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Understanding agrobiodiversity

At a time when a growing world population needs to be fed on limited resources in a changing climate, the conservation and sustainable use of agricultural biological diversity gains utmost importance. Agrobiodiversity plays a crucial role in food security and nutrition, as well as in the provision of environmental services and livelihoods. It is critical to the sustainability, resilience and adaptability of agricultural production systems. To promote awareness and share knowledge on conservation and the sustainable use of agrobiodiversity, the Deutsche Gesellschaft für Internationale Zusammenarbeit (GIZ) GmbH, on behalf of the German Federal Ministry for Economic Cooperation and Development (BMZ), has published this series of agrobiodiversity factsheets.

The present factsheet presents the basics of agrobiodiversity – what it is, why it is important, what causes it to diminish and why this is happening so rapidly, how it can be developed, and its relation to traditional knowledge and local innovations. It also covers gender issues, the global and national governance of agrobiodiversity, *in situ* and *ex situ* conservation methods, and, finally, options for action for conservation and sustainable use of agrobiodiversity in development cooperation.

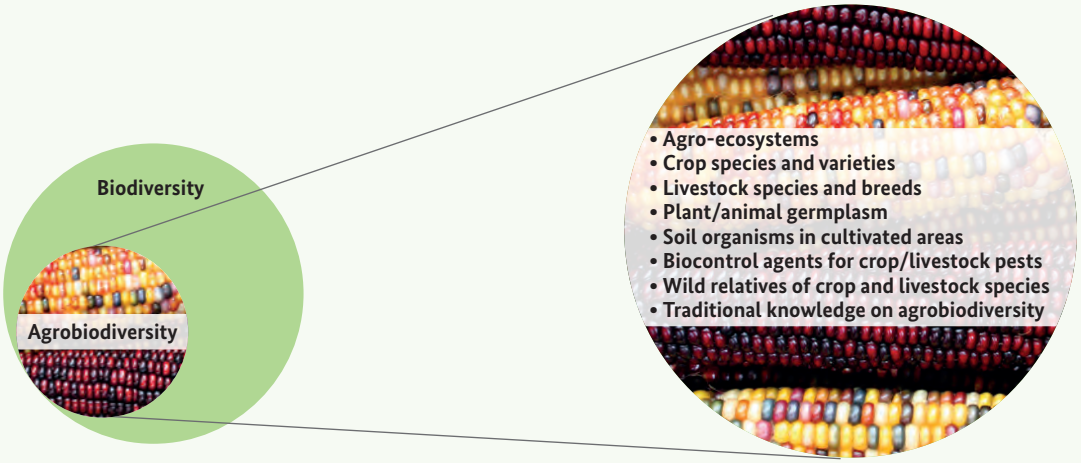
According to the Convention of Biodiversity (CBD), agrobiodiversity is comprised of four dimensions:

1. **Genetic resources for food and agriculture:**
   - Plant genetic resources, including crops, wild plants harvested and managed for food, trees on farms, pasture and rangeland species.
   - Animal genetic resources, including domesticated animals, wild animals hunted for food, wild and farmed fish and other aquatic organisms.
   - Microbial and fungal genetic resources.

   These constitute the main units of production in agriculture, and include cultivated and domesticated species, managed wild plants and animals, as well as wild relatives of cultivated and domesticated species.
2. **Components of biodiversity that support ecosystem services upon which agriculture is based** (Note: Ecosystem services are processes by which the environment produces benefits useful to people). These include a diverse range of organisms that contribute to nutrient cycling, pest and disease regulation, pollination, pollution and sediment regulation, maintenance of the hydrological cycle, erosion control, carbon sequestration and climate regulation.
3. **Abiotic factors**, such as local climatic and chemical factors and the physical structure and functioning of ecosystems, which have a determining effect on agrobiodiversity.
4. **Socio-economic and cultural factors.** Agrobiodiversity is largely shaped and maintained by human activities and management practices, and a large number of people depend on agrobiodiversity for sustainable livelihoods.

