Agrobiodiversity

– an option for cushioning the consequences of HIV/Aids

Red ribbon. Photo: AVERT

HIV/Aids long ago reached the rural regions of the Third World – areas in which people's lives are characterised by poverty and the lack of development opportunities. The disease has further exacerbated this situation.

The region most affected by HIV/Aids is sub-Saharan Africa. Two-thirds of all those infected worldwide live here. The pandemic strikes at the vital core of these countries – at small-scale agriculture, the means of livelihood for two-thirds of the population of sub-Saharan Africa. The work-force is dying, agricultural production is declining, knowledge is being lost, poverty and hunger among the rural population is increasing. Because of the cost, drug treatment for all who are infected is a fantasy; only 17 percent of those in sub-Saharan Africa who need antiretroviral treatment actually receive it.

The existing agrobiodiversity and the associated indigenous knowledge provide an opportunity for improving the living conditions of the rural population affected by HIV/Aids. However, both genetic diversity and indigenous knowledge are subject to creeping erosion, which is being accelerated by Aids. Only a comprehensive and integrated approach can halt this loss and make use of agrobiodiversity to cushion the consequences of Aids in rural areas.

Agrobiodiversity and possible strategies for alleviating the effects of HIV/Aids in rural areas

Strategic Components	Goals	
Traditional, neglected and under-utilised plants	Nutrition/health	• Balanced and better nutrition • Optimal use of local plant and food resources • Support for women and perception of their significance in agriculture, food production and nutrition • Nutrition as "first aid" for AIDS sufferers • Basic health care with medicinal plants
Agricultural diversification	Agricultural labour	• labour-saving production methods, flexible labour input • Opportunities for labour-extensive agriculture • Optimisation, better distribution and use of labour
Home gardens	Economic security	• Low-input agriculture, lower costs of production, higher incomes • Better and wider alternatives to generate income and market produce • Sustainable agriculture: affordable fertilisers and plant protection • Access to local seed, therefore independence for farmers from bought-in seed
Wild-growing food plants	Conservation and maintenance of natural resources	• Better opportunities to cope with natural risks such as drought and plant deseases • Use of marginal land possible • Transfer of knowledge to children and adolescents • Participatory research, farmers as "scientists" • Maintenance of the basis to strengthen rural areas
Medicinal plants		
Local seed systems		
Animal husbandry and agropastoral systems		

(after Garí 2003)

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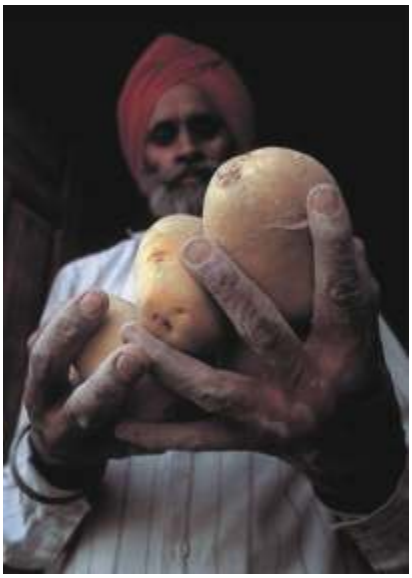

High mortality rates among HIV sufferers lead to a loss of traditional knowledge and place an additional burden on following generations.

Photo: Alejandro Balaguer/ CIP

Diversity a prerequisite for healthy nutrition

Species diversity provides rural households affected by Aids with the opportunity, using the right plant mixture, to both respond to the distinctive labour situation and ensure that all members of the family receive adequate and as far as possible balanced nutrition. Traditional, neglected or little-used plants are particularly suited to this purpose. They are adapted to the soil and climate, often require less work than "new" plants and varieties and – another important point – the women know how to use them.

African rice (*Oryza glaberrima*) is one such neglected food plant. It is adapted to a great range of biogeophysical conditions, has low labour requirements and a flexible planting time and is therefore suited as a relatively ready source of food. Another plant is amaranth: it contains plenty of protein and essential micronutrients such as calcium and vitamin A and also requires minimal labour. Onions, guava and cowpeas are also a source of vitamin A; furthermore, cowpeas provide calcium, folic acid and iron. All these plants are locally available, can be grown either in the field or in the home garden and require little or no expensive input such as fertilisers or pesticides.

With a varied and carefully chosen mixture of plants small farmers can make the best possible use of their land, minimise the risks posed by drought or plant diseases and secure the nutrition of their families. A diverse agricultural system with local and traditional species and varieties also improves farmers' seed security and renders them independent of bought-in seed (*see also the issue paper: "Agrobiodiversity and emergency response" in this series*).

As far as possible, extension services should therefore foster forms of agriculture that require little input but result in high yield. Households should be encouraged to grow plants containing all the necessary nutrients; families should keep poultry and other animals to provide a source of protein. The plants grown should have a short vegetation time as well as being affordable and easy to grow. Just as important as agricultural advice is nutritional advice, which helps to ensure that the produce of garden, field and pen is used in the best possible way. Only thus can nutrition be improved both qualitatively and quantitatively in the long term.

Good, healthy nutrition strengthens an infected person's immune system, supports the effect of Aids medication and thus enables those affected to lead a longer, more healthy and more productive life.

Chihali – diversity in the field

The Gogo are agropastoralists; their home is the Dodoma region of central Tanzania. The Aids rate here is very high – in some villages it is 25 percent. Households affected by the pandemic are particularly dependent on the traditional Chihali cultivation system. It is characterised by a great diversity of food plants and is very flexible with regard to labour input. Its unusual feature is the seed mix that the farmers sow. All the plant species are sown at the same time. The basic mixture consists of local varieties of pearl millet and sorghum, cowpeas and an additional type of bean as well as various cucurbitaceous plants. The first crops can be harvested a mere two months after sowing. The cultivation system is based on the local plant diversity and the indigenous knowledge of the farmers. The traditional plant mixture provides the family with a balanced range of nutrients and with food security even during the dry period. Studies have shown that the households affected by HIV/Aids reduce the area of land cultivated but nevertheless retain the Chihali system as the basis of their nutrition.

Medicine from nature

Wild-growing plants are even more important for traditional medicine than they are as a source of food. They can help to treat the concomitant infections to which those who are weakened by Aids are often subject. For example, various plants of the spurge genus can be used to treat herpes zoster; *Hydrocotyle manii*, an umbellifer, and *Priva cordifolia*, which belongs to the *Verbenaceae* family, are effective for diarrhoea.

Often, patients are closer to traditional healers, both geographically and culturally, than to academically trained doctors. While in Asia traditional and modern medicine complement each other to a degree, this is not yet common practice in Latin America and Africa.

Medication for Aids sufferers can decisively prolong people's lives and help keep whole families together. Photo: WHO

For example, with the support of the World Bank the governments of Zambia and Ghana are in the process of forging a link between health and the environment as part of the fight against HIV/Aids – in the form of an initiative for the conservation and sustainable use of biodiversity for medicinal purposes. The authorities are focusing on conservation, capacity building and communication. For example, training is being provided to traditional healers. The issues dealt with cover a wide range including changing behaviour with regard to HIV/Aids, the understanding of ecosystems, nutrition, toxicology, principles of virology and epidemiology, and immunology. Furthermore, traditional healers receive basic information on legal bases concerning their field of work and on human rights. The initiative is accompanied by newsletters, radio and television programmes, plays and leaflets. There is also a literacy programme, so that healers who were previously unable to read and write can register their patients and document their indigenous knowledge in writing.

