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Changing markets in a globalised world

Photo: J. Boethling

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Editorial

Dear Reader,

Markets play a crucial role for rural households. This is where they sell their goods as producers, can keep informed about prices and innovations, communicate their experiences with other farmers and procure the agricultural inputs they need. Also, markets cover their food and consumption requirements. But in addition, rural markets perform numerous other key functions ranging from identity forming and cultural blending to the development of social groups and political associations (pages 6–7).

However, many rural households face difficulties in accessing these markets and cannot use them to meet their needs, including the enhancement of their food security. Why is this the case? One essential aspect is that agricultural and food markets have changed significantly over the past decades. With the introduction of marketing reforms from the mid 1980s on, governments in most countries of the developing world started to withdraw from agricultural marketing and left the field to private-sector intermediaries. However, the policy and institutional frameworks of this period have since proved more of a hindrance than a support in market development – e.g. through restrictive legislation on farmer group registration or excessive licensing requirements for traders. Especially in scarcely populated, remote areas with weak infrastructure, this has strongly slowed down the development of functioning markets (page 8). But the efforts of numerous institutions to promote the development of intra-regional markets have also met with failure owing to policy obstacles at national level, such as the introduction of export restrictions or certificates not being recognised (pages 16–17).

The impact of globalisation has resulted in changes in market structures, too. Modern value chains have been developed with a high degree of integration and institutionalised relations among participants, enabling them to have a say what food is grown in what way. Moreover, the advent of supermarkets and processed food has changed the production, storage and distribution of food, which is forcing many countries to reconsider the organisation of the entire supply chain, as our example from India shows (pages 18–21).

The above changes mean that small-scale farmers are facing huge challenges. Owing to their distance from the markets, just like the buyers, they are confronted with high transaction and transportation costs, while the lack of storage facilities restricts their flexibility in price negotiations. Often, both when selling their produce and when procuring inputs, they are dependent on traders who only turn up sporadically, so that negotiating at eye level is not possible. Usually, they lack the assets, skills and information as well as the necessary degree of organisation to fulfil e.g. the quantity and quality standards of modern value chains or supermarket systems. Often enough, integration in corresponding contract farming systems has resulted in their being degraded to mere farm labourers.

Participating in modern marketing schemes as warehouse receipt systems could facilitate better access to markets and, simultaneously, to urgently needed assets (pages 12–15). However, smallholders can only be sustainably integrated in them if they are well-organised. The same applies to niche markets in which they are generating value added thanks to the special quality of their products, e.g., as our example from Peru shows, by making profitable use of their native biological resources (pages 22–24). Inclusive business models seeking a close integration of the private sector at different levels of the marketing chain (see also pages 9–11) are aimed at creating eye-level partnerships. However, integration in high-value markets can always only offer prospects for a small share of smallholders und small-scale enterprises; for the majority, participating in traditional supply chains that are frequently established in the informal sector will continue to dominate. This sector must not be forgotten in international co-operation, our author maintains (pages 28–29).

Market-related aspects and their significance for food security are also at the centre of our other articles. For example, the University of Liberia has examined whether the government is complying with its own provisions on transparency and participation in allocating land to foreign investors. Students at the Centre for Rural Development, Berlin, have taken a look at the prospects of microfinance systems in the Democratic Republic of the Congo and the potential that farmer field schools bear regarding improvements in the food situation of a post-conflict country like South Sudan. Finally, the International Livestock Research Institute (ILRI) presents its experience with market-oriented development interventions based on the watershed resources gradient in northern Ethiopia.

As always, you will find recommended further reading following the contributions on our website **www.rural21.com**.

Wishing you happy reading,

Silvia Richter

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Forests and trees – essential for global food security

Forests provide an estimated one billion people globally with nutritious foods. Their products are consumed directly by people living in and around forests and are also sold, generating income for rural populations. However, forests and their resources are rarely incorporated into development strategies. It was against this background that the UN Food and Agriculture Organization (FAO) in partnership with the Centre for International Forestry Research (CIFOR), the World Agroforestry Centre (ICRAF), the World Bank and Bioversity International organised the first "International Conference on Forests for Food Security and Nutrition" mid May 2013. 400 experts from 100 countries discussed the complex role forests, agroforestry systems and even individual trees can play for food security.

At the conference opening, the new FAO study "Edible insects: Future prospects for food and feed security" was presented, emphasising the importance of one of the primary sources of nutritious and high-protein food from the forest – edible insects. Insects are part of traditional nutrition for some two billion people worldwide. Gathering or breeding and marketing insects provide both jobs and income.

The three-day conference offered a rich selection of papers, discussions, publications, side events and opportunities for networking on all aspects of the topic of food security and nutrition through resources from the forest ecosystem.

A conference statement emphasised the direct and indirect benefits that forests, trees outside forests and agroforestry systems bring for food security and nutrition for millions of people worldwide. Direct benefits include consumption and sale of products harvested in forests and the animals hunted there, and indirect benefits take the form of jobs and income opportunities, biodiversity and ecosystem services.

Besides the importance of 'forest foods' (leaves, seeds, nuts, honey, fruit, mushrooms, insects and other forest creatures), the forest ecosystem also plays an enormous role as a source of fodder and firewood. 2.6 billion people rely on firewood and charcoal for cooking. The traditional knowledge of indigenous peoples and other local communities has priceless value for worldwide food security and nutrition, and strengthens the resistance of communities to the impacts of climate change and social transformation.

The neglected resource

Over-utilisation of resources, soil degradation, lack of land use planning, inadequate intersectoral coordination between ministries and incorporation into national development strategies were identified as the most important challenges and bottlenecks. Often, there is little investment in research, and data is not available to generate effective policy decision-making. Inefficient technologies in the use of wood as an energy source in particular can lead to health problems for users, particularly women and children worldwide, and high levels of emissions.

Secure titles to land and regulations which secure use rights and access to trees are especially important. The Voluntary Guidelines of the Committee on World Food Security for Responsible Governance of Tenure of Land, Fisheries and Forests are a good beginning. All this offers agricultural producers additional incentives for investment. However, it also requires microfinance systems for small and medium-sized enterprises (SMEs).

More qualified and better paid jobs in the forestry sector would also be significant to make working conditions more attractive. SMEs have high potential here, and can be particularly interesting as a source of jobs for women.

The conference closed with a number of recommendations. They include broader partnership between the various parties involved, consistent application of the voluntary guidelines mentioned above, establishing strong structures in rural areas, strengthening women's rights, improved use of the knowledge of local populations, and also establishing and strengthening producer cooperatives.

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Photo: FAO/G. Napolitano

Opening session of the conference held at FAO headquarters in Rome.

How volatile are African food prices?

It is almost universally accepted that food prices in developing countries have become more volatile in recent years, particularly in the African region. However, few if any empirical studies have examined recent trends and patterns in food price volatility in the region. Therefore, Nicolas Minot, Senior Research Fellow at the International Food Policy Research Institute (IFPRI), asked whether or not price instability intensified in African countries in the years following the food crisis of 2007–2008. The analysis considered the prices for ten staple foods: beans, bread, cooking oil, cowpeas, maize, millet, rice, sorghum, teff, and wheat and studied the shifts in 67 prices in eleven countries from January 2003 to December 2010.

Minot's research yielded some unexpected results. While it was indeed the case that volatility in the international markets ramped up since 2007, he found no evidence to support the claim of a similar volatility surge in the African markets during the same time period. Though volatility of maize and rice prices increased in some countries, for the majority of commodities, volatility substantially decreased or held constant.

And, it turns out, all crops weren't created equal: Processed foods, such as bread, and cooking oil offered the most stable prices. Drought-resistant crops, such as rice, and wheat, and tradable crops such as teff and millet also appeared to be insulated from price dips and spikes, and larger cities fared better than smaller. Perhaps most surprising was the finding that price volatility was actually highest in countries such as Kenya, Malawi, Zambia, and Zimbabwe where governments have attempted to stabilise prices by buying and selling staple crops, such as maize. This surprising result may be explained by the uncertainty that government purchases and sales introduce into local grain markets.

So what does this mean for food policy moving forward? First and foremost, the study raises questions about the effectiveness of government food price stabilisation programmes, and suggests that policymakers should prioritise productivity-increasing investments over stabilisation programmes. "Food price volatility remains an issue, but it is arguably no more of an issue now than it was before the global food crisis of 2007–2008," wrote Minot in the study. That's not to say volatility is not a concern, however, particularly because price jolts are considerably more severe and frequent in African countries than in the international market. The study emphasised the importance of access to information on crop stocks and prices as well as a continued commitment to social safety-net programmes to assist the most vulnerable when prices spike. *(IFPRI/wi)*

Sustainable bioenergy for rural development

Bioenergy could be an engine for rural development and poverty reduction if sustainable criteria and food security aspects were respected. With these words, Stephan Schmitz of the German Federal Ministry for Economic Cooperation and Development, summarised the discussions at the Policy Forum on "Opportunities for Sustainable Bioenergy Development: National Experiences and Global Exchange", in Berlin in late May. The Forum took place by invitation of the German Government, at the outset of two meetings oft the Global Bioenergy Partnership (GBEP), which was founded by the G8+5 Group in 2005.

At the Policy Forum, together with representatives of politics, business and civil society, members of the Global Bioenergy Partnership discussed how the production of bioenergy could contribute to improving income for the rural population without harming scarce resources such as land and water, destroying forests or jeopardising food security while recognising land rights.

Olivier Dubois, Bioenergy expert at the UN Food and Agriculture Organization (FAO) stressed that a sound and integrated approach was required in order to promote both "food and fuel", and ensure that bioenergy contributed to sustainable development. Dubois referred to the FAO Support Package to Decision-Making for Sustainable Bioenergy that had been developed over recent years in collaboration with partners such as GBEP. This support package includes different elements which can be used independently or together at different stages within decision-making and monitoring processes of bioenergy development.

In addition, the task force of GBEP released the "Global Bioenergy Partnership Sustainability Indicators for Bioenergy" in December 2011. These indicators are now being implemented by member states such as Mozambique, Indonesia, and Ghana. At the Forum in Berlin, representatives of these countries reported on initial outcomes. *(wi)*

For detailed information:

➤ **www.rural21.com**

➤ **www.globalbioenergy.org**

Why markets matter

Rural markets are important traditional institutional frameworks which perform a number of key functions in rural societies. Our author presents the major ones in Nigeria.

A rural market (also referred to as a 'farmers' market') is one of many varieties of systems, institutions, procedures, social relations and infrastructures whereby parties engage in exchange. While parties may exchange goods and services by barter, most rural markets in Nigeria rely on sellers offering their goods or services (including labour) in exchange for money from buyers. The rural market is a physical retail market featuring foods sold directly by farmers and farmers' wives to consumers and wholesalers/aggregators from the urban centres. Typically, it consists of booths, tables or stands, outdoors or indoors, where farmers sell fruits, vegetables, meats, and sometimes prepared foods and beverages. Rural markets can be classified on the basis of their periodicity, namely: daily markets, special markets, and periodic markets. The periodic markets take place regularly on one or more fixed days each week or month and are characteristics of smaller/rural market centres.

According to Braun et al. (1998), arrangement of rural markets over space takes into cognizance the distribution of population and settlement, degree of mobility of traders and buyers, and local variations in productive capacity and resource endowment. This space-time arrangement of periodic markets ensures a premium return from waiting for demand and supply of goods and services. Rural markets exist worldwide and reflect the local culture and economy of a particular community. The reflection of the local culture sometimes determines the location and the name of a rural market. Thus, "The King's Market" is often located near a king's palace. The sizes of rural markets range from a few stalls to several blocks of stalls. In some cultures, live animals, imported, locally unavailable delicacies and personal goods and crafts are sold.