What is agrobiodiversity?

Agricultural biodiversity includes all components of biological diversity of relevance to food and agriculture, and all components of biological diversity that constitute the agricultural ecosystems: the variety and variability of animals, plants and micro-organisms, at the genetic, species and ecosystem levels, which are necessary to sustain key functions of the agro-ecosystem. Agrobiodiversity is the outcome of the interactions among genetic resources, the environment and the management systems and practices used by farmers and herders. It has developed over millennia, as a result of both natural selection and human interventions.



Agrobiodiversity is an important part of biodiversity

Adapted from: FAO, 2005

The Irish potato famine – a lack of genetic diversity

The Irish potato famine of 1846–1850 illustrates the importance of agrobiodiversity and a broad genetic base in agricultural production. During that time, the population of Ireland decreased by two million, or 25 %. One million died of starvation or diseases associated with the famine and one million emigrated to North America or parts of England. To this day, the country has never recovered its population levels of 1845.

What happened? People had mainly lived off subsistence farming and the potato was the country's most important staple food. But only two varieties were under cultivation. A potato disease broke out, potato late blight, caused by the fungus-like microorganism *Phytophthora infestans*. Because both potato varieties were susceptible to this disease, it was able to spread unhindered, wiping out large parts of the crop.

Sustainable Development Goals (SDGs) and (agro-)biodiversity

Several SDGs touch the issue of conservation and sustainable use of agrobiodiversity, such as:

- SDG 2: End hunger, achieve food security and improved nutrition and promote sustainable agriculture.
- SDG 12: Ensure sustainable consumption and production patterns.
- SDG 15: Protect, restore and promote sustainable use of terrestrial ecosystems, sustainably manage forests, combat desertification, and halt and reverse land degradation and halt biodiversity loss.

This last dimension includes traditional and local knowledge of agrobiodiversity, cultural factors and participatory processes, as well as tourism associated with agricultural landscapes.

Biodiversity means the diversity of life in all its forms, and agrobiodiversity is an important part of it (see diagram p. 1). Biodiversity is comprised of three crucial dimensions: genetic diversity, which is the diversity of different genes and/or genomes (in other words, the genetic variability within each species), species diversity, which is the diversity of different species, and the ecosystem diversity, which is the diversity of different ecosystems. The same categories are applicable to agrobiodiversity – genetic diversity within a certain agricultural species, species diversity between agricultural species, and agricultural ecosystem diversity between agricultural ecosystems.

How has agrobiodiversity developed?

Agrobiodiversity is the outcome of more than 10,000 years of efforts by farmers and herders in selection and breeding, and in developing appropriate production systems and methods. Farmers and herders all over the world have been constantly improving the genetic resources of their crops and livestock. The result is a diversity of crops and livestock adapted to local conditions. It is this diversity that has enabled people to settle in almost all the regions of the Earth and to provide food for themselves under even the harshest of conditions.

Our major crops and most livestock species have their origins in the tropics and subtropics. Scientists have identified at least twelve major geographic 'centres of diversity' – regions, or hotspots, that harbour a high percentage of plant, livestock, and cultural diversity. 'Centres of diversity' refer both to regions where crops and livestock were originally domesticated from their wild ancestors, and regions of subsequent spread where ongoing adaptation to their environment and selection by farmers and herders takes place. That is why a specific crop can be listed in more than one centre of diversity (see Seedmap). A map displaying the major centres of livestock domestication will be published in the FAO's Second Report on the State of the World's Animal Genetic Resources for Food and Agriculture in November 2015.