Food from the wilderness

Wild-growing food plants are an important and moreover free source of food, particularly in drier areas. Members of households affected by Aids, especially children, are often dependent on blossoms, leaves, nuts, fruits, roots, fungi and on game to complement their diet. Food from the wild is often a good source of vitamins and minerals, which are essential for good nutrition and thus for health. Gathering these essential micronutrients wherever they can be found is an alternative for all those who do not have a garden. However, to avoid endangering species diversity, instruction in sustainable gathering methods needs to be provided. Gatherers must know that they must not uproot plants, as they would then not grow back – and there would then be nothing left to gather.

Of course no plant remedy can provide a cure for HIV/Aids, but with the judicious use of medicinal plants, the support of traditional medicine and a balanced diet it is nevertheless possible to treat concomitant infections and strengthen patients' immune systems.

Less knowledge, less species diversity

Indigenous knowledge plays a major role in the traditional agriculture of small farmers. Through working together children learn from their parents. HIV/Aids breaks this chain: because of the gender-specific division of labour and the associated knowledge in traditional agriculture (see also the Issue Paper "Women, men and agrobiodiversity" in this series), the surviving parent is often not in a position to pass on the missing knowledge to the children.

Aids accelerates the loss of indigenous knowledge and thus also the loss of biodiversity. This is the conclusion of numerous studies that have been carried out recently in the countries of sub-Saharan Africa.

Wild vegetables are an indispensable source of nutrients for families affected by HIV/Aids, since the time spent caring for family members makes it difficult to tend household gardens.

Photo: Guenay Ulutunçok

For example, a study of the FAO LinKS (Local Indigenous Knowledge Systems) project in the Chókwè district of southern Mozambique found that the effects of the disease on agriculture were already noticeable. These effects are felt in particular by the women. Households headed by a female cultivate significantly smaller fields than those headed by males, and they grow a smaller number of species. However, the women have more knowledge of traditional plants than the men, though this knowledge is not only gender-specific but also age-specific. While the majority of those over 45 could name at least one traditional variety of manioc, groundnut or cucurbitaceous plant, younger individuals had considerable difficulty doing so. It can be concluded from this that certain types of knowledge are only passed on to the younger generation when they have attained adulthood.

As the study also showed, households affected by the disease have only limited access to seed and the associated knowledge. According to the researchers this must be urgently changed, before the erosion of local knowledge undermines seed security and thus food security too.

Emergency sales diminish the genetic base of farm animals

Many families affected by Aids sell their livestock in order to pay for drugs or funeral costs. Often, too, the animals are slaughtered for funeral ceremonies.

Studies have shown that this disposal of farm animals can affect the genetic base of a breed – for example, if an entire village has only one breeding bull, as was frequently the case in Germany, too, even into the 1960s. The sale or slaughter of this bull has a direct effect on cattle breeding for everyone in the village. Gradual decimation of herds also has medium- and long-term effects on the farm ani-mal genetic resources of a community or a region, since it diminishes the stock of breeding animals and thus the genetic base. Furthermore, the knowledge of the animal keepers is lost, and this too has an effect on animal stocks. For example, in pastoralist communities the death of the "specialists" has led to the loss not only of indigenous vet-erinary knowledge but also of the expertise needed in the event of difficult births.

As yet, however, no detailed information is available on the extent to which HIV/Aids and the resulting emergency sales of animals have already had an effect, either at local or at national level, on individual farm animal breeds.

HIV/Aids as a cross-sectoral task in development cooperation work

Because HIV/Aids is not only a health problem, development agencies such as GTZ are adopting a multi-sectoral approach. Their aim is to identify and contain both the causes and effects of HIV/Aids. This means that in rural development interventions, the effect of the pandemic on agrobiodiversity must be acknowledged and the potential of agrobiodiversity in relation to HIV/Aids must be recognised and incorporated into relevant programmes. These programmes must in turn be linked to national HIV/Aids strategies, particularly to those designed for rural development. The most important strategies that are used in connection with HIV/ Aids measures are summarised in the box on page 1.

International and national development experts have the task of raising awareness and developing and implementing appropriate measures for tackling the disease and its effects.

The removal of gender inequalities in agricultural programmes has a preventive effect in the battle against the disease and against species loss. This is the only way to ensure that women have equal access to resources and can participate in all activities. Yet this often requires the adjustment of agricultural policies and programmes.

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- explain new concepts and issues relating to the topic of biological diversity,
- encourage and stimulate the mainstreaming of this topic within development cooperation projects and programmes.

We look forward to your suggestions and experiences so as to enable us to improve this series.

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Imprint

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Partnerships for agrobiodiversity

Devil's claw (*Harpagophytum procumbens*), Namibia. Photo: GTZ

Products from rare useful plants and animals whose preservation is at risk – so-called agrobiodiversity products – provide numerous opportunities for private industry. Marketing these products or otherwise promoting agricultural biological diversity enables companies to gain access to new groups of customers, make more profit and build up an image of being ecologically and socially responsible. At the same time, successful marketing gives the producers and breeders of such rare plant varieties and animal breeds an incentive to continue conserving them. This secures a rich gene pool which future generations will be able to draw on to continue developing and adapting agriculturally useful plants and animals to changing environmental conditions.

Development partnerships with industry

Very many different forms of cooperation are possible between private companies and development initiatives, institutions or programmes which support the sustainable use and marketing of agrobiodiversity.

GTZ provides various kinds of support for private companies operating in developing and newly industrialising countries. Companies interested in using and protecting agrobiodiversity in these countries are no exception. These development partnerships with private industry, or Public Private Partnerships (PPP), enable the public and private partners involved to combine their individual strengths. PPP projects are jointly planned, financed and implemented. The companies benefit from GTZ's contacts, experience and global network of experts, and at the same time their active involvement contributes towards achieving development policy objectives.

More than € 140 million have flowed into these projects so far. The public-sector contribution amounted on average to about 40 % (www.gtz.de/de/themen/uebergreifende-themen/ppp/2362.htm).

Advantages for the companies

A firm that has made or wishes to make the conservation of agrobiodiversity one of its company objectives can benefit from doing so:

- Agrobiodiversity products are innovative and new. Selling them opens up new markets, provides access to new groups of buyers and creates profit.
- For companies dependent on agrobiodiversity, conservation of the latter secures their resource base and future raw materials supply.
- A commitment to conserving (agro)biodiversity creates a positive social and ecological image.
- By committing itself to conserving agrobiodiversity a company can achieve its sustainability goals while also securing itself a marketing advantage.
- A positive image makes it easier to find well-trained employees.
- Investments in the protection of agrobiodiversity receive public support, as in the context of PPP projects, for example.

