *Ziziphus mauritiana*
- *Asimina triloba*

Vegetable and pulse crops

- *Adansonia digitata*
- *Amaranthus spp.*
- *Artemisia dracunculus*
- *Basella alba*
- *Basella rubra*
- *Borago officinalis*
- *Boscia coriacea*
- *Brassica carinata*
- *Campanula rapunculus*
- *Canavalia spp.*
- *Chenopodium album*
- *Cichorium intybus*
- *Cleome gynandra*
- *Corchorus spp.*
- *Crambe cordifolia*
- *Crotalaria spp.*
- *Curcuma spp.*
- *Cucurbita spp.*



Ipomoea aquatica photographed in the Sunday Market, Kuching, Sarawak, Malaysia

- *Hibiscus sabdariffa*
- *Ipomoea aquatica*
- *Kerstingiella geocarpa*
- *Lablab purpureus*
- *Lathyrus* spp.
- *Leucaena leucocephala*
- *Lupinus mutabilis*
- *Macrotyloma uniflorum*
- *Momordica* spp.
- *Moringa oleifera*
- *Mucuna* spp.
- *Muscaris comosum*
- *Opuntia* spp.
- *Parkia biglobosa*
- *Pastinaca sativa*
- *Physalis philadelphica*
- *Phytolacca acinosa*
- *Portulaca oleracea*
- *Psophocarpus tetragonolobus*
- *Rorippa indica*
- *Salsola kali*
- *Solanum nigrum*
- *Sphenostylis stenocarpa*
- *Talinum triangulare*
- *Vigna aconitifolia*
- *Vigna angularis*
- *Vigna subterranea*
- *Vigna umbellata*
- *Voandzeia subterranea*
- *Gynandropsis gynandria*

Root and tuber crops

- *Alocasia* spp.
- *Arracacia xanthorrhiza*
- *Calathea allouia*
- *Canna* spp.
- *Colocasia esculenta*
- *Dioscorea* spp.
- *Gastrodia sesamoides*
- *Harpagophytum procumbens*
- *Orchis* spp.
- *Oxalis* *tuberosa*
- *Pachyrhizus erosus*
- *Plectranthus esculentus*
- *Smallanthus sonchifolius*
- *Solenostemon rotundifolius*



Ulluco tubers (*Ullucus tuberosus*) for sale in southern Peru

- *Tylosema esculentum*
- *Tylosema fassoglense*
- *Ullucus tuberosus*
- *Vigna vexillata*
- *Xanthosoma sagittifolium*

Other crops

- *Ensete ventricosum*

Industrial underutilized crops

Oil seeds

- *Acrocomia aculeata*
- *Bactris gasipaes*
- *Balanites aegyptiaca*
- *Butyrospermum paradoxum*
- *Carthamus tinctorius*
- *Citrullus colocynthis*
- *Cuphea* spp.
- *Euphorbia lagascae*
- *Jatropha curcas*
- *Physaria fendleri*
- *Perilla frutescens*
- *Ricinodendron rautanenii*
- *Ricinus communis*
- *Sesamum indicum*
- *Simmondsia chinensis*
- *Vernonia* spp.



Bixa orellana fruit open, showing the seeds from which annatto is extracted, photographed in Campinas, Brazil

Latex/rubber/gums

- *Couma utilis*
- *Parthenium argentatum*
- *Takhtajaniantha tau-saghyz*
- *Taraxacum kok-saghyz*

Fibres

- *Hibiscus cannabinus*

Starch/sugar

- *Ceratonia siliqua*
- *Metroxylon sagu*
- *Heracleum (plant)*

Dye

- Bixa orellana
- Carthamus tinctorius
- Hibiscus sabdariffa

International events that fostered underutilized crops

- 1987 - Establishment of the International Centre for Underutilized Crops (ICUC)
- 1996 - The FAO Global Plan of Action for Plant Genetic Resources for Food and Agriculture emphasized the importance of underutilized crops
- 1999 - At an international workshop held in Chennai, India, the Consultative Group of International Agricultural Research (CGIAR) recognized the contribution that neglected and underutilized species make to food security, rural incomes and combating poverty
- 2002 - Establishment of the Global Facilitation Unit of Underutilized Species (GFU) of the Global Forum on Agricultural Research (GFAR), and was housed within Bioversity International, Rome, Italy.
- 2008 - Establishment of Crops for the Future (CFF) which is a merging of ICUC and GFU, based in Malaysia^[19]
- 2011 - Establishment of Crops for the Future Research Centre (CFFRC) in Malaysia^[20]
- 2012 - The international Crops for the 21st Century seminar held on 10–13 December 2012 in Córdoba, Spain aimed to discuss major topics related to underlining the role of neglected and underutilised species to address food and agriculture challenges in the future.^[21]
- 2013 - Official launch of the International Year of Quinoa (IYQ-2013), intended to increase awareness, understanding and knowledge about quinoa and its importance on food security.^[22]
- 2013 - 3rd International Conference on Neglected and Underutilized Species (<http://www.bioversityinternational.org/news/detail/ghanaian-ministers-claim-traditional-crops-as-assets-in-fighting-africas-food-challenges/>), Accra, Ghana - to ensure that research on neglected and underutilized species (NUS) is demand-oriented and that results are better shared and applied, researchers, extension agents, the private sector and farmers must engage in more collaboration - in sub-Saharan Africa.



Logo of the international year of Quinoa 2013

See also

- Food security
- Heirloom plant
- List of useful plants
- Slow Food
- Subsistence farming
- Food biodiversity

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External links

- [Crops for the Future](https://web.archive.org/web/20121128115824/http://cffresearch.org/) (<https://web.archive.org/web/20121128115824/http://cffresearch.org/>)
 - [NUS Database Asia](https://web.archive.org/web/20090427170631/http://www.agrofolio.eu/db/) (<https://web.archive.org/web/20090427170631/http://www.agrofolio.eu/db/>)
 - [NewCROP the New Crop Resource Online Program](http://www.hort.purdue.edu/newcrop/default.html/) (<http://www.hort.purdue.edu/newcrop/default.html/>)
 - [NUS Community - Bioversity International](http://www.nuscommunity.org/) (<http://www.nuscommunity.org/>)
 - [CGIAR Research Program on Roots, Tubers and Bananas](https://www.rtb.cgiar.org/) (<https://www.rtb.cgiar.org/>)
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