Traditional knowledge and local innovations

Closely associated to the development of local varieties and breeds is the development of related knowledge. Such traditional knowledge has been developed over the centuries and is a collective asset of the local communities; it is passed on from generation to generation in various forms. Just as local innovations have played a crucial role in the development of agricultural biodiversity in the past, farmers' and herders' current activities in domesticating wild species and in selecting and breeding plants and animals in view of changing conditions and new opportunities are still important. Whether to limit risk, enhance food security or improve their livelihoods, farmers and herders are constantly exploring new ways of using agrobiodiversity sustainably – they are innovating in order to increase their options to cope with variable environmental conditions and to exploit micro-environments (niches) in their agro-ecosystems. Such processes, local creativity and energies help to conserve and develop agrobiodiversity. At the global level, the International Treaty on Plant Genetic Resources for Food and Agriculture (ITPGRFA, see box page 5) recognizes farmers' traditional knowledge of plant genetic resources ('Farmers' Rights'). For further information, see Prolinnova (2009) and the following GIZ factsheets (Note: In the present text, GIZ factsheets, hyperlinked, are marked with ▸):

- *GIZ, 2009: Traditional knowledge relating to the conservation and sustainable use of biodiversity*
- *GIZ, 2010: The role of intellectual property rights in agriculture*

Links between cultural and biological diversity

Traditional local communities and indigenous peoples often have a profound understanding of their environment and its ecology. Such traditional knowledge – for example about the use of wild plants and animal products for food, medicine and dyes – is of importance to the conservation and sustainable use of agrobiodiversity. However, indigenous peoples suffer from the destruction of the environments in which they live. In line with this trend, the great wealth of traditional knowledge will disappear – it is lost to these peoples themselves and humanity as a whole.

Closely related to traditional knowledge and indigenous communities is the right to free, prior, and informed consent (FPIC) – the right of indigenous peoples to make free and informed choices about the development of their lands and resources. It is enshrined in the United Nations Declaration on the Rights of Indigenous Peoples (UNDRIP) and in ILO Convention 169. It ensures that indigenous peoples are not coerced or intimidated, that their consent is sought and freely given prior to the authorisation or start of any activities, that they have full information about the scope and impacts of any proposed developments, and that ultimately their choices to give or withhold consent are respected.

Gender and agrobiodiversity

Men and women play different roles in agrobiodiversity management and use. This is due to their different roles in production and reproduction. In most farming systems, there is a fixed division of labour. Men and women may be responsible for different crops or livestock species or for different tasks related to a crop or an animal. In many cases, for example, men plough the fields while women prepare the seedbeds with hoes. Weeding is often a task for women and children, while pesticide spraying or fertiliser application is mainly carried out by men. For harvesting, all available hands are needed. Home gardens are usually run by women. Men tend to focus on market-oriented cash crop production, while women are often responsible for the family's subsistence needs.

As family nutrition and health are in most cultures under the responsibility of women, their knowledge about related crop or animal product characteristics is often higher than that of men. They know better about issues such as taste, cooking characteristics, storability, and healing power.

Through their daily activities, experience and knowledge, women have a major stake in conserving agricultural biodiversity. In many countries, women are the custodians of agrobiodiversity. However, they are often limited in their decision-making power and access to and control over the resources that they rely on to meet their needs. Improvement of women farmers' access to land and water resources, and to education, advice, training, credit and appropriate services and technology as well as the decision-making structure is essential if agrobiodiversity conservation is to be improved.

- *GIZ, 2006: Women, men and agrobiodiversity*
- *GIZ, 2006: Gender – Gender relations and biodiversity*
- *GIZ, 2015: Gender and agrobiodiversity*

Gender and agrobiodiversity in Timor-Leste

The project 'Promotion of Sustainable Use of Agrobiodiversity' forms part of the BMZ-funded programme 'Sustainable Management of Agrobiodiversity in Timor-Leste' (2012 – 2016). It promotes the protection of biodiversity in agriculture by applying a gender-specific methodology (see GIZ, 2015). Sustainable use of local species, varieties, and landraces as well as the application of biodiversity-friendly farming practices are implemented whilst taking into account specific needs of women and men. A gender-based approach was chosen for the following reasons:

- To provide gender-segregated space for men and women, (a) to articulate needs and priorities, (b) to create selfconfidence, (c) to participate in decision-making and prioritize project activities.
- To include senior male and female farmers in order to appreciate their traditional knowledge regarding agrobiodiversity and pass it on to younger generations, e.g. the cultivation and use of ancient nutritious and climate-resilient crops such as job's tears *(Coix lacryma-jobi).*
- To allow both sexes to participate in and benefit from non-monetary effects of sustainable agrobiodiversity management (e.g. improved food security, balanced nutrition) and monetary impacts (e.g. value chain development of native species, such as wild mint, traditional rice varieties and the wild sugar palm).
- To create gender awareness at the project partners' level, leading to the provision of services and new technologies in a gender-balanced way.



Women play an important role in the conservation of agrobiodiversity.

Photos, l.t.r.: © GIZ, © Ilse Köhler-Rollefson, © GIZ/Ursula Meissner

Photo: © Christine Martins

Instead of analysing and improving the genetic potential of their local cattle breeds, many local governments focus on cross-breeding with Holstein-Friesian and other exotic high-performance breeds.

Present trends

In the last 100 years, agrobiodiversity losses have increased at an alarming rate and these losses are still increasing rapidly, especially in developing countries where agricultural biological diversity is often very rich. Throughout history, out of the estimated 250,000 plant species, about 7,000 have been used as food crops by humans. At present, only three of them, maize, rice and wheat, account for about 60 % of the calories and 56 % of the protein people derive from plants. Twelve crops together with five animal species provide most of the modern world's food. Besides general species diversity, the diversity within species – genetic diversity – is also reducing dramatically. Since the middle of the 20th century, the diversity of crop varieties is estimated to have declined by 75 %. In Mali, for example, 60 % of local varieties of sorghum have disappeared in one region over the last 20 years.

Similar trends are observed in farm animals. For example, the highly productive dairy breed Holstein-Friesian now makes up 60 % of European and 90 % of North American dairy cattle. Many developing countries are supporting cross-breeding programmes using Holstein-Friesian and other exotic high-performance breeds. The advantages of local breeds such as hardiness, disease resistance, and productivity even under difficult conditions are insufficiently explored and exploited. In many countries, local cattle breeds well adapted to their specific conditions are being replaced at a fast rate. With each breed going extinct, the genetic resources of this breed are inevitably lost for future breeding. In addition, the related traditional knowledge may be lost if the breed is extinct.

These losses of traditionally cultivated crop species and varieties as well as local animal breeds have many causes. Modernization and intensification, mechanization and monocultures, missing knowledge on and incentives for the conservation and sustainable use of agrobiodiversity, reduced access to genetic resources and their free use (intellectual property rights protection), and other processes of social and economic change all affect the agricultural biological diversity. In addition, social change – particularly the migration of male and younger people – often leads to a shortage of family labour, the loss of traditional knowledge of crop cultivation and livestock husbandry practices as well as of means for processing and utilization of products.

Another factor influencing agrobiodiversity is climate change. As production conditions change (temperature, rainfall, winds), crop varieties and breeds may be abandoned by farmers and livestock keepers, and may be lost forever if steps are not taken to ensure their conservation. In addition, extreme weather events such as floods and droughts pose an immediate threat to the survival of varieties and breeds that are raised only in specific small geographical areas and to crop wild relatives.

Agricultural policies and market conditions often focus exclusively on 'modern' varieties that dominate the market. The informal seed system in which farmers freely cultivate, exchange and further develop seeds is being increasingly affected by the commercial seed sector. The world's genetic resources are increasingly privatized. In addition, there is a growing market concentration in the commercial seed sector: today, three corporations control more than 50 % of the world's commercial seed market, leading to more uniform agricultural production, thus reducing agrobiodiversity.