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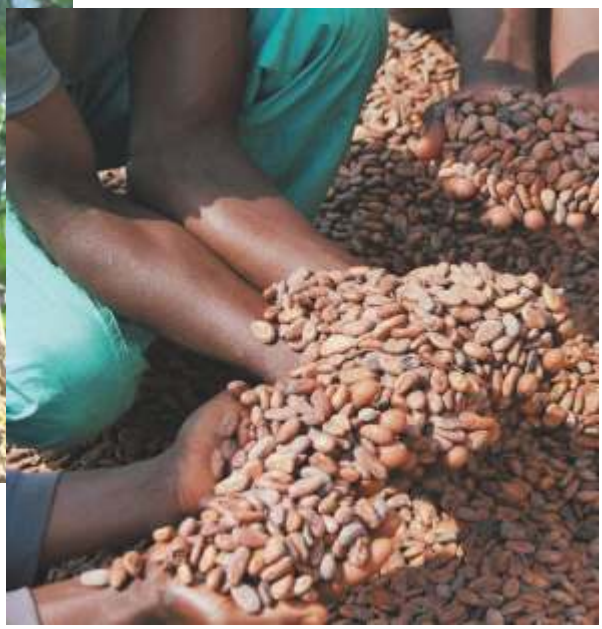

Cocoa production is a theme of promising Public Private Partnerships, for example in the Côte d'Ivoire or in Viet Nam. Photos: GTZ

Private companies and their potential for using agrobiodiversity

Fundamentally, any company can contribute something to the conservation of agrobiodiversity, such as using predominantly regional and seasonal produce in their works canteens or serving only fair trade coffee. And rather than having plane trees or robinias planted on the green spaces belonging to the company, old endangered fruit trees, such as the service tree (*Sorbus domestica L.*) or old species of cherry, could also be planted. This kind of activity gives companies above all a means of improving their image both internally and externally.

The companies that manufacture or trade in agrobiodiversity products have direct benefits from the use of agricultural diversity. There are various possibilities for this:

Development of new products

Little used agricultural species are often largely unknown. They offer the possibility of developing new products for various spheres – a unique opportunity for companies to create marketable produce for existing or new groups of consumers.

Integration of agrobiodiversity products into existing ranges

Companies that market foods, spices, oils, flavourings or starch, for example, have the opportunity to integrate biodiversity products directly into their product range. Large retail chains that have included fair trade and organic products in their range provide a role model for this. New products such as these improve the range of products on offer for existing customers and attract new ones.

As the number of markets for various agrobiodiversity products increases, so too does their importance for the conservation of agricultural biological diversity.

Awareness-raising and information for consumers

Retail companies can charge higher prices for biodiversity products if they raise their customers' awareness and inform them about the background of the products and their specific objectives. In doing this, they send a signal to consumers that they are environmentally aware and concerned about quality.

Responsible use

Companies that process large quantities of plant or animal raw materials from endangered varieties and breeds can cause farmers to switch to sustainable production methods by means of appropriate supply contracts. In the case of semi-wild species, sustainable use can ensure that stocks are not wiped out through overuse. This is also a way of helping to conserve diversity. Dealing responsibly with agricultural diversity can also be useful in marketing, creating a positive image in the general public sphere and among customers.

Benefit sharing

Private companies can contribute actively to the welfare of farmers by sharing benefits fairly by paying them a higher price for certain qualities, for example. Dealing with producers and suppliers in this way demonstrates an active commitment to agricultural diversity.

Fair and equitable benefit-sharing

The Convention on Biological Diversity and the International Treaty on Plant Genetic Resources for Food and Agriculture stipulate that the country of origin is to receive an appropriate share of the benefits arising from the economic use of genetic resources. This share can be monetary or non-monetary. Access to seeds or support for conserving seed and plant resources also counts as sharing benefits. On the basis of these rules, seed companies that obtain new varieties from genetic material, for example, are obliged to give the country of origin a share of the turnover from a product derived from genetic resources. Exactly how these approaches can be implemented is still a matter of trial and debate. Private industry can set a good example here and make clear its interest in the conservation of genetic resources. At the same time it can use its commitment to do so as a competitive advantage.

Examples of successful marketing of agrobiodiversity products

Agrobiodiversity products have become a taken-for-granted part of the range of international foods, especially in the organic sector; the range of products offered by the manufacturers of natural cosmetics and natural medicines would also be much the poorer without the diversity produced by small farmers around the world. There are now many examples of agrobiodiversity products being marketed successfully, including those that are worthwhile for both producers and marketers and that conserve diversity at the same time.

India:
Small local companies established in conservation area

On account of their great diversity of native plants the Biligiri Rangan Hills in the Indian state of Karnataka were declared a nature reserve in 1974. About 4,500 people live in 25 villages in this area. They belong to the Soliga ethnic group. They generate about half their income through the commercial use of plants that grow in the conservation area. These include the Indian gooseberry (*Phyllanthus emblica*), the soap nut (*Sapindus spp.*) and shikekai (*Acacia sinuata*). The latter contain saponins, which are a component of natural shampoos. These plants are endangered by overuse, as is the diversity of the other plants.

The local non-governmental organisation VGKK (Vivekananda Girijana Kalyana Kendra), in cooperation with the Biodiversity Conservation Network (BCN), the University of Massachusetts and the Tata Energy Institute, formed two local organisations and set up two companies to process various forest products. One company processes medicinal plants, the other foodstuffs and honey. The produce – vegetables in a sweet-sour brine, jams, honey and pumpkins – are sold in company-owned shops in Mysore and Bangalore, the two largest cities in the region. The companies also sell their products in the villages themselves. This has created jobs and increased the people's incomes.

South Africa: Devil's claw from agricultural production

Devil's claw (*Harpagophytum procumbens*) is a plant that grows only in southern Africa. Its root nodule contains active substances that help to ease rheumatic pain. It has been used by the local population for a long time. The growing demand worldwide for natural medicines in the last few years has not stopped at devil's claw, posing a threat to those that occur in the wild: the plants have been dug out whole from the soil, damaging the parent tuber and thereby reducing their natural ability to regenerate. It was obvious that measures aimed at the sustainable use of the plant were needed. These included improving the production, harvest, gathering and marketing of the plant. However, little was known about the ecology of devil's claw.

GTZ initiated a cooperative venture between a medium-sized German manufacturer of natural medicines, with 250 employees and an annual turnover of € 55 million, a 5,000-hectare commercial cattle farm in South Africa, and three villages, in which a total of 300 people earn their living collecting devil's claw. The Universities of Durban in South Africa and Münster in Germany looked into specific research issues. The goal of the company was to ensure a reliable supply of good quality raw material and the genetic improvement of devil's claw. The interest of the three villages and the farm was to preserve existing jobs, create new ones and earn extra income. The sustainable use of devil's claw was the common goal of all those involved, through improvements in production, harvesting, wild gathering and marketing.

GTZ financed a number of measures, such as training events for the farm workers in which they learnt how to handle the devil's claw nodule properly and with care.

Staff from Durban University received special training in the area of tissue culture and cloning, and the laboratories' capacity for analysis was improved. The villagers received instructions regarding the agricultural production of devil's claw and how to preserve the wild plants, while special collecting areas were also marked out. GTZ contributed a total of € 110,000 to this cooperative venture.

The cattle farm Avontuur provided experimental fields for growing the plant and permitted research to be done on the devil's claw plants that grow wild on the farm's land. A central collecting point for devil's claw was set up and managed by the farm. Münster University provided research equipment and scientific know-how for the tests on the farm. The German company contributed analytical instruments and software, know-how about the ecology and the processing of devil's claw, as well as expertise with regard to data analysis. The company also secured certification for the product and committed itself to purchasing a fixed amount at a price guaranteed by contract. The overall financial contribution of Münster University and of the company was € 125,000.

Within two years suitable procedures were developed for the agricultural production of devil's claw and the villagers were trained as professional producers. Now, not only do they produce the raw product, they also dry it, which brings an additional increase to their income. The quality of devil's claw produced on the farm has also improved, thanks to the training given to the technical staff. So far, only a small part of the population has benefited from the above measures. Efforts are currently being undertaken to increase the number of beneficiaries.