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Functions of rural markets in Nigeria

The rural markets in Nigeria are rarely static entities. They tend to change and evolve depending on the needs of the buyers and sellers participating in them, the nature of competitive forces, and the availability of technology.

Rural marketing is sometimes simply thought of as the process of buying and selling. In reality however, its tasks are much more extensive than this. Basically, the significance of periodic markets is pivoted on a diversity of functions performed out of which the economic, social and political functions have been identified as the major ones.

Economic functions. The economic function can be explained under three major sub-functions which are:

Exchange functions: This involves finding a buyer or a seller, negotiating a price and transferring ownership. These functions take place at the physical meeting point for buyers and sellers (market), at the point of production or via some other means of communication. At this point, formal or informal property rights are important to ensure the reliable transfer of ownership and to guarantee legality (e.g. to ensure that animals on sale were not stolen and will not be reclaimed). The performance of this exchange function often involves 'interesting' bargaining (haggling), the mode of which varies from one culture to the other. A participant in a rural market must understand the mode of transactions to operate optimally in the market.

Physical functions: This enables the actual flow of commodities through space and time from producer to consumer and their transformation to a form desirable to the consumer. Assembling or concentrating the product at convenient points allows its economical transport (e.g. yams from different owners are aggregated in a particular point for joint transportation). Storage allows the commodity to be held until peak season demand, thereby stabilising supply. Processing adds value by transforming the commodity into the products desired by the consumers. Grading and standardisation allow the consumer to be more confident of the

characteristics of the good being purchased. Most rural markets in Nigeria perform these functions, and in the process, they link the rural with the urban economy. On the market days, agricultural products are aggregated, sorted/graded and minimally cleaned (for grains). Little or no storage function is performed in the rural markets. Thus, agricultural products that are not sold by the close of the market day, for markets that are not daily, are sold out at giveaway prices, otherwise they will gradually rot away.

Financing and risk-bearing: These are two important facilitating functions performed by rural markets. The owner of goods at any marketing stage must sacrifice the opportunity to use the working capital needed to buy those goods elsewhere. Or the owner must borrow that capital. In either case, capital must be provided by the trader or by some lending source. There is also an implicit cost in the risk of losing all or part of that capital through theft, spoilage, mortality or changing market conditions. Rural market women (aggregators) who often act as intermediaries between farmers and other buyers must provide the capital to aggregate products and bear the risk of spoilage and/or theft. In Nigeria's rural market, spoilage is a major cost because of poor handling and/or storage facilities for fresh agricultural products. Without the willingness to provide the capital and to bear these costs, no stage of the market chain could function.

Photo: J. Boethling

Market day in a village in Mali.

Social functions. Apart from the economic functions, rural markets help maintain important social ties, linking rural and urban populations and even close neighbours in mutually rewarding exchange. Also, buying at markets encourages attention to the surrounding area and ongoing activities. By providing outlets for 'local' products, rural markets help create distinction and uniqueness, which can increase pride and encourage visitors to return. The Nigerian rural markets are points of cultural mix in which people of different tribes come together from the different parts of the country to interact. The Hausa kolanut buyers come from Northern Nigeria to aggregate kolanuts in the southern markets while the Yoruba yam wholesalers travel to Northern Nigeria to aggregate yams that are later transported to the southern markets. Rural markets therefore create the framework for cultural blending in Nigeria, a nation with great cultural diversity.

Rural markets also provide opportunities to meet neighbours while getting the required household food supplies. They serve as focal points of rural interactions where people can meet and form social groups and associations. In Nigerian society, traders such as yam sellers, garri sellers, etc. form trade/social groupings. These groupings support members socially, combining efforts to celebrate weddings, burials, etc.

Political functions. In a typical Nigerian rural market setting, social groups and associations formed basically for socio-cultural benefits in the rural communities also serve as strong units/groups of political associations that are mostly relevant during electioneering campaigns and the election of political office holders. These market groups, which come in different forms, such as market women associations, yam sellers' associations, etc., are organised into structures that are headed by formally recognised leaders or traditional chiefs in the community (e.g. Iyaloja – leader of market women).

Market groups were at the forefront of resistance to colonial rule protesting against some obnoxious impositions by the colonial administration. It is also on record that Egba market women led by the late Mrs. Funmilayo Rnsome Kuti rejected a flat rate tax for women and forced the Alake (traditional ruler) of Egbaland to abdicate in1948. In Lagos, market women worked closely with the early nationalists, especially the great Herbert Macaulay, who encouraged them to form a central organisation under the leadership of Madam Alimotu Pelewura in 1923. The current (female and male) leaderships of the market operators in Nigeria have been active players in Nigerian politics. Although they usually do not seek public offices, successive administrations have used them to mobilise market groups to support their various programmes.

Conclusion

Rural markets, otherwise called farmers' markets in Nigeria, are important traditional institutional frameworks which perform a number of key economic, social and political functions in Nigerian society. The economic functions are similar to those of other markets in other parts of the world while the social functions are influenced by the traditional socio-cultural settings in the Nigerian society. The political functions are historical and have their roots in the nation's colonial past and its resistance to colonial rule.

New marketing structures: new chances, new risks

Market liberalisation in the 1980/90s brought about fundamental changes to marketing structures in Africa, creating new opportunities but also, often, making it more difficult for smallholders to access markets.

Prior to the late 1970s to early 1980s, the state dominated agricultural marketing systems in most African countries. State-owned grain marketing companies were the main channels through which grains were marketed. Co-operatives were promoted as intermediaries in the marketing chain, distributing inputs, bulking produce and marketing to the parastatal marketing boards. The state owned storage infrastructure and facilities for assembling produce in very remote locations. Pan-territorial and pan-seasonal pricing policies were adopted, often with little or no regard for significant differences in the cost of assembling produce from different regions. Formal grades and standards were enforced at farmgate (by the co-operatives) and other levels in the state-controlled marketing system, in most cases with state-owned milling companies dominating the formal end-user segment of the chain.

The state-controlled marketing systems offered some level of certainty with regard to output marketing channels, producer prices (often announced prior to the harvest), and grain quality. However, by the beginning of the 1980s, it had become apparent in most countries that the fiscal burden of maintaining this marketing model could not be sustained. Furthermore, producer prices tended to decline in real terms as governments were often reluctant to adjust prices, especially when it meant requiring the more vocal urban consumers to pay more. Consequently, many African and other developing countries carried out major reforms in grain output markets. Marketing boards were either abolished or their role was scaled back substantially. In many cases, this process also involved the abolition of grading standards as informal, private traders emerged as dominant players in the grain trade. State involvement in setting grain prices was largely abandoned, and public financing of grain trading was substantially scaled back.

Mixed outcomes

More than two decades after these reforms, the overall outcome remains rather mixed. Scaling back the role of the state in grain marketing lowered the fiscal burden. Huge losses incurred by the parastatal marketing boards as well as their considerable financing requirements for grain procurement was reduced. In addition, pressure to subsidise grain prices was eased. The increased space for private sector involvement in grain trading opened up livelihood opportunities for micro and small-scale traders – with pro-poor benefits, especially in countries such as Ghana where women play a preeminent role in assembling produce at the farmgate. The emergence of a more competitive marketing system also led to lower marketing margins, often benefitting urban consumers.

Photo: FAO/G. Napolitano

Price negotiations with a vendor of corn seeds.

Despite these gains, inefficiencies in the grain output marketing systems persisted or were even accentuated. For instance, the involvement of large numbers of micro and small-scale traders as assemblers and retailers has made supply chains longer, squeezing producer margins. Farmers' organisations such as co-operatives have been marginalised in their role as assemblers. Furthermore, poor rural road infrastructure contributes to the high cost of assembling grain in the surplus-producing communities – the parastatal marketing boards used to absorb these costs and sometimes invested in rural roads and appropriate transport facilities. Access to markets became more uncertain for many smallholder farmers after liberalisation. This is partly because most of the assemblers are severely under-capitalised and unable to absorb large volumes of surplus at the peak of the harvest. Furthermore, limited access to finance for consumption smoothing often compels farm households to sell the bulk of their grain during the harvest season. Consequently, farmgate prices for grains tend to be depressed during the harvest and often pick up a couple of months later.

The abolition of state-guaranteed pan-territorial/pan-seasonal pricing exposed smallholder farmers to high price risks with little or no mitigation mechanisms. Their bargaining position tends to be weakened by a lack of market information and also by their limited ability to meet household consumption needs without selling their produce – even if prices are extremely low. Already facing the challenge of yield uncertainty given Africa's predominantly rainfed agriculture, their increased vulnerability to price risk has only made them even less attractive to formal lenders as borrowers. This does not, however, have to remain gloomy. The new challenges which have stymied the emergence of efficient and rewarding grain marketing systems in Africa can be overcome if innovative market-supporting institutions such as warehouse receipt systems are developed (see also article on pages 12–15).

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A boost for inclusive farmer-trader relationships

Representing 30 per cent of Ghana's formal trade in maize, the Techiman market serves as the main cereals trade platform within the country and the sub-region. However, its role in the region's economic development is threatened by several shortcomings. The Municipal Assembly and the Techiman traders have therefore launched an innovative public-private initiative to upgrade the maize market infrastructure.

As Ghana's most widely consumed staple crop, maize accounts for 50–60 per cent of the country's overall cereal production and contributes significantly to food security and rural incomes. While involving about 1.6 million largely small-scale producers, a considerable workforce is also employed and income generated at the upstream and downstream ends of the value chain. Even if per capita consumption (except subsistence) is set to decrease due to changing consumption patterns of the rapidly growing middle-class urban population, aggregate human consumption of white maize is likely to remain stable with population growth offsetting shifting demand trends. But rising industry demand for the production of starch, grits, flour, fermented dough and animal feed (yellow maize) will contribute to an overall growth rate in demand of an estimated 2.6 per cent per year. Furthermore, Ghana holds the potential of becoming a breadbasket for neighbouring Sahel countries.

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It is against this background that maize has been selected as one of the strategic commodities for support under the Government of Ghana Food and Agriculture Sector Development Policy (FASDEP II) that frames the country's obligations under the Comprehensive Africa Agriculture Development Programme (CAADP) Compact signed in 2009.

Given low productivity with an estimated 37 per cent gap between achievable and actual maize yields and high post-harvest losses ranging from 18 per cent to 35 per cent according to different sources, there is a significant dormant leverage potential hidden in smallholder farming and traditional trading. In other words, market supplies could be considerably increased even without expanding production areas. But it is obvious that raising farm productivity will only translate into enhanced food security and rural livelihoods if the root causes of agri-food market failure are addressed.

A driver for local economic development – but with many inadequacies

Generating substantial revenues and creating sizeable employment, the

Techiman market will no longer be competitive if infrastructure is not improved.

Photo: M. Plewa

Techiman maize market (see Box below) contributes significantly to the municipality's internally generated funds beyond providing proceeds for market operation and infrastructure maintenance. Also attracting associated businesses such as banking, transport, drying, warehousing and truck repair services, restaurants and hostels as well as food processing facilities, the Techiman maize market is a major driver for local economic development. However, market operations are highly inefficient. Failure to maintain the market over decades has left infrastructure in a dilapidated state. The place is seriously congested, with trucks sometimes having to wait for days to get into the market for unloading and loading. During the major (rainy) season, maize has to be dried on unpaved muddy ground. Market imperfections are also clearly demonstrated by security problems for stored produce and cash-based business transactions and the absence of standard weights and measures. The lack of established routines for measuring moisture contents in maize raises the risk of infestation by Aflatoxin, a carcinogenic fungus that grows under humid conditions.