Why is agrobiodiversity important?

Plant and animal genetic resources are the basis for the further development of crop varieties and animal breeds by farmers and breeders. The small farmers and herders of Africa, Asia and Latin America – and among them in particular women and marginalized groups – are especially dependent on the diversity of genetic resources. A rich diversity of native plant varieties and locally adapted animal breeds contributes to strengthening these farmers' and herders' resilience in the face of difficult climatic conditions and marginal locations, e.g. in arid or upland regions. Traditional crops and livestock breeds can be utilized with minimum agricultural input, have quality characteristics that correspond to local needs and, in addition, often play an important role in the culture of the rural population. In addition, agrobiodiversity can be the basis for the development of new products, such as it was in the case of stevia or quinoa, which have considerable market potential in the middle class in developing countries as well as in advanced economies.

Agricultural biodiversity provides environmental services (soil, water, habitat, and pollinators) and supports the sustainability and resilience of agricultural systems; it can provide a diverse and nutritious diet, contribute to health, and support the maintenance of traditional knowledge and cultural identity. Considering this, agrobiodiversity is a key asset to improve the livelihoods and productivity of poor smallholder

farmers. Of course, rich agrobiodiversity alone is not sufficient, but needs to be enhanced by other factors such as a supportive policy environment or well-functioning infrastructure. See also Bioversity International (2013).

Agrobiodiversity, with its abundance of local crop varieties and livestock breeds as well as crop and livestock wild relatives, hides many still-unknown genetic characteristics, which could be important for the survival of humankind. As the potential basis for new varieties and breeds, it could be our insurance for the future – it can help us to manage pests and diseases, climate change, nutrition and health. It is of especial importance for people dependent upon agriculture in marginal rural areas – see also FAO (2015) and

- *GIZ, 2001: Agrobiodiversity – Genetic resources for food and agriculture*
- *GIZ, 2006: Agrobiodiversity – the key to food security*
- *GIZ, 2013: Briefing Note Agrobiodiversity*
- *GIZ: 2015: Agrobiodiversity for survival*

Why agricultural biodiversity matters

1. Agricultural biodiversity is the foundation of agriculture.
2. Agricultural biodiversity can provide a cost-effective. way for farmers to manage pests and diseases.
3. Agricultural biodiversity gives farmers options to manage climate risks.
4. Agricultural biodiversity can contribute to health and nutrition.
5. Agricultural biodiversity can play a role in sustaining soil health, food and habitat for important pollinators and natural pest predators that are vital to agricultural production.
6. Traditional knowledge and culture is often based on local species diversity and its use.

Source: Biodiversity International

The global governance of agrobiodiversity

The Convention on Biological Diversity (CBD), hosted by the United Nations Environment Programme (UNEP), provides the global framework for the conservation and sustainable use of biodiversity. The CBD collaborates closely with the Food and Agriculture Organization of the United Nations (FAO) in the implementation of the CBD programme of work on agrobiodiversity. FAO's Commission on Genetic Resources for Food and Agriculture (CGRFA) is the only intergovernmental permanent forum for governments to discuss and negotiate matters specifically relevant to agrobiodiversity. It monitors the status of genetic resources for food and agriculture and takes action as appropriate, including through global action plans, codes of conduct and guidelines. FAO's International Treaty on Plant Genetic Resources for Food and Agriculture (ITPGRFA) ensures the continued global exchange of plant genetic resources essential to agriculture and food security.

In most countries, the Ministry of Environment is responsible for biodiversity, while the Ministry of Agriculture deals with agrobiodiversity. For agrobiodiversity research, Bioversity International has been set up under the Consultative Group on International Agricultural Research (CGIAR).