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Further improvements needed

The systematic and organised development and promotion of new biodiversity products has so far been limited to a few initiatives. There is generally little transparency surrounding the market for biodiversity products, patent rights for such products and benefit-sharing along the value chain.

Many agricultural biodiversity products are used traditionally, meaning that they have to be "discovered" and adapted to urban consumer habits in terms of their appearance, quality, taste and packaging if they are to be launched on new markets.

Further information:

BCNet:
http://www.worldwildlife.org/bsp/bcn/projects/ghats97_1.htm

Biotrade Facilitation Programme:
http://www.biotrade.org

Business and Biodiversity Resource Centre:
http://www.businessandbiodiversity.org

Centre for the Promotion of Imports from Developing Countries: http://www.cbi.nl/

Coalition for Environmentally Responsible Economics:
http://www.ceres.org

Danish Import Promotion Programme:
http://www.dipp.eu/en/linksen.aspx

Dr. Willmar Schwabe Group:
http://www.schwabe.de/content/wir/visionen/pflanzenforschung.php?navid=23

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GTZ/GFU: Value Chains for the Conservation of Biological Diversity for Food and Agriculture http://www.underutilized-species.org/record_details.asp?id=507

GTZ-PPP:
http://www.gtz.de/en/leistungsangebote/2362.htm

GTZ: ppp-buero@gtz.de

Intern. Petroleum Industry Environmental Conservation Association: http://www.ipieca.org

Swiss Import Promotion Programme:
http://www.osec.ch/osec/glossar-aw/sippo;internal&action=buildframes.action

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Value chains

and the conservation of biodiversity

Selling argan oil from small stalls – one of the many ways of marketing the valuable product from the argan tree. Photo: GTZ

It is crucial to conserve the diversity of useful plant varieties and animal breeds still in existence worldwide: this diversity forms the basis not only for the survival of small farmers in Africa, Asia and Latin America but also of the entire world's nutrition. Yet despite gene banks and plant nurseries, conservation is not guaranteed in the long term. This can best be achieved if farmers continue to use old varieties and breeds, even if they are not as productive or efficient as the modern ones, the reason being that they have other advantages, such as secure yields even in unfavourable conditions.

One way of improving farmers' incomes and thereby preserving biological diversity is to seek new opportunities – or indeed any at all – for selling products made from old plant varieties and breeds ("underutilised species"). It is also a means of reducing poverty and hunger. The term "biodiversity products" refers to products originating from local useful plants and animals that are very well adapted to local conditions, reflect traditional knowledge in terms of their development or processing, and are part of the local culture. Their particular characteristics and cultural connection make them suitable mainly for niche markets.

Value chains are helpful for planning

The individual stages from production, processing and marketing through to consumption are described as a value chain.

A value chain analyses activities, products and services during the individual stages of the process and does the same with regard to those involved, their relationships and power relations, as well as the exchange of information and knowledge that takes place between them. The value chain approach enables one to look beyond individual sectors and national boundaries at all the stages in the process and all those involved. If support measures are oriented early on towards the marketability of products, sales opportunities later on can be improved.

The marketing potential of a biodiversity product depends both on its characteristics and origin as well as on the type of value chain. To achieve a realistic assessment of the role played by the marketing of biodiversity products in the conservation of endangered varieties of useful plants and animals, it is necessary to know the characteristics both of the products and of the value chain.

The most important elements in a value chain and their impact on diversity

The most important elements of a value chain are:

- the original product,
- the number of producers and suppliers of the original product,
- the market power of the buyers (individual consumers or large buyers),
- the length of the value chain itself and
- the number of parallel value chains for an original product.

The original product

The starting point of a value chain may be an individual species or variety of plant or an animal breed, such as argan trees or grasscutters, or else it may consist of diverse varieties of a single species. The latter is the case with coffee and potatoes, for example. If the value chain develops only a limited amount of diversity – a single species in our example of the argan tree – then marketing the product will conserve only a comparatively small gene pool (see Diagram 1). In the case of Andean potatoes and Ethiopian

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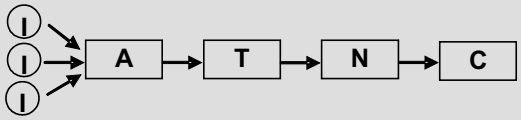
coffee, for example, a very large amount of genetic diversity is conserved, as can be seen in Diagram 2.

Diagram 1: Value chain with little genetic input

Diagram 2: Value chain with numerous varieties or species as genetic input

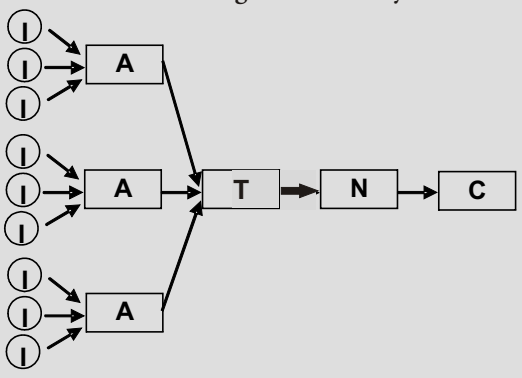


I genetic input
A agricultural production
T transformation
N trade
C consumption

Number of producers

Value chains supplied by many small producers (see Diagram 3) tend to be more helpful for the conservation of agrobiological diversity than those that are served by a few large farms. This is because subsistence farmers and small farmers use considerably more species and varieties than larger farms. The large number of small suppliers also indicates that a production sector is accessible to small producers as well as larger ones. When supplies come from larger farms this can be a sign that standardised qualities are necessary which can hardly be guaranteed by small farms, or that a bigger initial investment in equipment or know-how is necessary, which limits small farmers' access.

Diagram 3: Value chains with many small, non-specialised suppliers frequently use a large amount of genetic diversity



Market power of the buyers

Value chains that are determined one-sidedly by large buyers are frequently associated with disadvantages for the producers, who are forced to bow to the buyers' dictates. Coffee is an example of this. There are a few large coffee roasting companies on the buying side and numerous small coffee farmers on the producer side. Certain quality requirements and established standards on the part of the buyers can lead to a loss of diversity. However, if there are people in the companies on the buyer side who are open to new things, this is a constellation that provides an opportunity to integrate niche products in larger quantities into the mainstream market, such as premium or fair trade products in supermarkets.

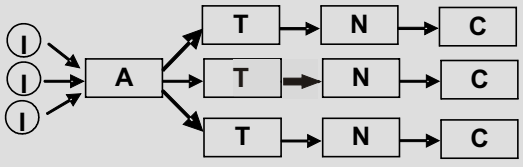
Length

The longer a value chain becomes, the more points there are at which support measures can be introduced. The number of actors increases, as does the complexity of the circumstances. This occurs in particular when a value chain extends over a large area across country borders. At the same time, long value chains open up new markets, customer groups and foreign know-how in production and processing. This can be at the expense of agrobiodiversity, if it is accompanied simultaneously by a large measure of standardisation of the end product. By contrast, short value chains, in which the original product goes directly from producer to consumer, are conducive to diversity.

Number of parallel value chains for an original product

Several parallel processing and/or marketing channels for one and the same product (see Diagram 4) make it easier to find a suitable marketing channel for biodiversity products – or to initiate another one – than if only one value chain exists. The various marketing channels facilitate both the purchase of different primary products as well as access to different groups of consumers. The use of argan oil as a cooking oil and in the manufacture of cosmetics is one example of this. The marketing of biodiversity can also occur outside the classical sectors of agriculture and nutrition, for example via tourism, as the establishment of a potato park in Peru demonstrates (*see issue paper: "Promoting the diversity of useful plants and animal breeds through marketing – the example of potato diversity in the Andes" in this series*).