Resulting high post-harvest quality and volume losses and prohibitive unit transaction costs bear on farmers' and traders' margins and discourage private investments into maize production, transport and logistics, trading or processing. As a consequence, some suppliers and buyers start to shift to other nearby (although smaller) markets that have already been refurbished. Furthermore, conflicting policy priorities and market interferences (e.g. export bans) seriously affect the competitiveness of Techiman as the leading maize trade platform in the sub-region.

Public-private solutions required – substantial commitments incurred

Aiming at enhancing local economic development and the viability of farmer-trader business linkages, it is obvious that public and private sector leadership and investments are critical for re-positioning the Techiman maize market. Amidst the on-going transformation of agri-food value chains in Ghana and West Africa, this is a strategic step in order to avoid exclusion of the Techiman maize market from prospective future mainstream cereal marketing schemes such as the Warehouse Receipt System (see article on pages 12–15). Viewing the challenges as opportunity, the Techiman Municipal Assembly (TMA), which is mandated to plan and co-ordinate local economic development, and the Techiman Maize Buyers and Sellers Cooperative Society (TCS; see Box on the right) decided to join forces guided by the vision that: "The Techiman Market remains the leading maize trading platform in Ghana and for the sub-region to support actors to capture the best value possible at all stages of production, processing and trading."

The Assembly and traders committed themselves to:

- refurbish the existing basic infrastructure of the Techiman maize market (especially drainage, pavements, sheds, power and water supply, sanitary facilities);
- establish new facilities and services (especially drying and storage as well as hostel facilities);
- introduce codes of practice for assuring quality from farm to table (within the framework of national initiatives for introducing modern cereals trading systems); and
- derive good practices from the innovative public-private partnership as a catalyst for the upgrading of other commodity markets within the Techiman market and elsewhere.

Following an assessment of upgrading needs, recommendations for market improvements and an architectural design have been developed and a first estimate of investment costs submitted (roughly 0.5 million Ghana cedis or 200,000 euros for public and roughly 1.5 million cedis or 600,000 euros for private investments). There is clear commitment from all parties. The TMA

The Techiman maize market – a transhipment for Ghana and the sub-region

Thanks to its strategic position at the crossroads along the North-South Trans-West Africa Highway, the Techiman market serves as the major trade hub for food staples in Ghana and as an important trade platform for the West African sub-region, especially for neighbouring Sahel countries. With about 80,000 tons throughput per year, the Techiman market realises around 30 per cent of the country's formal trade in maize. Located at the centre of Ghana's maize belt formed by the Brong Ahafo and Ashanti Regions, the market attracts supplies from different catchment areas following seasonal production calendars: during the major (rainy) season, supplies are mainly assured from the maize belt; during the minor (dry) season, small volumes of local supplies are supplemented with deliveries from the Northern, Upper East and Upper West Regions. Despite the distance, supplies from these regions are on the rise since Ghana's northern bread basket investment programme started three years back aiming at developing commercial agriculture in the largely food insecure regions in the north.

The Techiman market also attracts buyers from neighbouring Sahel countries. Owing to scarce drying and warehousing capacities in the maize belt, they procure maize during the rainy season when prices are low. The maize is then said to be (largely informally) exported, dried and stored across the border and resold in Techiman once prices go up during the minor season. While this price arbitrage contributes to somewhat levelling the volatility of maize prices between the major and minor seasons and to reducing post-harvest losses, these foreign speculations represent forgone opportunities for local producers and traders. They furthermore add to transaction unit costs that in the end have to be borne by largely poor consumers.

Trustful farmer-trader linkages – home-grown informal inclusive business models

The Techiman Maize Buyers and Sellers Cooperative Society (TCS) represents maize traders' interests at local and at national and regional levels such as in the recently founded West African Cereal Network. The society provides member services such as market information and book-keeping (all in and outgoing maize supplies) and runs a reputable dispute settlement system that also serves farmers in case of disagreements with buyers. The majority of TCS members extends embedded services including crop pre-financing, advice and livelihood support to about 2,500 small-scale farmers (around one third of TCS suppliers). This is a strong indication that reliable, long-term and trustful business linkages exist between traders and farmers. Interdependencies assure a balance of power between the two contract partners given the reliance of traders on farmers' supplies during the minor season and the dependence of farmers on traders' buying maize during the major season.

has budgeted first items, and the TCS has started collecting member contributions for the construction of sheds. The efforts of the Assembly and the traders are accompanied by the Traditional Council (which owns the land the market is operating on) through the recently established Market Development Committee, the Techiman branch of the Ministry of Food and Agriculture (MoFA) and the Ghana Grains Council (GGC), a private-sector cereals industry representative body.

Seizing opportunities, overcoming challenges – the way forward

With growing demand of industry and institutions for procuring sizeable volumes of maize, the opportunities for the Techiman maize market to grow are obvious. However, rising requirements for quality assurance, reliability of supplies and participation in forthcoming innovative marketing systems (Warehouse Receipt System, Commodity Exchange) will be challenging for traditional agri-food trading systems. Upgrading the market infrastructure and up-scaling existing inclusive farmer-trader relationships is imperative for the Techiman maize market to recoup its competitiveness and keep its vital role for local economic development in the municipality.

To promote private investments (warehouse, drying, hostel and sanitary facilities), the Assembly intends to organise an investment forum. While the TMA is currently examining different sources of public financing, various development partners have expressed interest in supporting private-sector investments, in particular for the construction of a warehouse and drying facilities.

In their efforts to come together and plan the public-private initiative, the Municipal Assembly and the traders' society have been supported by the Market Oriented Agriculture Programme (MOAP), a technical assistance measure funded by the German Federal Ministry for Economic Cooperation and Development (BMZ) and implemented by GIZ (Deutsche Gesellschaft für Internationale Zusammenarbeit) in co-operation with MoFA. In the past, MOAP supported TCS in building capacities in the competent use of marketing information systems and plans to assist members in upgrading and up-scaling their existing informal contract farming/embedded service systems already linking about 2,500 smallholders to the market. Thereby, special focus is laid on developing capacities for quality assurance from the farm to the market and the participation in the Warehouse Receipt System. The TMA will be supported in learning from experiences made in upgrading the maize market as catalyst for further infrastructure development in the Techiman food market. In a wider perspective, MOAP is currently also assessing opportunities and needs for improving the coherence between agricultural and trade policies, a major precondition for removing barriers to smooth agri-food market functioning.

Photo: M. Plewa

Trucks often have to wait for days to get into the market for unloading and loading.

Better grain marketing with warehouse receipt systems

Grain markets in Africa suffer from a range of constraints. Smallholder farmers are particularly affected owing to their vulnerability to price fluctuations and their weak bargaining position. Many African governments as well as donors reckon with improvements through warehouse receipt systems. The article illustrates the theoretical potential of the WRS and some of the obstacles in setting them up in African countries.

Warehouse receipt systems (WRS) consist of a set of interrelated structures and procedures instituted to ensure that contractual obligations associated with a warehouse receipt are fulfilled. The receipt proves that a named person has transferred custody of a specified commodity (e.g. grains) to another party storing the commodity at a stated location (warehouse or silo).

The named depositor may be a farmer, farmer group, processor or a trader. The issuer of the warehouse receipt, who may be described as the warehouse operator, holds the stored commodity by way of safe custody – meaning that the operator does not own the deposited goods and so, in case of liquidation, his/her creditors will not be able to seek recourse to the commodities stored. This is because legal title to the commodity remains with the depositor or, where existing legislation recognises the warehouse receipt as a document of title (as is the case in Uganda), any other party to whom the receipt is properly transferred. The warehouse operator is legally liable to make good any loss of value of the deposited commodity other than that resulting from price changes. The operator's liability includes loss arising from deterioration in the quality of the commodity (e.g. maize grains growing mouldy and therefore losing value). Theft or damage by fire etc. may also cause losses. In paying the depositor for the loss of value, the warehouse operator is entitled to and can deduct any outstanding storage costs owed by the depositor.

Under the WRS it is possible not only to trade by transferring the receipt but also for the depositor to pledge the stored commodity as collateral for a loan. Usually, smallholder farmers and small-scale traders do not own assets which banks and other formal lenders accept as collateral. Hence, a warehouse receipt can be an important means of borrowing. Large-scale enterprises, such as processors and exporters, can similarly benefit when they need to stockpile sizeable volumes of produce (e.g. for processing or export).

Benefits of WRS

The guarantee that the quality and quantity of commodities stored in warehouses under a WRS will be preserved offers the following benefits:

Improved crop marketing to the benefit of producers and other players: The WRS facilitates aggregation

Part of a warehouse receipt system in Uganda: The quality controller checks the moisture content of dried maize.

Photo: WFP/M. Hofer

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of grains and other commodities by smallholder farmers. In most African countries, grain production is dominated by small-sized farms of usually less than two hectares, which are also widely dispersed. Buyers there incur costs bulking produce from farmers which are often passed to the producer, whose margins are therefore reduced. Under WRS, it is possible for groups of smallholder farmers to deposit their grains at central warehouses, easing the cost of procurement. This cost is further lowered by buyers not having to physically sample the grains they intend to buy: the quality and quantity of the grain in the warehouse is specified in the warehouse receipt, and the operator guarantees delivery. So buyers can negotiate purchase on the basis of the description of the crop in the warehouse receipt and, after making payment, arrange the logistics of collection.

Farmers can transact directly with larger-scale buyers such as wholesalers, processors and exporters, without going through multiple layers of middlemen. This enhances the bargaining position of farmers and also shortens the marketing chain, improving producer margins. In addition, as trade is based not only on volumes but also on quality, producers will be able to enjoy quality premiums rarely obtained by smallholder grain farmers in most African countries. Standard weights have to be adopted under WRS and the receipted grains are weighed using properly calibrated scales. This minimises the risk of cheating on quantity which is quite common in the grain trade in Africa where weights and measures are rarely standardised.

Currently, most smallholder farmers are compelled by various factors to sell the bulk of their produce during the harvest season, when prices are very low. They cannot delay the sale of their crop in order to benefit from seasonal price increase because they lack suitable storage facilities and cannot meet household consumption needs without selling their crop, as they have little or no access to consumption credit. Also, farmers wanting to buy inputs for the next planting season a couple of months after harvest sometimes cannot delay the sale to their advantage. But with the WRS, farmers are able to access inventory credit and therefore match their crop marketing strategy with price movements.

Warehouse operators can only release deposited stocks on presentation of the receipts and farmers and other depositors are only to transfer the receipts to parties who have paid for them. This ensures that farmers get paid for the stocks sold. In most farming communities where such a system does not exist, farmers trade only on cash basis or only with traders with whom they have long-term trust-based relations. These situa-

How the warehouse receipt system works

- Smallholder farmers deliver their crop to their group (which can be a primary-level cooperative or association).
- The group, on receiving the deposit from the individual farmer, checks to ensure compliance with minimum quality standards; then
- Issues a receipt to the farmer, documenting the volume delivered and can make a "first payment" to the farmer.
- When the minimum lot size stipulated by the operator has been accumulated, the group deposits with the designated warehouse operator; who
- Issues a warehouse receipt, documenting the volume and quality of the crop deposited by the group at the designated warehouse.
- The group, on the basis of the warehouse receipt, can obtain inventory finance, which allows it to purchase more of the crop from its members. The receipt is transferred to the financing bank.
- Later in the marketing season when the group feels they can get the best offer, they sell the crop to a buyer offering the best price.
- The buyer makes payment directly to the financing bank, receives the warehouse receipt in return and takes delivery of the crop.
- After deducting the loan amount and the cost of financing (including interest) the bank credits the accounts of the group with the balance.
- The group then deducts all marketing costs and pays the balance to members as "second payment" based on the volume of crop each member deposited.