Information on important organisations dealing with plant and animal genetic resources for food and agriculture and on international agreements on agrobiodiversity is available in

- *GIZ, 2015: Agrobiodiversity – plant genetic resources*
- *GIZ, 2015: Agrobiodiversity – animal genetic resources*
- *GIZ, 2015: International agreements on agrobiodiversity*

The CBD

The Convention of Biological Diversity (CBD) is an international legally-binding treaty with three main goals: conservation of biodiversity; sustainable use of biodiversity; and the fair and equitable sharing of the benefits arising from the use of genetic resources. It was opened for signature at the Earth Summit in Rio de Janeiro on 5 June 1992 and entered into force on 29 December 1993. To date, there are 196 parties.

The ITPGRFA

The International Treaty on Plant Genetic Resources for Food and Agriculture (ITPGRFA) is a legally binding instrument adopted by the FAO Conference in 2001. It entered into force on 29 June 2004 and has at present 134 contracting parties. Member states are obliged to conserve their plant genetic resources for food and agriculture in accordance with the CBD, to ensure their sustainable use, and to share equitably the benefits arising from their use. The treaty recognizes 'Farmers' Rights': the traditional rights of farmers as producers, maintainers and developers of agrobiodiversity.

In situ or *ex situ* conservation?

Agrobiodiversity can be conserved *in situ* ('on site') or *ex situ* ('off site'), within or outside of the original habitat. *In situ* conservation is the conservation of agrobiodiversity in its area of origin, in the surroundings where the plants or animals have developed their distinctive properties. *Ex situ* conservation is the conservation of agrobiodiversity outside its area of origin, which can be done by maintaining live populations or by storing frozen genetic material; *in vivo* (alive) conservation is done in botanical or zoological gardens or on government-owned farms, *in vitro* ('in glass') conservation in gene banks, in the form of seeds, tissue, sperm, embryos, or somatic cells.

In situ and *ex situ* conservation are two different, but complementary approaches to agrobiodiversity conservation; each plays a distinct and important role. *In situ* conservation helps to guarantee the survival of a species in its natural habitat and

Photos: © Beate Quilitzsch-Schuchmann



Learning together in Farmer Field Schools in Timor-Leste.

allows it to adapt to a changing environment. *Ex situ* conservation preserves the genetic material in its present state and prevents extinction. Examples of *in situ* and *ex situ* conservation can be found in the 2015 GIZ factsheets on plant and on animal genetic resources mentioned above.

Conservation and sustainable use of agrobiodiversity – options for action in development cooperation

By ratifying the Convention on Biological Diversity (CBD), the parties commit to conserve biological diversity within their own country as well as to support other countries, in particular developing countries, to achieve the convention's objectives. Germany has assumed this task and assists its partners to implement the CBD through different development cooperation activities. Many projects deal with the protection of biodiversity in general and some have a component on agrobiodiversity; a few projects focus on agrobiodiversity (see BMZ and BMUB, 2014).

Key factors for the success of agrobiodiversity support measures are appropriate targeting of audiences, and a proper mix of activities and approaches. These can be generally divided into the three categories of: producers, consumers, and politicians; or 'field level', 'general public' and 'political level'.

Field level

Pilot activities in agrobiodiversity-rich areas for awareness-raising and capacity-building at field level should be based on a documentation of agrobiodiversity and traditional knowledge as well as village development plans developed in a participatory way, which include agrobiodiversity and other measures. Activities could comprise Farmer Field Schools for biodiversity-friendly farming, community seed banks, home gardens, and activities for awareness-raising such as village posters and project calendars, focussing on the local agricultural biodiversity. Seed fairs as well as livestock exhibitions and markets support the exchange of genetic material and highlight the importance of agrobiodiversity issues; they can be combined with providing information on improvement of local varieties and breeds and made more attractive by emphasising local culture. Other important considerations are the value-amelioration (valorisation) of under-utilized crop varieties or domestic animal breeds and inventing other incentives for conserving and using the local agrobiodiversity, such as payment for ecosystem services and other direct or indirect compensation payments, monetary or non-monetary.