Diagram 4: Value chain with several processing and marketing channels



This is how a value chain influences diversity

- The degree to which a value chain contributes to conserving agrobiodiversity depends on the diversity of the original product.
- The presence of many small producers in the value chain favours the conservation of agrobiodiversity.
- If a value chain is dominated by a few large buyers, this may have either a positive or a negative effect on the conservation of diversity, depending on their behaviour.
- Short value chains are more suitable for the conservation of agrobiodiversity than long ones.
- Several parallel value chains for an original product offer a better opportunity for opening up new markets for biodiversity products than is the case with only one value chain.

Which characteristics of biodiversity products make market access easier?

As is the case with many products, there are particular features of biodiversity products that make it easier to market them. The product's own history can make marketing easier, as can a striking name. For example, "wild" or "forest" coffee from the Ethiopian Highlands can be well utilized in advertising, as the names spark the consumers' imagination. Since this coffee also depends on the shade provided by the forests, every forest coffee drinker is simultaneously protecting the few remaining tropical mountain forests of Ethiopia with their natural coffee growth. This additional benefit of forest coffee can likewise be used for marketing purposes, as it opens up access to more groups of consumers.

Other biodiversity products possess special constituents that make them unique. This is often the case with vegetables, medicinal plants, spices and aromatic plants. It is also good for marketing if a plant grows in just one particular region, as the advertising can then be geared towards selling it as a product with a protected geographical origin. This is the case with the argan tree, for instance. It grows only in Morocco, so argan oil can only be obtained from this country (*see also issue paper: "Promoting the diversity of useful plants and animal breeds through marketing – the example of argan trees in Morocco"*).

The proportion of a biodiversity product contained in an item for sale also influences its marketability. In a medicine, for example, the amount of the biodiversity product may be so small that it is no longer noticeable to the consumer. In the case of forest coffee, 100 % of the end product consists of the biodiversity product, which makes it easier to see the connection between biological diversity and the pack of coffee in the supermarket.

Which supporting measures are especially suitable for developing the market for biodiversity products?

The analysis (GTZ 2006) of support measures implemented for the four biodiversity products forest coffee, Andean potatoes, grasscutters and argan oil showed that in every case it was important to organise the producers into production or marketing structures; this made it easier to tackle product development, to conduct an exchange of information and to train the farmers. Training included technical, organisational and business management courses, and in some cases basic education as well, such as literacy programmes.

All the programmes or projects developed an intensive strategy of innovation which stimulated cooperation with universities, encouraged the farmers to experiment with and develop practical solutions, and promoted an exchange of information among producers, researchers and experts.

In all four cases the producers were supported in the process of improving the quality and efficiency of their production. The certification and development of labels made the products more marketable. Networks between producers, traders and processors were built up in order to open up new (niche) markets. In addition, norms were created for the production process and for the products themselves, analytical capacity was built up for the purpose of monitoring these norms, legal hurdles were dismantled and property rights clarified.

What contribution can support measures for biodiversity products make towards reducing poverty and improving nutrition?

Measures aimed at improving the marketing of biodiversity products also offer an opportunity to improve the incomes and living conditions of what are usually poor small farming households. However, this does not happen automatically; it is dependent on various characteristics of the value chains:

- **The division of power (governance) within the value chain**

This may be concentrated so heavily around a few actors that they are able to dictate prices and procedures to the other actors. In this way, the profits accrue not to the households of the poor producers but rather at the level of processing or trading of the product.

- **Opportunities for access to the value chain**

The manufacture of new products usually requires start-up investment in equipment, buildings or education. Poor households can only join in if these initial costs are not too high or if they can be financed through loans or subsidies. Poor people frequently have only a low level of education, and this limits the use of complicated production or processing procedures.

- **The proportion of women among the beneficiaries**

Many poor households are headed by women. Since the division of labour in developing countries is very gender-specific, the participation of women in value chains depends on the kind of activities and products involved. Some activities are culturally inadmissible for women, and in other cases women have been later replaced by men, who took over the activity once it became clear that there was economic benefit to be had from it, as was partly the case, for example, with the highly profitable activity of grasscutter husbandry in West Africa.

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- encourage and stimulate the mainstreaming of this topic within development cooperation projects and programmes.

We look forward to your suggestions and experiences so as to enable us to improve this series.

Important parties involved in the sphere of marketing biodiversity products

The opening up of markets for biodiversity products is supported by various initiatives and institutions. The Biotrade Facilitation Programme (BTFP) of UNCTAD (United Nations Conference on Trade and Development) promotes contacts between suppliers of biodiversity products in developing countries and buyers in the European Union (EU) via a business to business (B2B) programme. The programme cooperates with the Centre for the Promotion of Imports from Developing Countries (CBI), which also helps to forge contacts in addition to offering market information, help with product development and training measures. BTFP also supports the regional Amazon and Andean BioTrade Programmes as well as several national programmes.

Further support for (biodiversity) products from developing countries occurs through national programmes run by the industrialised countries. The Swiss Import Promotion Programme (SIPPO) provides assistance for initiatives in more than a dozen countries. The Danish Import Promotion Programme (DIPP) provides market information, and on its website there are numerous links to support programmes in other countries (http://www.dipp.eu/en/linksen.aspx). In Germany the PPP office at GTZ supports partnerships between private companies and initiatives in developing countries in order, among other things, to improve the marketing of biodiversity products.

Further information:

CBI: http://www.cbi.nl/?pag=59

DIPP: http://www.dipp.eu/en/about.aspx

GTZ: http://www2.gtz.de/agrobiodiv/index.html

GTZ: ppp-buero@gtz.de

GTZ and GFU (2006): Value Chains for the Conservation of Biological Diversity for Food and Agriculture. Potatoes in the Andes, Ethiopian Coffee, Argan Oil from Morocco and Grasscutters in West Africa.

SIPPO: http://www.sippo.ch/

Stamm et al. (2006): Strengthening value chains in Sri Lanka's agribusiness.

UNCTAD: http://www.unctad.org/Templates/Page.asp?intItemID=3791&lang=1

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Promoting the diversity of useful plants and animal breeds through marketing

The example of argan trees in Morocco

Ideally suited for an arid climate, the argan tree is a vital source of shade and provides conditions allowing other vegetation to grow. Photo: GTZ

The argan or ironwood tree (*Argania spinosa*) has grown for more than two million years in Morocco. It grows in no other location in the world than here, in the Arganeraie region on the slopes of the Atlas mountains. The tree's extensive root system allows it to thrive in this hot and arid area while at the same time permitting the little rainwater that falls to percolate into the soil. This makes it possible for cereals and fodder grass to grow in the shade of the argan trees, as well as numerous medicinal and aromatic plants collected by local people. Uses of the tree are highly diverse. The hard wood serves as firewood and building material and for charcoal-making, the leaves and shoots provide animal fodder, while the fruit contains a very hard nut with two to three seeds yielding highly valuable argan oil. The oil contains more than 80 percent unsaturated fatty acids and the Vitamins A and E. Argan oil is used traditionally as edible oil, as a treatment for the skin and hair and for wounds, and to alleviate rheumatism and arteriosclerosis.