Source: WRS Experience of NMB Bank PLC Tanzania (presentation by Robert Pascal) June, 2010.

tions tend to create liquidity problems in the trade and reduce the number of traders competing to buy up the crop at harvest – competition can improve producer prices. Some farmers can also take advantage of the WRS to market value-added commodities. For instance, instead of rice farmers selling paddy rice, they can deposit the paddy with designated millers who process it for a fee. Farmers who use the WRS in this way can obtain financing against the stored paddy to meet household consumption and other needs while waiting for the crop to be processed and the milled rice sold, creating an opportunity to increase household income. This has occurred e.g. in the coffee and cotton sub-sectors in Tanzania and Uganda respectively.

Improving access to credit by providing suitable collateral. The WRS eases access to credit for farm households. Applying for the inventory credit tends to be simpler as it often does not require elaborate applications with cashflow statements that most smallholders are unable to produce. Apart from easing problems with financing household consumption needs, this system makes it possible for farmers to enter into forward contracts with suppliers for timely delivery of farm inputs. They can do this without having to sell their crop and therefore sacrificing potential gains from normal seasonal price movement. Evidence from the maize sub-sectors in Ghana and Zambia demonstrate that the profitability of using fertiliser improves significantly if the grain produced is marketed using the WRS. For instance, in Ghana, the value-cost ratio (VCR), which can be used to measure the profitability of applying fertiliser, rises from 1.4 when the grain is marketed without the WRS to 2.05 when farmers use the system to market their output. This is largely because farmers can better time the sale of their crop to benefit from seasonal price increase and/or sell to market players further down the marketing chain (e.g. larger-scale traders and processors) for better prices. The system can, therefore, enhance the capacity of smallholder farmers to utilise inputs which can improve farm productivity and grain output.

Improved storage, leading to lower post-harvest losses. The WRS, by creating incentives that encourage smallholder farmers to store grains in better storage facilities, can contribute to lower post-harvest losses. With most smallholder farmers storing grains in inefficient facilities, post-harvest losses in most African countries are very high, and are estimated at between 11 per cent for rice and 19 per cent for maize, the value of which would equal or exceed the value of annual grain imports (see also Rural 21, No 1/2013). Reducing post-harvest losses will therefore not only benefit the farm households but also improve food security in countries where grains constitute the main staple food.

Limiting factors

Despite these benefits, progress in promoting these institutions in Africa has been frustratingly slow, as shown in the box. Factors involved here include:

Legal issues affecting transfer of rights. Banks often cite uncertainty about the rights of parties to whom warehouse receipts are transferred as the main reason why they are reluctant to provide inventory financing under WRS. Basically, banks are unwilling to take on the risk of lengthy and costly litigation in the courts in order to exercise their right to sell the pledged stocks in the event of default by the borrower. Some countries, such as Tanzania, Uganda and Zambia, have tried to resolve this problem by enacting enabling warehouse legislation. However, concerns about the capacity of regulatory agencies to effectively enforce the laws and applicable warehouse industry standards have undermined confidence in the regulatory framework and therefore uptake of inventory financing opportunities created as a result of the WRS.

Missing or under-developed complementary institutions. When WRS is developed without complementary structures such as reliable trading platforms to facilitate sale of the stored commodities, it is difficult to assure significant utilisation of the system. Banks, for instance, are particularly nervous about lending against stored commodities when there is no structured trading system in place as this creates difficulties in liquidating the collateral when the borrower defaults. This also applies to the absence of reliable market information systems, which makes it difficult for lenders to properly estimate and track the value of grains which they have financed.

Balancing apparent trade-off between welfare goals and sustainability of WRS. The fact that smallholder farmers dominate agricultural production in most African countries tends to motivate donors and governments to focus on setting up systems which exclusively target these farmers. As stated in the Box, such systems often have considerable difficulty in achieving sustainability. The option is therefore to set up commercially viable WRS which are open to larger-scale depositors including large-scale farmers, traders and processors. Lessons which have emerged e.g. from Tanzania and Zambia show that smallholder farmers can still be enabled to access such a system if effective primary-level farmers groups are promoted and their capacity is built to undertake aggregation of grains and in collective marketing. What sometimes hinders active involvement of such groups is lack of clarity about the legal status as entities which can engage in commercial transactions involving contracts. Here, in most African countries, existing legislation only recognises registered companies and co-operatives as legal entities. With the rather chequered history of co-operatives in Africa, most smallholder farmers are reluctant to join

Promoting WRS in Africa: a difficult task

From the 1990s many governments in Africa and donors made efforts to promote accessible WRS to farmers with the primary aim of improving access to finance. Large commercial enterprises could access inventory finance through a system under which international inspection companies were willing to secure the interests of lenders by providing collateral management services. The high cost of these services virtually excluded access by smallholder farmers and small-scale traders and the financing available was predominantly for the import/export trade. There was little or no benefit to the domestic trade in agricultural commodities. Furthermore, the typical bespoke agreements underpinning these transactions also made transferability of the receipts issued impossible, so that they could not be used to facilitate trade contracts. To ensure wider access, NGOs promoted inventory credit systems which exclusively targeted smallholder farmers. The promoters were often required to provide intensive supervision as well as loan guarantees (which could be as high as 100 % of the credit advanced to farmers). The scale diseconomies and high oversight costs associated with these systems limited efforts to scale them up, and they were often unsustainable. A more widely-accessible WRS that is open to all parties was subsequently promoted in West, Eastern and Southern Africa.

A recent review revealed that Tanzania has the most advanced WRS north of South Africa. Warehousing services are largely provided by private operators licensed by the Tanzania Warehouse Licensing Board (TWLB). Inventory financing is provided by commercial banks, and smallholder farmers are able to access these facilities as groups mobilised by the primary-level co-operatives and farmers associations. However, it is in export commodity sub-sectors (cashew, coffee and to some extent cotton) that the system has been most successful. Efforts to extend the WRS to grains in Tanzania have not yet gained sufficient traction. As in many other countries, the grain WRS centres around surplus-producing communities are lacking appropriate storage infrastructure, implying provision of storage services in low-capacity warehouses (between 100 and 200 tonnes storage capacity). The viability of such an operation is quite a challenge. In addition, the review clearly demonstrated that success depends not so much on enacting enabling legislation but on strengthening the capacity of regulatory agencies to robustly enforce adopted rules and standards. Even more crucially, it is important to remove or at least reduce policy-related uncertainties such as ad hoc imposition of export bans or waiver of import duties which undermine private storage incentives. This, for instance, appears to be a defining factor in explaining the differences in outcome in Tanzania (between the WRS for the grains sub-sectors and for export commodities). The same conclusion appears to apply in most African countries.

Source: AGRA's African Agriculture Status Report (forthcoming).

them. Broadening legal recognition to include other forms of farmers' organisations will therefore foster more active engagement of smallholder groups in trading and financing activities related to the WRS.

Limited access to suitable physical infrastructure. Private investment in commercial warehousing tends to be concentrated around the ports in most African countries. Warehousing capacity is often limited in rural communities where grain production is concentrated. Where such facilities exist, the state tends to be the major owner. Attracting private sector investment in such areas has met with little success, largely because demand for commercial third-party warehousing remains low.

Disabling policies. Disabling policies have in many instances been the most fatal constraints which have undermined the development of WRS. Examples of these include ad hoc interventions in grain markets such as unpredictable imposition of export bans, waiver of import duties and setting of minimum prices in grain markets. Often, the main justification for these interventions is concerns about food security (see also article on pages 16/17). There is little evidence to show that these interventions are able to significantly impact on consumer prices. On the contrary, uncertainty in grain markets is accentuated. As a result, traders and processors are unwilling to keep large inventories of grain or tie themselves to forward contracts involving fixed future prices. Smallholder farmers then end up with holding stocks and being exposed to price shocks that result from government interventions in the markets. Some governments have attempted to use strategic grain reserves to moderate grain price variability. However, emerging evidence suggests that by keeping the entire procurement, storage and release process outside of the market, governments end up crowding the private sector out of the market and therefore undermine the development of market institutions such as the WRS.

What is in store?

In particular, smallholder farmers stand to gain from improvements in grain marketing and finance which will occur as a result the development of viable warehouse receipt systems. African governments, therefore, need to make WRS and related trade and finance systems an integral part of strategies to promote agricultural output and productivity growth. To achieve this, it is important not only to aim to enact enabling legislation but also to address the other storage infrastructure constraints as well as disabling policies that undermine the development of this system. Furthermore, sustainability of the system does not need to be sacrificed in order to assure access to smallholder farmers as it has been demonstrated that promoting well-organised farmers' organisations at the primary level and empowering them to engage in aggregation and collective marketing can achieve the same objective even if the WRS is open to all players.

Advocacy for free trade

Regional trade bears a great potential to improve food security in West Africa. Again and again, however, efforts made in this field by organisations such as ECOWAS and UEMOA are frustrated by the policies of individual countries.

In recent years West Africa has experienced serious difficulties in producing enough cereals to feed its population. Blame can be put on drought and other climatic or anthropogenic disasters such as war or political instability. But the issue also remains that cereal bans, used by politicians as a means to address food security, are increasing food insecurity and are in total disregard of the rules set by the Economic Community of West African States (ECOWAS) and the West African Economic and Monetary Union (UEMOA) on the free circulation of goods and persons with the West African sub-region. Trade policies and unlawful practices affecting the trade of cereals in West Africa are as follows:

Prohibiting exports

National governments in West Africa often impose export restrictions on grain, in the form of global export bans or seasonal bans. By blocking exports, they hope to ensure an adequate supply of grain to their own markets during the "short season". The seasonal export bans refer to a specific period that the ban is introduced for, while global bans simply block exports until further notice. Both seasonal and global export bans are a violation of ECOWAS rules prohibiting export restrictions. The process by which national governments impose export bans is far from transparent. Often, the restriction is not an official act or decree, but rather a politically motivated decision made by a small committee composed of the heads of public safety, food security and territorial administration to meet the concerns of the people in the fight against hunger and grain shortages, a move expected to garner support for politicians in elections. However, grain actors (producers and traders) maintain that export bans in fact exacerbate food insecurity. The elimination of seasonal or global export bans would allow grain to cross borders unhampered, opening up new opportunities for intra-regional trade.

18 per cent VAT charged on cereals

Cereals traded across borders in West Africa are often unfairly taxed at 18 per cent (value-added tax, VAT). According to the WAEMU (UEMOA) VAT directive 2009, cereals are exempt from VAT (except for luxury rice), which means a zero VAT rate. Customs agents in West Africa continue to levy VAT on cereals and other staple foods because they are unaware of regional rules (ECOWAS or UEMOA). By knowing their rights, grain traders and transporters can help overcome the ignorance on the part of customs officers at the border.

While small amounts of corn or rice are imported from outside the region,

West Africa is a major importer of cereals from around the world, some shipments of which run between the ECOWAS countries. Imported cereals from outside ECOWAS face high tariffs and VAT when crossing borders within ECOWAS, so customs officers are extra vigilant about cereals imported from outside the ECOWAS region.

A national certificate that is not universally recognised

The national phytosanitary certificate accompanying a shipment of local cereals is supposed to be honoured and accepted by the authorities of the importing country, without a new certificate being issued. When the local cereals are marketed within ECOWAS, the phytosanitary certificate from the exporting country should be valid in all countries of ECOWAS. In addition to the financial cost involved, traders lose time waiting for a new certificate, increasing their cost to transport cereals. Cereals producers and traders can rightly demand that this policy be applied correctly by the National Department of Agriculture, which oversees the phytosanitary authorities at border crossings. The ECOWAS countries have

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Photo: FAO/G. Bizzarri

It is disputable whether export bans will bring the desired food security. In all events, they constitute a major barrier to intra-regional trade.

negotiated and implemented the technical arrangements required for the recognition of equivalence of each other's phytosanitary procedures.

