

USE OF LOCAL CROP VARIETIES

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NOWADAYS, THE MAJORITY OF THE WORLD'S FOOD COMES FROM A HANDFUL OF PLANT AND ANIMAL SPECIES (SINGH 2018).

For plants, the focus lays on the production of starchy crops (corn, rice, wheat), which are high in calories but low in nutritious value (Borelli et al. 2020). The reliance on these crops has led to serious levels of obesity all around the world. Additionally, their cultivation in large areas of monocultures leaves us extremely vulnerable to diseases and is destroying our farmlands (Borelli et al. 2020; Perez-Caselles et al. 2020). The current reliance on a limited number of crops is a risky strategy with the increasing global population and a rapidly changing climate (Ficiciyan et al. 2018).

There are literally thousands of wild or rarely cultivated species that could be cultivated to provide a more diverse palate of affordable, nutritious food for the entire global population. Agrobiodiversity, the diversity of crop varieties, can provide an insurance against crop failure, allow for a wider cropping season, provide us with a gene pool to mitigate the effects of climate change or diseases and even reduce our impact on the environment (Ficiciyan et al. 2018; Singh 2018). It is important we focus more on the conservation of our agrobiodiversity and promote the use of more locally adapted crop varieties (Borelli et al. 2020).

Local crop varieties still play a significant role in the livelihoods of rural farmers in developing countries (Borelli et al. 2020). Their fields host a huge diversity of plants, and local crop varieties are essential to food, nutrition and the economic security of these farmers. Several organisations (FAO, Biodiversity International) are focusing on the conservation of this agrobiodiversity and the knowledge on their cultivation. In the developing nations, much of the local crop varieties are no longer in use and the associated knowledge has been lost (Ceccanti et al. 2018). In the Mediterranean region, people are 'rediscovering' the use of their local crop varieties, as they are more resilient to the climatic conditions and add variety to their diet (Ceccanti et al. 2018; Perez-Caselles et al. 2020).



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Harvesting of local crop varieties, Lebanon © Shouf Biosphere Reserve



THREATS TO THE PRACTICE

The most important threat to local crop varieties is the global market that promotes the spread of high yielding uniform varieties (Jarvis et al. 2011; Perez-Caselles et al. 2020). Locally adapted varieties may have the benefit of having a higher tolerance to local environmental conditions, they often also contain traits that reduce yield. With the focus and pressure on farmers on maximizing production at the expense of abandoning traditional production systems, lower-productivity varieties are being lost at an alarming rate worldwide, and with them the ability to respond to environmental impacts (Aguilera et al. 2020; Jarvis et al. 2011).

RECOGNITION AND FUNDING

The general public, policy makers and local communities often underestimate the value of local crop diversity, and the global market is solely responding to the demand of the customer for more, cheaper and faster. Initiatives are therefore taken to highlight the importance of the preservation of local crop varieties and their associated knowledge. One initiative, the application of Payment for Ecosystem Services, could be very beneficial to the conservation of agrobiodiversity and help rural communities that prioritize the use of local crop varieties. Another initiative for the preservation of wild crop varieties is the establishment of seed banks, accessible to farmers and other crop maintainers for processing, storage and distribution. Participation of farmers in crop improvement programmes with research institutes or private breeding companies is another initiative helping towards more climate and pest resilient varieties. Focus has been mainly on the developing countries, but initiatives are being taken to revive the sharing of local crop varieties in the Mediterranean region as well (Ceccanti et al. 2018).



Terra Vita wheat, rusks and pasta cultivated in Lemnos, Greece © MedINA

1. CULTURAL SUSTAINABLE LAND-USE PRACTICES

Local crop varieties are varieties that have been adapted to the local environmental conditions (Perez-Caselles et al 2020). For centuries, farmers all over the world have selected on the basis of their ethnic and socioeconomic groups, their farming practices and the climatic conditions (Hufford et al. 2019). The continuing maintenance of local crop varieties is still undertaken by small-scale farmers but is often associated with poverty (Jarvis et al. 2011). In the arid zones of the Mediterranean countries, for example, small-scale farmers focus on shorter duration crops (rye, barley, oats) that require less water to complete their life cycle than the popular wheat (Hossain et al. 2020).

The diversity in crops provides both risk-avoidance and spreading for small-scale farmers, but is also important to their traditional local cuisine and specific dietary requirements (Borelli et al. 2020). The practice of planting mixtures allows these farmers to spread the risks of the variable environment and have food available over a wider period of time (Hufford et al. 2019). Using a larger proportion of local crop varieties is likely to become more popular with growing emphasis on reducing our dependence on chemical inputs and the development of more sustainable agricultural systems (Jarvis et al. 2021).

TECHNICAL DETAILS

	Necessary material	No additional material needed. Possible reduction in need for fertilizers and biopesticides because of better adaptation to environment
	Time period	Larger harvesting spectrum over the year, because more crops with different harvesting time
	Economic costs	No additional economic costs, except possible differences in yield & output

RESEARCH BY THE ALLIANCE FOR MEDITERRANEAN NATURE AND CULTURE (AMNC)

The current emphasis on the value or yield of the individual crop should be shifted towards a focus on the crop's interactions with its environment and the local community (Jarvis et al. 2011). The increasing consumer's demands and product labels on food quality and the knowledge on the origins and the production processes of products are important steps towards promoting local food production (Petropoulos et al. 2019). Although research on local crop varieties has become more popular, the effects on biodiversity richness and crop pollination have continuously been neglected by the scientific world (Ficiciyan et al. 2018).