Most of the present argan forests have belonged to the state and municipalities for about one hundred years. A use right introduced in 1925, however, gives the local population heritable individual or collective rights to graze the forests, to engage in arable farming, to harvest the fruits and to extract wood, stones and sand.

Argan tree stands have been at risk due to arable farming, land clearance for building purposes and infrastructure, private extraction of firewood and timber for various purposes, and imbalanced use of the trees for fodder. This has weakened the natural regenerative capacity of the dwindling stands, and the flora and fauna have become increasingly impoverished.

Today, some 8000 square kilometres of argan tree stands remain in south-western Morocco, an area about ten times the size of Berlin. Between 4,000 and 25,000 trees grow on one square kilometre. The argan forests play an important role in efforts to combat desertification in Morocco, and GTZ is supporting a nature conservation project to that end.

The roughly two million people living in the Arganeraie region are the direct and indirect beneficiaries of the trees.

Argan oil value chains

It is important to distinguish between two value chains on the basis of major differences in the type of oil extraction involved. One is the manual pressing chain, the other the mechanical pressing chain. The manual process, which yields less product, is used in rural areas where the nuts are collected, while the machine-aided process is used in urban areas.

Hand-pressed argan oil

Traditionally, the fruit of the argan tree is collected, dried and stored by families holding use rights. Some families collect up to six tons per season, others just a few hundred kilograms.

The first processing step is to remove the soft pulp, and then to crack the nut in such a way that the seeds (kernels) it contains suffer as little damage as possible. This is important in order to achieve a better price on the market. To improve the aroma, the kernels are then gently roasted and finally ground in a stone rotary quern. The resulting oily paste is constantly kneaded and lukewarm water added in order to drive out the oil. The remaining fruit pulp and oilcake are valued as high-grade livestock fodder; the nutshells are used as firing material to roast the kernels. The raw oil is filtered and filled into bottles. Some of this is used by the families themselves, but most of it is

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sold on local markets or directly to urban consumers and small traders at prices between three and eight euros per litre. The small traders, in turn, market the product as edible or cosmetic oil or themselves process it to make natural medicines. Urban customers as well as tourists are key customers of the traders, paying 50 € and more per litre of oil.

The manual production of argan oil is almost exclusively women's work. Production is organised either within a family or in cooperatives with 50 to 60 women. Such co-operatives were founded for the first time in the mid-1990s with GTZ support. Since then, most of the women's cooperatives have amalgamated to form associations such as the Union of Women's Cooperatives of the Arganeraie (UCFA: *Union des Coopératives des Femmes de l'Arganeraie*) which organise marketing. In contrast to the individual cooperatives, UCFA, with its modern filtering and filling facilities, is able to supply oil of higher quality that is standardised and packaged ready for the market, and can safeguard regular analyses and quality checks of larger batches. UCFA supplies national retail chains as well as individual traders, and is also an important exporter. Its local brand Tissaliwine fetches a price of about 20 € per litre, from which the individual cooperatives receive twelve euros immediately; moreover, they receive a share of the profits that are distributed at the end of the year. Since 2004 UCFA has had a German marketing company operating as its distribution partner for Europe. The hand-pressed oil is sold in Europe as an anti-cholesteremic product to health-conscious consumers, gourmets and upmarket restaurants with the "organic" label or with claims such as "functional" or "slow food".

Mechanically-pressed argan oil

Mechanised argan oil production began about ten years ago. Today there are already at least 16 private oil mills, which take over a large proportion of the time-consuming manual labour with their peeling systems, roasting units and mechanised presses. With support from abroad, operations in ten women's cooperatives have also been semi-mechanised. Young women and men with professional training work in the oil mills. The private mills and the semi-mechanised cooperatives are not located in the actual production areas, but in urban areas and on the main tourism routes – close to the consumers.

The private mills and the semi-mechanised cooperatives have led to the emergence of two new markets: one for kernels to supply the mills, and a further for dried fruit to supply the semi-mechanised cooperatives. The rural families continue to perform the gathering, drying and storage of fruit, and, in the case of the kernel market, the cracking of the nuts. The latter is performed by specialised co-

Like manual processing, which is done almost exclusively by women, pressing by machine offers employment for women. Photo: GTZ

operatives (*Coopératives de Concassage*) which have formed since 2004 all over the Arganeraie region upon the initiative of Ibn-Al-Bheitar, a non-governmental organisation, the aim being to retain as many processing stages as possible – and the associated income – in the rural regions.

The mechanical production process extracts edible oil from roasted kernels, and oil for cosmetics and food supplements from unroasted kernels. Mechanical pressing yields greater quantities of oil and the oil keeps better. This makes it easier to export it as edible oil. Monitoring nut quality is more difficult than in the manual production process, as origins are more difficult to trace. Mechanically-produced oil is basically cheaper than its hand-pressed counterpart.

In addition to edible oil, the large private mills also produce cosmetic products and natural remedies. It is estimated that the private entrepreneurs market twice as much oil, via the formal Moroccan market, as the co-operatives; they supply large retail and hotel chains, individual dealers, duty-free shops and airlines. Both the private oil mills and the cooperatives make an important contribution to generating employment and income.

Measures to promote production and marketing

National and international research institutes have been studying the argan tree since the 1970s: Its physiology and production biology are now known, as are the composition and properties of the oil. The research findings, however, have mainly served scientific purposes alone and have led to national researchers patenting constituent substances. The population has benefited little from the findings.

There are 2-3 kernels inside the hard shell of the argan nut which contain valuable oil. Much effort is required to extract this oil.
Photos: GTZ

Since the early 1990s, various international donors such as GTZ or the EU, as well as NGOs such as the Mohammed V Foundation and Oxfam, have been promoting the production and marketing of argan oil – so, too, has the Moroccan government.

The *Projet de Conservation et de Développement de l'Arganeraie* (PCDA), carried out by GTZ from 1995 to 2002, developed a framework plan for recognition of the region as a UNESCO Biosphere Reserve, which was granted in 1998. The implementation plan supported the production of hand-pressed argan oil because of the reduction of environmental and resource pressures that this entails. The establishment of village development associations involving both men and women was supported, as was the formation of women's cooperatives. The latter received further support from an EU project, from the Mohammed V Foundation and from various non-governmental organisations and state bodies.

Three types of women's cooperatives have emerged:

- Cooperatives located in the main collection areas; these produce hand-pressed argan oil themselves from the material harvested by their members.
- 'Semi-mechanised cooperatives' in the wider urban setting; these produce mechanically-pressed argan oil, procuring the fruit or kernels both from their members and from peeling cooperatives (*Coopératives de Concassage*).
- Peeling cooperatives; these are women's cooperatives in the main collection areas which remove the pulp from the nuts supplied by their members, crack the nuts and supply the kernels extracted from the nuts to the semi-mechanised cooperatives.

The members of the these various cooperatives have received literacy courses, organisational and business management training, and practically oriented courses on technical topics such as the planting and management of trees, low-impact harvesting, product quality, quality and hygiene standards, and workflow organisation. It has been critical to the success of these training activities that the courses fitted into the women's daily schedule and were carried out by local female trainers. The hand-pressing women's cooperatives received containers, sacks and small materials on a grant basis, while the semi-mechanised cooperatives received peeling and roasting machines, presses, filters and filling equipment.