General public

Public information, sensitisation and awareness-raising on the importance of agrobiodiversity are important for the conservation and the sustainable use of agrobiodiversity. Television films, campaigns, posters, articles, brochures, internet blogs/websites, as well as local competitions and exhibitions focussing on agrobiodiversity, may all be of use. The International Biodiversity Day, May 22, can be used for special campaigns focussing on agrobiodiversity. Incorporating agrobiodiversity into school and university curricula are further important steps for increasing public knowledge. In addition, agro-tourism can create awareness on agrobiodiversity. A good example for this is the BMZ-funded programme Conservation of Agrobiodiversity in rural Albania (CABRA) which combines the conservation of (agro-)biodiversity with the promotion of sustainable agriculture and tourism.

Farmer Field Schools

Farmer Field Schools (FFS) provide a perfect platform to enhance the sustainable use and conservation of agrobiodiversity. The approach is based on active participation of local female and male farmers. Instead of just transferring knowledge, FFS helps build skills and confidence. FFS members can share experience of agricultural production, traditional knowledge of biodiversity-friendly agricultural practices, improvement of local plant varieties, as well as the marketing of traditional agrobiodiversity crops.

Livestock Farmer Field Schools and Pastoralist Field Schools allow livestock farmers and pastoralists to improve their respective management skills – these are adjustments of the FFS approach as means of empowering livestock farmers and pastoralists to develop their own solutions to problems that research and extension could not provide answer for. See also FAO website and FAO (2014).

Conserving agrobiodiversity in P.R. China

From 2005 to 2011, funded by BMZ, EU and the Chinese Government, the Chinese Ministry of Agriculture and GIZ implemented a project on sustainable management of agrobiodiversity in mountain regions in Southern China. In 26 pilot villages, the status of agrobiodiversity, including related traditional knowledge, was assessed. Subsequent village-level activities for *in situ* conservation of agrobiodiversity were planned in a participatory way, with activities such as small habitat protection, training on biodiversity-friendly farming techniques in newly established Farmer Field Schools, improved seed maintenance, seed fairs, and developing a village-level code of conduct for agrobiodiversity management.

In addition, small rural infrastructure measures were planned as incentives or compensation. In order to provide economic returns on agrobiodiversity conservation, agrobiodiversity crops with economic potential were identified, their value chains analysed and areas for improvement highlighted and supported. Farmers' production and marketing skills were strengthened, cooperatives for agrobiodiversity products established and farmers supported to participate in food exhibitions such as the Shanghai BioFach to present their agrobiodiversity products.

Capacity-building at farmers' as well as at the institutional level was key to project success. Study tours to places significant to agrobiodiversity conservation proved an efficient means for transferring knowledge. Numerous project activities served to raise awareness, such as a project's documentary film broadcast by local television channels, a travelling exhibition, and various publications. Such measures also made agrobiodiversity knowledge more readily available and easily accessible. Project results were incorporated into government policies and plans, the establishment of new institutions was facilitated, and agrobiodiversity courses were introduced at universities. See also Waldmueller (2011) and Seib (2011).

Political level

The international resolutions and regulations on agrobiodiversity need to be translated at national level into laws, policies and implementing activities. In this, it is important to facilitate coherence among the various sectors – for example environment, agriculture, trade, education and health. Constraining factors, such as promotion of input-intensive agriculture through subsidies and use of high-yielding breeds at inappropriate locations, need to be identified and removed or reduced. Supportive policies need to be established considering the experiences made at field level. National seed laws should include the topic of Farmers' Rights, thus allowing farmers access to and use of genetic resources. Workshops, conferences, and national and international study trips on agrobiodiversity contribute to exchange, learning and networking. Locally adjusted training and awareness-building materials can enhance the capacity of politicians, officials and field staff. Other measures at political level are linking different stakeholders, for example, in multi-stakeholder platforms, and spreading success stories. At the international level, assistance for the conservation and sustainable use of agrobiodiversity is needed. The German government, for example, is participating at the international negotiations of the ITPGRFA and relevant commissions on agricultural genetic resources.