Rejection to authorise the export of cereals products with government-subsidised inputs

In recent years, national governments in West Africa have subsidised the price of improved seed and fertiliser for rice and other cereals, and then prohibited the export of cereals grown using subsidised inputs, even to other ECOWAS countries. The philosophy is that national governments do not want to subsidise their neighbours' supplies. The export ban on cereals grown with subsidised inputs constitutes a breach of ECOWAS rules against restrictions on exports. It also discourages farmers to increase production to serve export markets. Cereals producers and traders can advocate with national governments to end this policy, asking that exports to other ECOWAS countries be allowed to encourage greater investment in production, processing and the cereals trade.

Refusal by Burkinabé authorities prevents the export of certified seed

In Burkina Faso, some cereals seeds producers reported having encountered an unfair trade barrier in 2009 and 2010, when the national seed certification agency refused to certify their seeds production because they might export part outside Burkina Faso. The government had provided a grant for the initial seed stock but made no stipulation that the seeds could not be exported. The ban on the export of cereals seed is a breach of ECOWAS rules prohibiting export restrictions. In addition, the seed certification agency of Burkina Faso is not the government agency responsible for formulating or implementing trade policies. Its role is to determine quality.

Advocacy from farmers' co-operatives led by the Comité interprofessionel des céréales du Burkina Faso (CIC-B) to the Burkinabé Ministry of Agriculture and Commerce has led to the end of the practice and at the same time re-energised intra-regional trade in cereals seeds.

Certificate of origin required to avoid paying other duties

ECOWAS regulation A/P1/1/03 is very clear. No certificate of origin is required on grain trade between ECOWAS countries. In fact, in order to export cereals from one ECOWAS country to another, traders must submit a certificate of origin to customs officials indicating the importing country. Without this certificate, they are required to pay all customs duties as if the cereals were from a country outside of ECOWAS. This can add up to 23 per cent in additional costs (for UEMOA countries) or more, and then VAT, which is usually collected near the customs duty on imports from outside the ECOWAS, has to be considered. The solution to this problem lies in better education of customs officials, who are often unaware of this provision. Customs officers at border posts should be informed of the rule itself. No certificate of origin is required on the grain trade between ECOWAS countries. Customs officials should also be aware that no certificate of origin is required for the "local cereals", which should move freely within the ECOWAS region.

Côte d'Ivoire requests certificate of origin for bags containing cereals

Malian traders have reported that customs officials in Côte d'Ivoire not only require the certification of the origin of their product, but also proof of the origin of the bags containing the cereals. Under international trade rules, the package or envelope is considered part of the full product. Fifteen ECOWAS countries belong to the World Customs Organization, which oversees the harmonised tariff system used world-wide. A series of decisions of jurisprudence have been developed over the years, and they are the general rules of interpretation (GIR). GIR No. 5 clearly states that the bag containing the cereal should be classified with the product contained within. In other words, the packaging is part of the product traded and is not considered a second product itself. To avoid confusion, the West African Cereals traders should avoid recycling bags of cereals from Thailand, Brazil, etc. More local cereals traders are more likely to travel in the production areas (Office du Niger in Mali, Senegal River Valley) and not in the major cities or capitals, where the non-ECOWAS cereals are imported.

Advocacy should be carried by national or regional cereal producers or producers' associations. Their responsibility is to organise cereal professionals in ECOWAS member countries in West Africa to remove trade barriers so that:

- all consumers of grain products in West Africa benefit from the positive effects of the liberalisation of trade in agricultural products, particularly cereals at regional level, and
- the governments of the member countries of ECOWAS have more opportunities to develop food security policies taking into account the potential of the entire region.

Where is food logistics going?

Logistics costs play a decisive role in food price development, especially when looking at local agricultural supply chains, e.g. for fruit and vegetables. The logistics cost burden on groceries varies greatly, depending on the prevalent supply chain setup. This article discusses the pros and cons of a traditional supply of agricultural produce into cities versus a modernised logistics setup, involving organised retail chains. This comparison is illustrated using the example of India, a country where the Government has recently decided to legalise foreign direct investment (FDI) in the retail sector.

Indian food price inflation was at 10.7 per cent in January 2013. Vegetables, considered a staple food in India, ranged at an alarming 26 per cent in the same period (Economic Times of India, 12.02.13). The media have been focusing on this issue, repeatedly reporting staggering inflation rates in this 230 billion US dollar market and investigating possible reasons for these rises. Public interest in this topic is not surprising. In 2012, the average share of wallet spent on food and nutrition of an Indian household was 43 per cent. Interestingly, while consumer prices are constantly on the rise, farmers are reporting a decline in their production price levels. So the price hikes are mostly due to an increase in the overall margin between farmgate and retail counter. In a straightforward supply chain setup, such as the delivery of vegetables from a peri-urban environment to a city like Bangalore, the capital of Karnataka, a standard markup would be anything between 70 per cent and way above 100 per cent. Note that no packaging, refining, processing or even grading is involved in such a supply chain. The markup is attributable to the relocation of produce from farm to market. According to the media, a simple product such as carrots or bringel passes through the hands of up to seven middlemen before reaching the consumer.

Traditionally, the informal retail sector has enjoyed the protection of the Indian National Government since the days of Mahatma Ghandi. Even today, millions of informal hawkers earn a living with small vegetable or fruit stalls at street corners or in one of many weekly markets, called "mandis". Acknowledging the limitations and inefficiencies of the existing goods supply system, the Indian Government recently decided to legalise foreign direct investment (FDI) in the Indian retail sector, a move accompanied by fierce public debate, demonstrations and strikes lasting several days.

Whilst there is a certain amount of hope that the market entry of the global players will improve and professionalise the sector to the benefit of the consumer, there is also concern over long-term implications. Will the organised retail chains only put the middlemen in the food trade out of business? Or will they also wipe out street vending and farmers markets completely? Many fear that the traditionally small and marginal farmers in India will be worst hit. Will they continue to earn a livelihood from their smallholdings, or will they be forced to give up and eventually join the urban slum population?

The traditional supply system: not the cream of the crops

Right now, urban retail is extremely dispersed, and not many supermarkets are to be found (Bangalore is said to have the highest organised retail market

In India, millions of informal hawkers earn a living with small vegetable or fruit stalls at street corners.

Photo: B. Herzog

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Average food mileage* in the unorganised sector (expressed in km)

Potatoes	1,531
Onions	406
Tomatoes	161
Eggplant	216
Okra	216

* Food mileage stands for the average geographical distance a grocery product has travelled from where it is first being produced through all processing stages to the shop or market.

[Source: "Business Models of Vegetable Retailers in India", by Paulrajan Rajkumar and Fatima Jacob, Anna University, Chennai, March 2010]

share at 22 %). At the same time, the country's agricultural sector is very fragmented. For food logistics, this poses an enormous challenge. Lacking their own transport, farmers are more or less forced to sell their produce locally, making use of a long chain of intermediaries, who will take care of load consolidation, transport, and distribution.

As inefficient as the system might be, average food mileages in India are small, compared to the European Union or North America (see Table above). Tomatoes easily travel more than 800 kilometres in Europe, but not more than 160 kilometres in India. So it is not excessive food mileage, nor exorbitant transport costs, that are to blame for the high markups.

Let's have a look at the following example: One of the low-cost and high-volume items is tomatoes, with their market price fluctuating between 10 and 50 Rupees (Rs) per kg. Producer prices range at 60 per cent of the retail price. Tomatoes are graded on the farm, packed in boxes and taken to the local Agricultural Produce Market Committee (APMC) for auctioning to traders under the supervision of the commission agent. No further processing takes place until delivery to a retailer in the city. Typically, tomatoes for Bangalore would be grown in an area of up to 150 kilometres from Bangalore city centre, e.g. in the region of Mysore.

The Table on page 20 illustrates the allocable cost of transport – in an oversimplified calculation and compared to a westernised supply system. As can be seen, it is not the pure cost of transport which makes retail prices soar. However, the whole process of collecting produce from small farms, consolidating loads, transportation and distribution is rather complex, as will be shown further down. Transportation and handling is both a cost and a time issue. Altogether, this process can involve five to six business transactions and load handling turns. Total delivery time can be up to four days, so the miraculous increase in value of at least 70 per cent is something that could be expected under these circumstances.

It is not surprising that the food wastage percentage in the supply chain is said to be up to 30 per cent. This is produce spoilt through improper storage, improper handling, excessive transportation time and "no sell" stocks, which subsequently go into animal feeding. A big portion of this wastage is a direct result of inefficient logistics and additionally pushes up the retail price levels.

Chain retailing: Will the multinationals bring the solution?

The country's hopes rest on the multinationals to solve the food supply chain problem. What is certain is that organised retail will bring more efficient logistics and processing, making many of the small traders obsolescent. However, nobody yet knows exactly how this will impact on consumers and farmers. A look at other countries e.g. in Latin America tells us which developments can be expected for the future of India:

Large production units. In the agricultural sector, industrial and mechanised farming will become the norm sooner or later. Small farming will become less profitable, and many independent smallholders will have to give up their land and their livelihood, migrating to cities, or will at least have to opt for contract farming, and restricted independence and autonomy, in the long run.

Processing. Global retailers will prefer to have their product go through a processing chain, starting from quality control and grading, through cold storage, processing and packaging to labelling. Generally, trade margins rise along with the level of processing, with the top profitability items always to be found in assortments such as processed sugar and starch based products, cool drinks and meatstuffs.

Complex logistics. For all retailing chains, the prime competitive factor is company logistics. Logistics concepts which have proven efficient in Europe and the US will probably be rolled out in India one to one. With increased processing, the delivery process becomes multi-stage, meaning that food travels through many stations before reaching the consumer. It is expected that even though the logistics processes will be more professional and more streamlined than in conventional supply set-

Generation of traffic demand driven by retail structure

Example 1: In an average **suburban fruit and vegetable street market** in India, only some 8 to 10 per cent of the shopping is picked up by private motor car, another 15 to 20 per cent by bicycle or scooter, and the remainder is taken home walking.

Example 2: In an average **suburban supermarket situation**, e.g. in South Africa, assuming a floorspace of 250 sqm, 75 to 80 per cent of the merchandise is shopped by car, with an average one-way driving distance per shopping trip of 1.8 km. With increasing floorspace, the catchment area increases, and with it, the average driving distance per shopping trip.

Product embedded transport cost for a traditional supply system (truckload of tomatoes) compared to corresponding cost in a typical westernised supply system

	Traditional supply system	Westernised supply system
Truck operating cost per km	35 Rs	35 Rs
Cost of delivery trip	5,250 Rs (150 km)	19,250 Rs (550 km)
Load capacity	3,500 kg	3,500 kg
Freight cost allocation	1.5 Rs/kg of merchandise	5.5 Rs/kg of merchandise
Amounting to a loose produce retail price percentile of	3 to 15 %, depending on market price	11 to 55 %, depending on market price
CO_2 generation	45 kg	165 kg

ups, the average food mileage is to increase at least by 200 per cent.

Larger outlets in centralised locations. Each of the global grocery retail professionals knows that it is essential to act fast and gain as much market share as possible, say within the first three years of free market competition. This means they will roll out with predesigned strategies, aiming at opening the maximum number of outlets within the shortest time, and at contracting the maximum number and output of suppliers. To achieve this speed, the focus will be on high floorspace outlets in strategic locations.

However, a lot of roadside hawkers being replaced by one large supermarket with a catchment area of say 15 sqkm means a marked rise in the need for urban mobility. Where previously the daily requirements of food and convenience articles could be satisfied by a stroll to the next street corner, now it will mean a scooter, car or bus trip (see Box on page 19).

Fuel dependence and food security. India does not have crude oil reserves, nor does it produce any oil itself. Therefore, all vehicular, processing and refrigeration energy consumption as well as crude oil used for packaging material is imported, bringing about a specific dependency on world markets.