Five years after UCFA – the first amalgamation of cooperatives – was established, the National Association of Women's Cooperatives in the Arganeraie (ANCA: *Association Nationale des Coopératives d'Arganeraie*) was launched as an umbrella association in 2004. ANCA represents the interests of its member cooperatives at national level. Not all cooperatives have yet joined, however.

In addition to supporting the cooperatives, the projects have also provided assistance to the state bodies concerned with argan oil production, national marketing and export. These bodies were advised on the elaboration of a product standard for argan oil, on the formulation of laws concerning protected designations of geographical origin, and on organic production standards (EC Organic Farming Ordinance).

Results achieved by the measures

The framework plan for establishment of the Arganeraie Biosphere Reserve led to the designation of state argan tree stands in a process involving the local population. Both state-run and private tree nurseries now offer a considerably larger volume of argan seedlings, which indicates increased demand for young trees and more extensive new plantings.

The number of women's cooperatives concerned with argan oil production and the number of their members is rising steadily. At present some 70 cooperatives are recognised; in addition to UCFA, three further associations of cooperatives have formed. These associations have gained political influence and are involved in the process of developing product standards for protected designations of origin.

The quantity of oil produced has risen considerably. While in 2002 the 13 cooperatives organised within UCFA produced 500 litres per month, that figure had already risen to 3000 three years later. More than 90 percent of this oil is exported to Europe under the terms of a company partnership. Within Morocco, the cooperatives can market their edible oil at 20 to 40 euros per litre,

Argan oil can be used in many different ways: as a cooking or cosmetic oil, as a dietary supplement or as a medicine. Photo: GTZ

while oil from the private mills fetches a lower price, as it is less sought after than the hand-pressed variety. The increased market value has led to higher returns, thus improving the income of cooperatives and their members.

At household level, argan oil production secures a workflow that is distributed evenly throughout the year and assures a regular income. It is estimated that rural households in the remote collection areas derive up to 60 percent of their income from argan oil production. For women, this is often the only source of income. When the kernels are pressed by hand and the oil is marketed by the women themselves, they retain a larger proportion of the value created. As this proportion remains in rural areas, it makes an important contribution to reducing poverty. A further result of the increased economic interest in argan trees is that fewer trees are felled or, where this happens, new trees are planted to replace them.

While this integration into the market clearly has many benefits, its further intensification presents a risk that the cultural development services rendered by traditional producers of argan oil will not be rewarded sufficiently. Products based on argan oil are increasingly being traded as innovations by individual marketers, who seek to protect them under patent law and charge licence fees. The local population has no share in the benefits thus gained. This does not meet the standards of international agreements such as the Convention on Biological Diversity (CBD) or the International Treaty on Plant Genetic Resources for Food and Agriculture adopted in 2001. Both treaties call for a fair and equitable sharing of the benefits arising from the use of genetic resources. Practical implementation of these agreements has been insufficient until now, as illustrated once again by this example. It will be important in future to take care that benefits are shared equitably among all stakeholders (*see also the issue paper on the "International Treaty on Plant Genetic Resources for Food and Agriculture", GTZ 2004*).

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Promoting the diversity of useful plants and animal breeds through marketing

The example of potato diversity in the Andes

There are around 4000 different varieties of potatoes worldwide. Photo: CIP

Only a few varieties of potatoes make up the vast majority of those produced in the world today. The only place where an unequalled diversity of varieties is being cultivated and used is the potato's place of origin, the Andes region of South America. It is estimated that there are approximately 4000 potato varieties worldwide, and of these more than 2000 are cultivated in the Peruvian Andes alone. The Andes varieties are red, blue or black; only a few have yellow or white flesh. The come in a wide range of sizes and irregular shapes. This diversity is a gene reservoir of inestimable value for global food security. But there has been a dramatic decline in the cultivation of traditional varieties over the past few decades, and many are on the verge of disappearing. And some can no longer be found outside of gene banks.

Our potatoes have little in common with those from the Andes region. Even today, most of the local varieties being used there are bitter, and contain substances that cannot be tolerated by the body, so they need to be pretreated before being eaten.

The traditional value chain – producing chuño and tunta

To produce *chuño*, which are freeze-dried potatoes, the bitter potatoes are left to freeze at night for several days, and then they are sun-dried during the day. *Tunta* is made by adding moisture during this process, which results in even better removal of the bitter agents. The end products are not only tasty and popular, they also keep for months. Both products are consumed largely by those who produce them, and, since they are dried products, they can be easily transported and treated.

Buyers buy the bitter potatoes prepared as described from farmers and then sell them, sometimes through brokers, to wholesalers and retailers. From there they get to end consumers. To make *chuño* or *tunta*, potatoes need to be cleaned and sorted. This is done by the farmers, buyers or merchants. Suppliers of seed potatoes, fertilizer and pesticides are located upstream of potato production in the supply chain. Some links in this chain be skipped over. For example, the farmers can produce their own seed potatoes or organic fertilizer, or they can sell their processed *chuño* or *tunta* directly to retailers.

A study done by Fundación PROINPA (Foundation for the Promotion and Research of Andean Projects) estimates that in the Bolivian highlands around 5600 family farms produce more than 5000 tons of *chuño* and *tunta* at a value of approximately USD 3.3 million annually. That translates into around USD 550 per family. In Peru, the amount produced is likely even a bit higher. *Chuño* and *tunta* production is therefore very economically significant for the Andes region and it is closely inked to preserving potato biodiversity.

The diversity of varieties, farming techniques, processing and food traditions make the potato both a staple food and a cultural artefact for rural populations. Accordingly, there are a variety of approaches for promoting traditional potato production and for preserving genetic biodiversity, which traditionally has been done by saving seed stock in gene banks and research institutions. But, increasingly, market-oriented approaches are also being developed.

Measures for promoting production and commercialisation

The traditional way to boost production has been improving the efficiency and productivity of cultivation, processing and storage. Virus-free seed stock, better plant protection and better fertilisation improve potato productivity. But farmers can only afford the increased costs associated with these measures if they can get higher market prices. So an objective of these types of measures is to ad-

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just the potatoes and potato product offerings to better meet demand. Networking producers with processors and producing a product of theoretically higher quality helps increase farmers' income, but these measures do not always also help preserve agrobiodiversity, as the following examples show.

The development of single-variety quality potatoes

In Bolivia, there are only 13 varieties of potatoes sold commercially, but small farmers are familiar with, and cultivate, hundreds of potato varieties. This contradiction can be explained by the fact that bulk potatoes are usually only available as a mixture of varieties, so a commercial "variety" necessarily consists of more than one biological variety. Neither consumers nor processors can distinguish all the varieties, which is why consumers are happy to pay more if they can get potatoes of uniform quality instead of a mixture of varieties of uncertain quality.

With support from the International Potato Centre (*Centro Internacional de la Papa, CIP*), single-variety potatoes packed in bags as part of the *Papa Andina* project have become established as a brand. They single-variety potatoes are either packed in 50 kg sacks for the wholesale trade or sold as *t' ika papa* in consumer-friendly pack sizes by the country's largest supermarket chain. However, this type of marketing only works for around 20 varieties of "non-bitter" potatoes.

So, while this approach boosts the incomes of a limited group of small farmers who have favourable farming conditions, it does little to preserve potato biodiversity.

Access to industrial potato processing

The producers of potato chips and french fries are very particular about potato shape and make-up, but they pay higher prices which is why *Papa Andina* put a lot of effort into helping small farmers get access to this market. By improving plant protection, organising farmers, and establishing a governing body for small-scale producers and industry representatives, farmers from several villages were able to get supply contracts. However, they had to limit themselves to two varieties of potatoes, which reduced the biodiversity of potatoes being cultivated. Moreover, the larger farmers with more favourable production conditions had the advantage here, too, while industry was only interested in production from small farmers as a way to cover periods of increased demand.