Moniato de Menorca, local sweet potato variety from Menorca, Spain © GOB Menorca



Almonds from High Atlas, Morocco © Pommeliers Da Silva Cosme

Several communities still work with local crop varieties, and at three research sites especially they promote the use and selling of local crop varieties. In the High Atlas Mountains in Morocco, the local community is working on a plant enrichment programme for medicinal and aromatic local plants. These local crop varieties are planted in protected zones, and are sold as culinary and medicinal products. In this way, wild relatives are also protected from consumption and exploitation. On the islands of Menorca and Lemnos, an assessment was done on the local crop varieties that are still grown. The resilience to the local environmental conditions and yield were assessed for several local varieties of vegetables and fruits.

2. BENEFITS OF THE PRACTICE

2.1. BIODIVERSITY

Local crop varieties fall in the vulnerable position between the agricultural and wildlife conservation agendas, and agricultural conservation is often seen as separate and even opposite from wildlife conservation. But there is great potential to align the efforts and activities to achieve positive outcomes for both agricultural and wildlife biodiversity (Jarvis et al. 2011). Many of the agricultural plant and animal species, varieties and breeds depend on the continuing attendance by farmers for the survival (Aguilera et al. 2020). Protecting this agrobiodiversity therefore requires diversifying our farming practices and production systems.

The diversification within our farming systems has the potential to provide several ecosystem services beneficial for wildlife conservation. Because of its adaptation to the local environment, local crop varieties can aid better in the regulation and control of pests and diseases, sustain a higher pollinator diversity and support below-ground biodiversity and soil health (Jarvis et al. 2011). At the same time, the reduced dependence on fertilizers and pesticides has a positive effect on the financial and health risk of the environment and the community (Jarvis et al. 2011). Although neglected by agronomic research and avoided by wildlife conservation research, local crop varieties have great potential to support many ecosystem services (Jiménez-Alfaro et al. 2020).



Organic local vegetables from Hammana, Lebanon © Andre Bechara SPNL

2.2. CULTURAL

In the Mediterranean basin, local crop varieties are the results of complex cultural and environmental processes of selection (Aguilera et al. 2020). The knowledge and the use of local crop varieties provide many benefits to the local populations, strengthening their culinary and medicinally traditions that are closely linked to culture and identity (Borelli et al. 2020). Local crop varieties are often used for traditional festivals, family traditions, worship activities and possess the exact cooking characteristics for special dishes (Ficiyan et al. 2018, Nan et al. 2021). They also provide the community to continue their sovereignty in food production (Ficiyan et al. 2018). According to a study by Nan et al. (2021), several Globally Important Agricultural Heritage Systems (GIAHS) sites have shown promising results on the conservation of agrobiodiversity because of the mutual promotional trend between agricultural conservation and traditional culture conservation.

2.3. CLIMATE CHANGE

Local crop varieties might be good alternatives to high-yielding modern varieties with the treats from climate change, as they have grown adapted to usually more extreme environments that are low in resources (Aguilera et al. 2020). Modern varieties have often lost their resistance to several stress factors during the breeding for high yield (Ficiyan et al. 2018). Small-scale farmers often use the local crop varieties in areas with under-optimal farming conditions, and they are seen as a trusted source achieving stable crop yield, independent on harsh climatic conditions such as droughts or floods (Ficiyan et al. 2018). For example, several old wheat varieties have been shown to adapt better to the semi-arid Mediterranean conditions than the modern varieties (Aguilera et al. 2020). Important is to store the seeds and the planting material in genebanks in order to protect the diversity, and the genetic resources that might be proven useful under a global climate change (Petropoulos et al. 2019).

2.4. SOCIO-ECONOMICAL

The use of local varieties provides a sovereignty on their food production to the small-scale farmers and their families (Ficiyan et al. 2018). The free access to the seeds, including the right to save and replant seeds, share them through informal seed exchange systems and breed new variants, is an important condition for small-scale farmers (Ficiyan et al. 2018). This in turn contributes to the empowerment of the most vulnerable groups (women and indigenous people) (Borelli et al. 2020). Since local crop varieties are often cultivated on more complex landscapes (hedgerows, riparian strips), they provide an additional source of food for the farmers besides the yield from their crop fields (Ficiyan et al. 2018).

Besides for food production, local crop varieties also provide the local community with clothing, shelter, medicine and the maintenance of soil and water conservation (Nan et al. 2021; Perez-Caselles et al. 2020). Finally, the local crop varieties supply a larger scale of available products stretched over a prolonged period of the year, with the sole dependence on local products adapted to the environmental conditions (Aguilera et al. 2020, Borelli et al. 2020). Last but not least, they improve the local biodiversity, increasing natural enemies and pollinator populations, and provide regulating ecosystem services (Ficiyan et al. 2018).



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