In the final analysis, the setup of the urban food supply lines is also a question of food security and crisis resilience as a whole for the society.

It is also known that for industrialised food production, meat, starch-based and dairy products as well as highly processed sugar products seem to be interesting assortments, whereas fruit and vegetables tend to be high-risk and low-profit, and do not fit well into the standardised logistics processes. Possibly, this trend might – in the long run – even influence the eating habits of the traditionally vegetable-based Indian population.

So while logistics will become more professional, expenditure for packaging, processing, storage and cooling will increase exponentially. At least for processed groceries, food mileage is expected to grow by at least 200 per cent over the traditional fruit and vegetable retailing system. The extra cost will mainly have to be borne by the consumer – although some of it might also be squeezed out of the producers – but the major concern is the question of greenhouse gas emissions caused by the food supply chain, as shown in this example, where levels are more than 3.6 times higher than in the conventional setup demonstrated earlier on.

Photo: B. Herzog

Street traders waiting for goods.

Compared to the traditional regional supply chains found for fruit and vegetables in India today, the future might bring a setup which could be similar to what we see in the European Union or the United States, with low-value foodstuffs travelling for thousands of kilometres before they reach the consumer.

So, even if the step taken by the Indian Government concerning FDI in the Indian retail sector is understandable, it should be considered as an emergency measure. Like with many other emergency measures, whether it will bring nothing but blessing in the long run remains to be seen.

The best of two worlds: preserve supply chain diversity

India's population is manifold. Extensive parts of the society can well afford to shop in malls and supermarkets. A member of a "dink" household, numerous in Indian cities, will stop by at a supermarket on the way home from a highly paid IT job and pick up some ready-made food to be warmed up in the microwave. Only an organised retail can cater for this type of demand. Price levels are not an issue. However, the portion of Indian society depending on low-cost foods can be expected to remain there for quite a while. An alternative supply system should also be kept in place for this market.

So therefore, there seem to be very good reasons to follow a dual development strategy for the Indian food

The impact of logistics on urban traffic congestion and GHG emissions

Bangalore consumes some 2,000 tonnes of vegetables a day. Depending on whether this volume is shipped on trucks or auto-rickshaws, as is often the case today, the impact on the network traffic load and the environment can differ considerably.

With haulage by regular trucks, this flow of goods represents some 600 truckloads, taking up approximately 9,000 sqm of traffic space at any one time, and generating 27,500 kg of CO_2.

If auto-rickshaws or other small vehicles are used for transportation, with an average load of some 130 kg (e.g. a full microvan load for tomatoes), some 32,000 sqm of traffic space would be used and 105,000 kg of CO_2 would be generated in the operation.

Photo: B. Herzog

sector. While the organised grocery chains, in co-operation with large-scale farming and industrialised processing, will set up very intricate supply chains for the high- profit assortments, a niche survival market should be earmarked for the traditional system, consisting of small-scale producers and small city retailers, allowing for walking-distance shopping.

Decisive improvements will be necessary to make the existing traditional trading system for fruit and vegetables efficient and competitive. Hopes are that the efficiency of this sector will self-improve quickly, under increased competitive pressure from multinational contenders. So far, however, this has been a fairly unregulated, full-competition market. So, it seems unjustified to raise these hopes too high. On the contrary, the organised chains could wipe out the sector completely, leaving nothing to optimise further. In this case, the low-income city populations would lose a possibility to purchase low cost fresh staple foods in their immediate vicinity, and the society as a whole would enter into a higher dependency on long, complicated and highly fuel-dependent supply chains, which, in the case of a national fuel shortage, might collapse temporarily.

The traditional supply structures will have to be nurtured and protected, and innovative ideas will be needed to increase their performance and adaptation.

How can the traditional supply system survive?

Choose the right product range. Relating to certain assortments, such as highly processed and brand foods, the organised retailers cannot be beaten by local supply setups. By contrast, in the fruit and vegetables sector, even small and informal players with little financial clout have a definite chance of success, as the survival of the weekly and farmers markets in Europe and the US shows.

Choose the right geographical setup. So-called "short and regional supply chains" are key to trading in fresh products and perishables and when it comes to preserving the traditional small grower production setup. The prime objective will have to be to organise a local and regional exchange of goods and to make the growers in the immediate geographical vicinity of the agglomeration independent of traders or middlemen.

This is easy to do in the urban vicinity, but gets very difficult in remote areas. Therefore, giving preference to vegetable production in the peri-urban areas makes sense and might eventually result in the formation of "urban vegetable belts". In the long run, these would double up as an emergency food reserve for urban populations.

Enable a high-performance logistics setup. Whereas farmers in Europe and North America supply to weekly markets directly, using their own vehicle for the shed to market delivery, most Indian farmers have not progressed to this level, yet. Without their own transportation, they can only depend on traders and middlemen, which counteracts the notion of logistical efficiency. Even where goods are transported directly from the village to a city, this is done in minute quantities on motorbikes and tricycles, a both uneconomical and unecological practice that creates enormous traffic problems in the cities (see Box above).

The key question is whether traditional and regional supply setups, even after adoption of innovative logistics concepts, will be able to resist high-powered competition from organised retail. In India, we will have the answer in just a few years' time. However, looking at the development of fuel prices, some people consider intricate, transport-intensive food supply chains as being transitory, and expect local and regional food supply to come back either way – all a question of time.

BioTrade – development opportunities for small farmers in Peru

Not only is biodiversity a valuable asset, but it also represents a possible source of income for rural communities. The article shows how Peru is making use of this potential in the context of the BioTrade concept to sustain both, rural livelihood and conservation of native biodiversity. It further analyses the challenges farmers face and how targeted support for supply chains can help to overcome these challenges.

During the last ten years, the Peruvian economy has experienced a considerable economic growth. Although living conditions for many of the country's 29 million inhabitants have been improved, income inequalities are still high, and more than 30 per cent of them still live below the poverty line, 60 per cent in rural areas. Especially in the Andean highlands or the Amazon forest, home to a large majority of indigenous communities, 20 per cent of the population are considered extremely poor.

The main source of income for the rural population is agricultural production, which consists of small family farms of less than 1 hectare (ha). Productivity of these farms is low, as their harvest is mainly used for self-consumption and exchange between neighbours and communities. Only a small proportion of the products is traded on local food markets or through intermediaries, mostly with low value commodities.

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Making use of the country's biodiversity

One of Peru's main assets is its rich biodiversity. It has 84 of the world's 104 climate zones and is among the top ten countries that account for the world's greatest biodiversity of plant and animal species. So Peru has a great potential to supply food and raw materials derived from native biodiversity, and linking up to value chains that guarantee the sustainable use and commercialisation of these products has been identified as a new promising opportunity to ensure rural farmers a stable income and improved livelihood.

The concept of production, transformation and commercialisation of products derived from the sustainable use of native biological resources is called BioTrade. It contributes to the conservation and sustainable use of biodiversity, the minimisation of negative impacts on people and environment, and the generation of economic benefits for rural farmers. Its products can include those coming from wild collection or from cultivation practices. To qualify for the BioTrade concept, companies have to meet the seven sustainability principles (see Box) as defined by the United Nations Conference on Trade and Development (UNCTAD).

The concept as developed by UNCTAD seeks an inclusive value chain approach to enhance business linkages within the chain, not only allowing a better sharing of benefits, but also to enhance efficiency and traceability of the products. These linkages are long-term, trust related and mutually beneficial commercial relations and partnerships, including technology transfer, technical assistance and capacity

UNCTAD's BioTrade Principles

Principle 1: Conservation of biodiversity
Principle 2: Sustainable use of biodiversity
Principle 3: Fair and equitable sharing of benefits derived from the use of biodiversity
Principle 4: Socio-economic sustainability (productive, financial and market management)
Principle 5: Compliance with national and international legislation and agreements
Principle 6: Respect for the rights of actors involved in BioTrade activities
Principle 7: Clarity about land tenure, use and access to natural resources and knowledge

Photo: Villa Andina

Women farmers harvesting physalis in Cajamarca, northern Peru.

building initiatives benefiting small rural producers.

Normally, the transformation and commercialisation of these products is done by local small and medium-sized enterprises (SMEs). However, by providing financial resources and transferring technical knowledge to their producers, these are often able to take over some of the basic value-adding activities (e.g. selecting, peeling, cleaning, drying, etc.) in order to maximise their income.

Access to markets – benefits and challenges

The demand for BioTrade products is growing considerably, especially in the United States, the European Union and Japan. One of the advantages of exporting BioTrade products is that many of the customers are more receptive to sustainability messages, willing to pay a price premium for products produced without harming the environment or society. Often, however, information asymmetry in these markets is high, as many of the exporting companies have no direct contact to their international clients and thus find it difficult to capture the real needs of consumers and to establish a trustful relationship. Also, BioTrade products are frequently subject to high quality demands and special regulatory procedures before they can enter international markets.

Though the main markets for BioTrade products are those outside of Peru, local and domestic markets are also an important platform, not only because of lower transaction costs and a less demanding environment in terms of quality, but also because consumers in local markets are more familiar with and increasingly proud of their native products. Consequently, the demand in Peru has shown a considerable growth, also thanks to the domestic gastronomy having recently rediscovered the richness of native biodiversity and its value for a high-class cuisine. On the other hand, local consumers are often unfamiliar with social and environmental certifications and standards and thus unwilling to pay a price premium.

Another major constraint that companies face for both national and international market development is the unstable supply of raw material for products derived from biodiversity. The following factors cause unstable supply in Peru:

- weak implementation of good agricultural practices or standards ensuring sustainability in the cultivation of BioTrade products;
- low levels of productivity and quality due to limited access to technical assistance, training and information;
- fluctuating prices due to changing climate conditions, leading to unpredictable abundance or scarcity of the harvest;
- weak associativity of horizontal and vertical production units and lack of strategies to promote the development of the respective chains.

Support activities

To address this situation, Peru has taken important institutional and legal steps to support the sustainable use and commercialisation of biodiversity products. Various governmental institutions as well as international cooperation agencies have joined forces in the National BioTrade Program, led by the Ministry of Foreign Commerce and Tourism of Peru (MINCETUR), to enhance the competitiveness of companies and farmers working with BioTrade. One of the initiatives is the Perubiodiverso (PBD) project, implemented by the Deutsche Gesellschaft für Internationale Zusammenarbeit (GIZ) and co-financed by the Swiss State Secretariat for Economic Affairs (SECO). PBD aims to strengthen and promote value chains of goods and services related to Peruvian native biodiversity in order to include farmers and small companies into national and international markets.

One approach taken by Perubiodiverso is to promote public-private partnerships with local small and medium-sized companies working with the BioTrade principles in order to leverage activities and achievements. While some of these activities seek to create mutual benefits between companies and farmers, others aim to improve the access to markets for BioTrade products. Results include the following:

Capacity building. Eight public-private partnerships were signed between 2011 and 2012 with companies working with different native crops. One of them is

Sacha Inchi, a seed rich in omega 3 and 6 that grows in the Peruvian Amazon region of San Martin. Capacity building initiatives supported the farmers in the implementation of good agricultural practices, certification with sustainability standards (organic, fair trade and others), extension of crops and the installation of post harvest machinery, which improved their productivity, quality and income. At the same time, they were trained in the BioTrade principles, learning how to protect native Peruvian biodiversity and put it in value. In total, the partnerships have directly benefited 1.818 rural families.

Conservation of biodiversity and benefit sharing. A partnership between PBD and Takiwasi, an organisation transforming and selling medicinal plants in the Peruvian Amazon, has become a reference on the work related to benefit sharing, the third BioTrade principle. Takiwasi sources its plants from native communities. In order to ensure the conservation and sustainable supply of the plants, Takiwasi developed an environmental management plan defining the exact amount of plants that can be collected from the forest without harming stocks. Further, the organisation provided capacity building initiatives and the transfer of technologies to the communities enabling them to develop their first own product, a soap from copaiba (*Copaifera reticulata*) and dragon's blood (*Croton lechleri*), which is ready to be marketed.