Presentation of *chuño* as a typical Bolivian product at a trade fair.
Photo: GTZ

The *T' ika Papa Initiative* connects small farmers from the Andes with new urban markets. Photo: André Devaux/CIP

The concentration in the value chain on several processors and highly standardised end products has a negative effect on potato biodiversity.

Development of new product lines for small farmers

So, *Papa Andina* developed entirely new products that are produced solely by small farmers: multi-coloured potato chips, and *chuño* and *tunta* as branded products.

Multi-coloured potato chips

The newly developed multi-coloured *Jalca Chips* are a mixture of around 30 different-coloured potato varieties put together by a processing and export company and sold in appropriate packaging as an high-end specialty food, for example at the airport in Lima.

Sales volumes are still extremely small, but by developing this product *Papa Andina* was able to create another value chain. Now there is a market for some potato varieties that previously had had no commercial viability outside of their region of origin.

Chuño and tunta produced by small farmers sold as a premium branded product

A similar approach was taken for the development of marketable *chuño* and *tunta*, which are sold in supermarkets under the brand names *La Llaveña* and *Chuño Blanco*. By maintaining recognised hygiene standards during processing and having appropriate packaging, premium branded products were developed that appeal to a new

group of buyers and garner higher prices. This is particularly interesting in terms of agrobiodiversity since these products represent one of the few ways to profit economically from bitter potatoes.

The development of these products has noticeably changed the value chain's structure. Originally, the cultivation and processing was done by farmer-run businesses, which sold the *chuño* and *tunta* directly, or via brokers, to consumers. The many and diverse parallel commercial relationships made it possible for there to be a range of product qualities and varieties used.

With the new branded products, though, all goods are being funnelled into one location where they are processed. This means, in this case only, that the products are sorted according to strict quality criteria and then packaged. While previously a range of product qualities were offered to consumers, now there is only one quality. This standardised product is sold along with the traditional mixtures so that consumers still have the same selection they are used to.

Though, for the *chuño* and *tunta* branded products only a few dozen varieties are used and not, as with traditional production, hundreds. Again, this is to the detriment of the biodiversity of potatoes under cultivation. Like the multi-coloured potato chips, the new, packaged *chuño* and *tunta* products appeal to a new group of buyers.

Lengthening the value chain by adding new consumers and market niches with higher prices provides farmers with an opportunity to preserve at the varieties used for these products and to earn higher incomes.

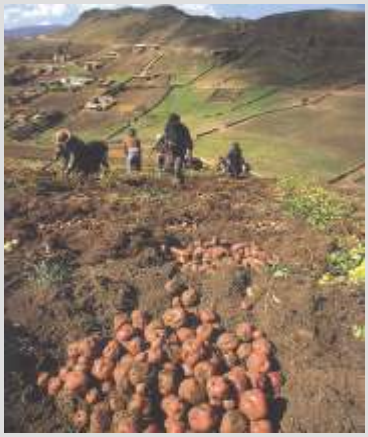
The Peruvian potato park

At the heart of the potato's area of origin in Peru, six Quechua villages banded together to create the *Parque de la Papa*, the potato park. Its objective is to preserve the landscape and the traditional way of life of the inhabitants. In this region around 1,200 different potato varieties are identified by name and used. A typical family farm grows 250 to 300 potato varieties. The park is being used not only to help preserve this astounding biodiversity, but also to re-introduce varieties to the region that have already disappeared. An agreement was signed with the International Potato Centre (CIP) for re-introducing 206 potato varieties. Reforestation and improving nutritional practices went hand in hand with the agricultural activities.

Its current status as a protected area, the development of agrotourism, a visitor centre with a potato show and restaurant, better commercialisation thanks to storage options and the selling of potato mixtures at the country's largest supermarket chain should ensure the continued existence of the project.

The establishment of the *Parque de la Papa* introduced new components to the existing value chain. The farmers are helped by scientists, who give them healthy seed stock of old potato varieties. Research institutions provided materials to help marketing efforts and to inform visitors and consumers. Tourists who eat at the restaurants in the villages and go on the guided tours are buying additional products or services from the farmers, which increases their income and, ultimately, helps preserve the old varieties.

But the additional sales opportunities in the park itself are not the only important thing. Agrotourism, official commemorative days (such as Potato Day, which is celebrated on May 30), exhibits of varieties and cooking contests increase awareness among producers and consumers alike about the significance of the potato and its biodiversity.



Potato harvest in Peru. Photo: CIP

Traditional potato production was long seen as backward and uninteresting, but today there is a greater understanding of the necessity of preserving the potato and its associated cultural traditions. This awareness increases the marketing opportunities for potatoes and potato products, whose properties now better appreciated.

The establishment of the potato park also changed the legal situation and formalised existing cooperative agreements. An agreement signed by the six communities and the International Potato Centre sent an important message. Among other things the institute's gene bank gave certain varieties with all associated rights back to the farmers. The agreement is intended to ensure that the old potato varieties and knowledge associated with them remain available to the indigenous population in perpetuity. For their parts, the farmers agreed to help preserve these varieties.

Non-commercialisation measures

Market-oriented approaches can increase the income of small farmers, and they can also preserve biodiversity, at least to some degree, as is shown by the example of multi-coloured potato chips and the high-quality *chuño* and *tunta*. Exclusively endangered, rarer potato varieties are used to produce these products, so premium market opportunities were developed, although only for a few dozen varieties. Measured based on the overall biodiversity of agricultural plant varieties or animal species that need to be protected, market-oriented approaches almost always tend to decrease diversity on the market, and therefore they also reduce the diversity of cultivated plants or production animals.

To raise public awareness of the value and significance of agrobiodiversity and maintaining it, more is needed than marketing support. One successful example is the Peruvian potato park (*see box overleaf*).

The consequences of these measures

In addition to the effects of the individual measures described above, it is clear that while all of the projects are using very innovative approaches, none has had a big economic impact yet. The sponsored initiatives have not been able to be consolidated to the point that they could survive on the free market without support. The number of farmers whose incomes went up is still low. To be truly viable in the marketplace, additional outside support is necessary, for example technical and administrative consulting and quality management.

The first preliminary market successes should not mislead us into thinking that a significant percentage of potato varieties can be preserved through long-term support of gene banks and subsidised farming alone.

The potato is the most important crop in Peru's agricultural sector. Annual per capita consumption of potatoes stands at around 63 kg and is rising. Photo: GTZ

The Issue Paper series "People, Food and Biodiversity" aims to:

- stimulate an interest in the conservation and sustainable use of biological diversity,
- present quickly and clearly concrete actions and experiences,
- explain new concepts and issues relating to the topic of biological diversity,
- encourage and stimulate the mainstreaming of this topic within development cooperation projects and programmes.

We look forward to your suggestions and experiences so as to enable us to improve this series.

Further information:

GTZ and **GFU** (2006): Value Chains for the Conservation of Biological Diversity for Food and Agriculture. Potatoes in the Andes, Ethiopian Coffee, Argan Oil from Morocco and Grasscutters in West Africa.

Asociación Andes: www.andes.org.pe

Papa Andina project: papandina.cip.cgiar.org

CIP: www.cipotato.org.

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