Outlook

The conservation and sustainable use of agrobiodiversity is essential for the survival of humankind. Besides its supporting role in risk-management for millions of smallholder farmers around the globe, assuring their survival and livelihood, agrobiodiversity holds important keys for the future adaptation of agriculture to a changing environment, especially in terms of climate and diseases. Greater genetic diversity contributes to reducing climatic and disease-related risks and increases resilience. The value of agrobiodiversity in agro-ecosystems needs to be unlocked – insufficient conservation of agrobiodiversity would be biting the hand that feeds us.

World food security depends on a broad genetic basis, supported by a smart combination of *in situ* and *ex situ* measures. Essential in agrobiodiversity management are the active involvement of the rural population in *in situ* conservation, considering the vital role of women in the conservation process, and adding economic value to products derived from agricultural genetic resources ('use it or lose it'). Key aspects are policy advice and legislation, capacity-building in governmental and non-governmental institutions, public awareness-creation, and supporting farmers in conserving and utilizing their genetic resources in an economically sustainable way.



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Photos: © GIZ

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A multi-level approach is needed, ranging from village interventions and capacity-building to providing policy advice and mainstreaming agrobiodiversity at local, national and international levels. Successful and sustained efforts will contribute substantially to the conservation and sustainable management of agrobiodiversity worldwide.

The main challenge for the agricultural sector is to simultaneously secure enough high-quality agricultural production for global food and nutrition security, conserve biodiversity and manage natural resources, as well as improve human health and wellbeing, especially for poor people in developing countries.

Important links

- Bioversity International: www.bioversityinternational.org
- Commission on Genetic Resources for Food and Agriculture: www.fao.org/nr/cgrfa/cgrfa-home/en
- Convention of Biological Diversity: www.cbd.int
- Sector Project Sustainable Agriculture (NAREN): www.giz.de/sustainable-agriculture

Further information

- Bioversity International, 2013: Diversifying food and diets: Using agricultural biodiversity to improve nutrition and health. www.bioversityinternational.org/uploads/tx_news/Diversifying_food_and_diets_1688_02.pdf
- BMZ and BMUB, 2014: Committed to Biodiversity – Germany's International Cooperation in Support of the Convention on Biological Diversity for Sustainable Development. www.bmz.de/en/publications/type_of_publication/information_flyer/information_brochures/Materialie238_Biodiversity.pdf
- FAO, 2015: Coping with climate change – the roles of genetic resources for food and agriculture. www.fao.org/3/a-i3866e.pdf
- Lossau, Annette von, and Qingsong Li (eds.), 2011: Sourcebook on Sustainable Agrobiodiversity Management. star-www.giz.de/dokumente/bib-2010/gtz2010-0834en-sustainable-agrobiodiversity.pdf
- Lossau, Annette von, and Johannes Kotschi, 2011: Agrobiodiversity – The key to food security and adaptation to climate change. www.giz.de/expertise/downloads/giz2011-en-agrobiodiv-food-security-a-climate-change.pdf

The GIZ Agrobiodiversity Factsheets

GIZ has updated its issue papers and factsheets on agrobiodiversity, which have been produced during the last 15 years, and has so far produced seven new factsheets on agrobiodiversity:

1. Understanding agrobiodiversity
2. Agrobiodiversity – plant genetic resources
3. Agrobiodiversity – animal genetic resources
4. International agreements on agrobiodiversity
5. Incentives for agrobiodiversity conservation
6. Adding value to agrobiodiversity
7. Agrobiodiversity for survival

The factsheets can be downloaded at www.giz.de/expertise/html/7358.html under 'Genetic Resources in Agriculture'.
A printed version of the folder with factsheets can be ordered at i-punkt@giz.de.

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