Technical Boards. The Sacha Inchi Value Chain Technical Board is an institutional platform established by companies, producers and regional government representatives in which stakeholders meet regularly to discuss the terms of commercial relations within the value chain. Thanks to this platform, farmers have been able to engage in formal long-term contracts with exporting companies including a minimum price that covers the cost of sustainable production of the product, even if the market price falls below it.

International market access. To improve access to international markets, Peruvian BioTrade companies have been supported through various initiatives, such as marketing, sales and quality trainings as well as matchmaking activities. The latter may be so-called 'buyers missions', in which international clients are invited to attend Trade Fairs in Lima, such as the Expoalimentaria Fair, which has recently opened a special pavilion for BioTrade products. During the mission, the buyers can also visit the production sites of the Peruvian SMEs and to meet their farmers 'in situ'. This way, buyers can familiarise themselves with the harvest and production processes and make sure that quality and sustainability standards are being met. However, more and more BioTrade companies have also been able to participate in international trade fairs, such as the Biofach in Nuremberg. These activities allow companies not only to establish direct contact with clients, but also to get to know international market trends and opportunities for innovation in the area of BioTrade.

National market development. To stimulate national market demand, PBD and the Ecological Association of Peru – *Ecológica* have joined forces to develop new local market channels for sustainably produced products. One of these channels is the recently launched Ecological Market in the Surquillo district of Lima. The market offers about 600 different products ranging from food and cosmetics to accessories provided by more than 35 organisations of organic producers from different regions of Peru. Some booths are reserved for producers of BioTrade products, such as those from Piura (mesquite syrup), San Martin (sacha inchi and medicinal plants), Cajamarca (Andean fruit) and Cusco (Andean grains).

Another channel used to create access to local markets for SMEs and producer associations was participation in trade fairs such as the Peru Natura – Expoalimentaria Fair and the Gastronomic Fair Mistura, contributing to a wider dissemination of BioTrade products in local markets. During the fair, farmers could establish first contacts with potential customers and get to know their needs, concerns and suggestions. Feedback was helpful in improving their product presentation such as labelling and packaging, making their products more attractive for the local market.

Conclusions

Working with the BioTrade principles offers companies as well as small-scale farmers in rural areas many advantages. The strong linkages between the different actors in the chain enable the transfer of knowledge and technology to small producers, helping them to comply with quality and sustainability criteria and enhance their productivity while protecting native biodiversity in and around their fields. Further, the participation of local actors (companies and associations) via the Regional Technical Committees has led to a high performance of the value chain with good co-operation and articulation between the different actors in the sector. It has set an interesting scheme of work that could be replicated in other regions and chains in order to create a healthy and competitive environment.

It is also important to focus on the development of the national BioTrade market, not only to diversify the client base but also to educate customers on the richness of native biological resources and the importance of their sustainable use and conservation.

However, since most BioTrade chains are led by small and medium-sized companies, their capacity to create strong linkages on their own has yet to be developed. Thus, public support can leverage the activities and achievements made through a variety of initiatives, such as public-private partnerships.

Irrigation and markets – a fertile combination for poverty reduction

In the early 1980s, Germany's KfW Development Bank financed the first irrigation project around Mount Kenya. A reliable supply of water was expected to enable farmers to achieve stable yields. In this way, they could not only safeguard their own food supply but also supply new markets and earn themselves an income. The following article takes stock of progress and benefits.

Even 30 years ago, Mount Kenya's rainy seasons did not always arrive regularly. The predominantly poor farmers in the Mitunguu region had great difficulties in planning the production of their crops. Given the great uncertainty regarding the amounts and distribution of rainfall and ensuing risk of a crop failure, they saw no point in using improved seed or fertilisers. Therefore their production was concentrated on growing a few food crops for their own use; no monetary income was derived from agriculture. In years when the harvests failed (two years out of five) even food security was severely jeopardised. Farmers were then forced to hire themselves out as itinerant labourers in other regions. Illiteracy was widespread. Women and children had to bear a heavy share of the work in the fields just to survive. Social institutions, schools and shops barely existed.

From 1982 to 1985, KfW on behalf of the German Federal Ministry for Economic Cooperation and Development (BMZ) financed the first irrigation perimeter around Mount Kenya. Thanks to the region's topography it was possible to choose a robust system with low maintenance and upkeep costs: pumps are unnecessary because the water is carried down the slope by gravity. Since 1985, 301 smallholders have had access to a regular and reliable supply of water, sufficient for two hectares of land maximum (the upper limit per farmer as defined by the project).

The aim was to ensure a consistent and continuous irrigation flow as far as possible ("water for 24 hours 365 days a year"). Over time, the number of farms involved rose from 301 to around 1,200, and the originally planned area under irrigation doubled to 800 hectares. As in most African countries, the increase in farms went hand in hand with a drastic reduction in farmed area per holding: in 1985, 85 per cent of holdings were larger than two hectares in size, as opposed to only 25 per cent today; 40 per cent of holdings are smaller than one hectare.

New crops with good market potential

Up to the end of the 1980s, the main crops farmed in Kenya were cotton and tobacco as cash crops, along with maize and beans. In those days the country had already liberalised the marketing of field vegetables and other horticultural products and it was no longer mandatory to sell these products via the parastatal Horticultural Crop Development Authority (HCDA). This meant that farmers could freely decide to produce products that promised higher margins. Initially they opted for various types of vegetables, but these proved troublesome and difficult to market. Then, from 1990, the situation was transformed by the production of bananas, which are considerably less labour-intensive to grow and sold very well in local markets. Today bananas are a mainstay crop for small and large farms alike. Furthermore, maize and beans plus another cash crop, papaya, are grown – output of the

Converting from vegetables to bananas has reduced women's workload.

Photo: KfW archive / U. Grabowsky

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latter is rising steadily since local sales markets for this fruit have emerged. Local demand for these primary agricultural products has remained extremely high. From the viewpoint of farmers, although there are no sales problems there is certainly potential for optimisation in the organisation of marketing and distribution of proceeds.

Farmers' margins depending on place of sale

Source: Mitunguu Irrigation Scheme, 25 Years On, Ex-Post Assessment of Development, Functioning and Impact, Final Draft, November 2012, p. 22

The role of the farmers' cooperative

Mitunguu Farmers' Cooperative (MIFCO) was founded for the maintenance and upkeep of the irrigation systems, which are financed by the water charges paid by users. Its other responsibilities were to provide seed and fertilisers and to organise marketing. For a short time after liberalisation it also took on the role of a broker by negotiating contracts with private traders and paying the farmers the difference between revenues, water charges and transaction costs. It soon became apparent, however, that MIFCO was completely overwhelmed by this task. Accounting irregularities meant that farmers lost their trust in MIFCO as an honest broker. Furthermore, the buyers began to negotiate and conclude contracts directly with the farmers.

Finally, in 1992, an independent organisation of water users, the Water User Association (WUA) was founded, which confined itself largely to questions of operating and maintaining the irrigation infrastructure. MIFCO and WUA were eventually merged, but only once MIFCO had officially ceased its commercial activities in 2004.

Today the vast majority of banana marketing takes place directly in the field. A few days before harvest, contracts are concluded at the field boundary and the traders take responsibility for harvesting on the plantations. By this means the sellers reduce their own workload and minimise the risk of spoiling the products through incorrect harvesting and transportation and the uncertainties of market prices. Buyers, for their part, have the advantage of inspecting and selecting the goods directly in the field to ensure quality. Monopolistic structures are prevented since several buyers exist and the farmers do not necessarily sell to the first bidder.

Some profits deliberately sacrificed

Current studies (see Figure) show that farmers could substantially raise their margins if they were to sell their main product at local or central markets instead of directly from the field. However, this would presuppose that they could organise efficient transportation; in fact, the farmers deliberately settle for lower margins. In return, they are spared the need to make any major marketing effort or to rely on any type of marketing organisation.

As interviews with the participating farmers have shown, some of them are perfectly aware that they could achieve substantially higher prices for their products, and pay lower purchase prices for the inputs (up to 40 per cent less for fertilisers, for example) if they organised themselves accordingly. Nevertheless they deliberately refrain from doing so. The mistrust of cooperatives is still deep-seated and is probably also well founded, given the negative experiences of the past.

Sales are impeded during the rainy season by the poor state of local roads and agricultural tracks. There are plans to build a tarred road to Mitunguu, which would distinctly improve the conditions for marketing.

Effects on the population's living situation

In the mid-1980s, around 2,000 people lived in Mitunguu, and there were 300 agricultural holdings; the current figures are around 8,000 people and around 1,200 holdings, representing a fourfold increase in farm and population statistics. The proportion of families not employed in agriculture grew from around 10 per cent to the current figure of around 25 per cent of the population today. The annual population growth rate of 5.7 per cent is far above the currently estimated average population growth for Kenya (2.4 %). Thus despite the difficulties mentioned and the room for improvement that still exists, the region has its attractions

The markets for papaya and bananas have developed best.

Photo: I. Huber/KfW Development Bank

The problem of water tax

One threat foreseen by the farmers is the central government's plan to introduce a water tax. So far this has been prevented by protests from the population, but would be a requirement in order to support the nationwide costs of the infrastructure and also to set incentives for better water management. On the other hand, the tax also ought to allow the state to support users in the maintenance and expansion of these systems, which has rarely if ever happened so far. The current policy paper (Kenya Draft National Irrigation Policy) is very guarded about stipulating basic regulations on user contributions to investment and running costs, and leaves it to local authorities to find acceptable solutions.

for migrants from other parts of Kenya. Apart from this influx, the reduction in the average area of agricultural holdings is also explained by the partitioning of farms among numerous children (partible inheritance). Only around one-fifth of farms have not been partitioned over the course of time.

Model calculations show that even very small agricultural holdings are capable of generating income from banana sales sufficient to secure the basic food supply and, moreover, invest in housing and pay school fees. A contributory factor is that 60 per cent of the holdings have livestock (particularly cows, sheep and chickens).

The positive income effects generated by the project also become clear from a direct comparison between irrigated and non-irrigated parcels of land: irrigated land is higher in value by a factor of 20 (!). As little as 0.2 hectares is adequate to secure a livelihood.

Instead of two primary schools (1985) there are now nine primary schools and one secondary school. Around 2,800 pupils are being taught by 150 teachers. A few teachers and in some cases new classrooms were funded by parent initiatives. Moreover, the interviews reveal that the living conditions of women have improved considerably. Conversion from vegetables to bananas has reduced their workload substantially, since banana production requires less work and the men do a greater share.

Numerous businesses have been attracted by the rapid development of the location. Around ten banks have opened branches. There are now around 450 small businesses (30 years ago: 15), which have created some 650 new jobs. Around 900 people work all year round as hired labourers on the irrigated farms.

Challenges

Despite the positive developments, numerous challenges remain to be mastered. Over time, numerous illegal connections to the water supply have been installed; only 40 per cent of users have paid their outstanding water charges for the last year. For that reason, there are hold-ups in the supply of spare parts, and the wages of MIFCO employees are delayed or go unpaid. The water supply is no longer continuous but intermittent. Given better maintenance and upkeep of the irrigation infrastructure, the users would certainly be more willing to pay their charges on time and in full. Appropriate public information measures are needed to make them aware that only if charges are paid can MIFCO afford to buy replacement parts and pay and motivate its staff.

The greatest problems to be faced, however, stem from the almost total lack of a drinking water supply. The drinking of unboiled irrigation water or river water leads to water-borne diseases that could be avoided. Additional problems are the relatively high prevalence of malaria due to the area of land under irrigation, inadequate connectivity to the electricity grid, and the poor transportation network. Purchasing and marketing could be optimised if a renewed effort were made to establish a purchasing and sales cooperative.

Positive net benefits

Despite the numerous weaknesses mentioned and various aspects in need of improvement, the Mitunguu irrigation project has decisively contributed to improving the living conditions of the population. The farmers were no longer forced to seek other forms of employment elsewhere. They have been able to replace their huts with comfortable stone houses, and can often afford a vehicle and keep livestock. Their food supply is secure throughout the year. The irrigation system has helped predominantly poor smallholders and their families to become members of Kenya's still rather sparse middle class. For this middle class, educating their children is the foremost priority. Most of the farmers questioned underline as an essential achievement their ability to give their children a good schooling and enable them to learn a trade. The evaluation study on the project finds that around five times as many children from families benefiting from the irrigation project complete secondary school compared to families who are not beneficiaries, and nine times as many of their children gain a qualification from a higher-level school. This has been accomplished even though the number of agricultural holdings and the population figures have quadrupled over the last 27 years while the irrigated area has doubled. The key factors determining success have been the very robust, user-friendly and expandable design of the irrigation system and the favourable development of sales markets, particularly for bananas.

The article is based on an evaluation report, prepared for KfW and the Kenyan Water Ministry: Mitunguu Irrigation Scheme, 25 Years On, Ex-Post Assessment of Development, Functioning and Impact, Final Draft, November 2012

Markets for the many rather than the few

A development policy opting exclusively for value chain development and the integration of producers in modern markets overlooks the reality for the majority of smallholders, our author maintains. Policy should pay greater attention to addressing the area most small-scale producers are active in: the informal sector.

Rural development is full of dilemmas, no more so than the position of small-scale farmers in emerging and globalising markets. What makes the situation so hotly debated is the fact that there are two contradictory forces at work. One is the process of modernisation of food manufacturing, distribution and retailing in emerging markets, ushered in by globalisation, foreign and domestic investment, a rising middle class and the drive for improved food safety and quality.

Another is the resilience – and in many countries, growth – of informal markets, driven by producer and consumer poverty, poor employment prospects in formal sectors (themselves a possible effect of globalisation), and regulations that punish formalisation.

Both of these forces can make their mark on rural areas and influence farmers' choices of markets. The outcome has huge implications for social cohesion and food security of emerging economies. As clearly spelled out in the 2008 World Development Report, a much greater proportion of the world's rural poor live in emerging markets compared to more agriculture-based economies. Whether those rural poor are part of economic success stories or have been left behind is one of the big questions of the early 21st century.

Adapt or die?

The development community has a recent history of rather dogmatically seeing only one side of the story – that of the inevitable march of modernisation. In this world view, smallholders must adapt to the strictures of modern value chains – whether for export or domestic markets – and rise to the challenge of higher market standards for quality, safety, and reliability. That view has been backed by large donor investments into value chain development, and calls to global agribusiness to apply inclusive business models in their procurement so that small-scale farmers can be partners in this new world of 'high value' markets.

In the Regoverning Markets programme (2004–2008) we looked across developing and emerging markets at the implications of modernisation and restructuring for smallholder production. We did indeed find some countries and sectors where smallholders were successfully linking to modern food sectors via a new generation of market intermediaries.

But we also found cases, for example in Chinese horticulture, where despite a massive transformation in the retail sector, farming was largely unchanged. The modern food sector had grown fast but, for reasons of cost, kept its roots in a structure of unorganised small-scale farmers selling to numerous petty traders. And in sub-Saharan Africa, it was difficult to fit the theory of value chain modernisation to a reality dominated by informal trade. Even in South Africa, where modern retail has captured a large market share, small-scale farmers were selling to informal markets and hawkers, in what is effectively a two-tier economy.

A recent partnership between the Netherlands-based international development organisation Hivos, the International Institute for Environment and Development – IIED and a global learning network led by the Bolivia-based research centre Mainumby looked at the dilemmas of smallholders in the globalised market, and concluded that when we understand where smallholder farmers are, rather than where we want them to be, we find them making logical choices that often involve selling to informal or semi-formal trade. Their agency leads them in directions that challenge current theories of change.

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Photo: J. Boethling

In sub-Saharan Africa, most goods are traded in the informal sector.

Informal trade has a number of advantages for small-scale producers. It absorbs risk by buying what producers have to sell rather than demanding regular deliveries of fixed quantities and qualities. It buys from the farm gate. And what used to be the banes of trade with middlemen – poor competition and lack of price transparency – are being challenged by the presence of more traders in the countryside competing for farmers' produce (in response to urbanisation, economic growth and south-south trade) and the rapid spread of mobile phones. For consumers, the informal sector is often more accessible, more flexible in responding to new opportunities, and may better satisfy traditional tastes than the formal sector. Robert Neuwirth has observed that the global informal economy has evolved into the 'economy of aspiration'; informality is often where entrepreneurial attitudes are strongest.

We are inclined to forget that rural areas are highly differentiated places, with wide variations in access to capital, organisation, technology and infrastructure, and wide variations in entrepreneurial attitudes. Only a small subset of producers – perhaps 2 to 10 per cent – can easily step up to commercial sales in modern value chains. Bringing a larger pool of smaller-scale and poorer farmers into the game requires a rare combination of institutions: effective producers' organisations, receptive buyers, a facilitating policy and effective brokering. Without such an arrangement, efforts to link smallholders to modern markets can remain stuck in the pilot stage and dependent on project funds.

Market institutions for the majority

What does this mix of challenges and opportunities mean for policy? Refocusing policy attention on improving the performance of markets for the many rather than the few is going to be the main priority for inclusive rural development and urban food security. In rural worlds dominated by informal trade, where domestic markets are dynamic and south-south trade is opening up, it seems imprudent to hang all our hopes on chain-based interventions, despite the many opportunities in 'high value' markets. Those informal and grey markets have for too long been ignored or seen as an impediment to modernity and the development of a formal private sector.

The informal sector for one has to deal with a record of poor performance in food safety and environment. The situation in China, home to perhaps five times as many small farms as the whole of Africa, shows just how drastic state and business interventions must be when consumers lose confidence in the integrity of the food system. Attempts at market formalisation can be highly exclusionary and push large numbers of producers, small and medium enterprises (SMEs), traders and hawkers to the economic margins. Over coming years IIED and Hivos will be having a close look at what 'inclusive formalisation' really means for policy and for small-scale producers. Special attention will be drawn to identifying the benefits of informality – market access, flexibility and resilience – that can be built into policy and business frameworks that overcome its dark side of corruption and criminality, monopoles and cartels, poor traceability and food safety, a poor environmental record and poor worker welfare.

Policy that ensures markets for the majority is first and foremost about getting the basics right – the provision of public goods of infrastructure (roads, market spaces) and the rule of law, control over land and natural resources, and the voice of small-scale farmers and women in policy design and programming. It will mean supporting a diversity of market outlets that serve all sectors of the population.

But there are also institutional arrangements that take a more aggressive approach to managing markets in support of small-scale farmers and their share of value through improved market liquidity, improved product quality and reputation in national and export markets, and especially reduced exposure to price risk. These institutions – such as the Ghanaian Cocoa Marketing Board, the Kenya Tea Development Agency, the Colombian Coffee Growers Federation and the Ethiopian Commodity Exchange – all have their weaknesses as well as strengths. But they deserve a close look if policy is to 'raise all boats' and work for the majority.

Taking the land without encumbrances

Liberia's government seeks to put greater emphasis on integrated cash/food crop systems with broad-based farmer participation. However, shortcomings in regulations on land transactions could threaten livelihoods in what is already a vulnerable country.

About 40 per cent of the land in Liberia is now under concessions with companies for producing rubber, palm oil, timber or minerals for exports, most of them foreign-owned corporations with Liberian affiliations. At the same time Liberia being an agrarian society as it is, the country is extremely dependent upon food imports: about 50 per cent of daily calories and 60 per cent of protein intake is imported, according to a UN Food and Agriculture Organization (FAO) estimate. Liberia's food sector has not yet recovered from 15 years of civil war

The Government of Liberia (GoL) is well aware of this contradiction. That is why it is determined to achieve a transformation of its agricultural sector – defined as follows: "… the conversion of a system characterised by an economically concentrated commercial plantation sector to one in which there is broad-based farmer participation in integrated cash crop/food crop systems. It is essential that the country avoids falling back into old patterns of growth and development based on natural resource extraction industries and a heavily concentrated plantation and commercial agricultural sector." In spite of this commitment, the Government recently (2008, 2009 and 2010) again granted land concessions on a huge scale to three foreign companies to mainly produce palm oil for the international market.

Here, the overarching objective that guides Liberian government policy on the use of natural resources, which can be found in the 2008 Poverty Reduction Strategy (PRS), enters the picture: "The secretive, special deals of the past that benefited a few to the detriment of the majority will be replaced by transparent agreements with fairer terms and stronger mechanisms to ensure the proper distribution and spending of funds and concession revenues will be used to promote public welfare by financing investments in roads, education, health, water and other areas." Do the new concessions live up to this goal? In order to evaluate this, several teams of students of the College of Agriculture and Forestry from the University of Liberia went out into the areas of the three new plantations. For their interviews in the Project Affected Communities, they used a list of indicators which drew on the wisdom of the "Voluntary Guidelines on Responsible Governance of Tenure of Land, Fisheries and Forests" recently adopted by the FAO.

The concessions

The objective of the new concessions is to plant oil palm trees in monoculture on large scratches of land (one company also plans to grow rubber trees on 25 % of the land), after clear-cutting a dense bush-forest area. The concessions are made up between the Government of Liberia and multinational leading corporations in the world's palm oil

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business. The Malaysian Sime Darby company and the Indonesian Golden Veroleum company were each awarded a 220,000 hectare concession, and the UK/Indian Equatorial Palm Oil (EPO) company got 169,000 ha.

All three concession agreements were quite similar. The agreements were ratified by Parliament for a rent of five US dollars (USD) a hectare (developed area). The concession periods were 63, 60 and 40 years, with options to extend for quite some more decades. The companies promised to invest billions into the plantations and oil mills and create 22,000/35,000/20,000 jobs each. They are all obliged to pay five USD for each "developed" hectare of the land into a Social Fund to be administrated by a common board of the company, the government and appointed representatives of the local communities. They are also obliged to pay 0.5–1 per cent of their yearly turnover into a Palm Oil (and Rubber) Development Fund. In addition, the agreements commit them to invest into housing, schools and health facilities for their employees and their dependents. All have to assist the government in getting an outgrower scheme started three years after the commencement of their own plantation; areas of 44,000/40,000/10,115 hectares additional land to each concession have been set aside by the government for these programmes; funding is supposed to come from outside sources.

Example of a concession agreement

"The Government of Liberia represents and warrants to the investor that all the public land that makes up the concession area shall be free and clear of **encumbrances**" (for instance paragraph 5.1 of the agreement with Sime Darby). "Government agrees to defend and protect for the benefit of the Investor, all rights granted to Investor hereunder and indemnify and hold harmless Investor for any losses incurred by Investor, as a result of … without limitations disputes relating to the ownership of land." (paragraph 5.1 of the agreement with Sime Darby)

Students from the University of Liberia during field visits. The Malaysian Sime Darby company has awarded a 220,000 hectare concession.

Photo: R. Buntzel

Tensions over the land acquisitions

The basic conflict over the concessions is about the land rights of the people, who have been using the land the government is handing over to the companies for all kinds of livelihood activities for centuries, like slash-and-burn agriculture, collecting firewood and making charcoal, fishing, hunting, collecting herbs and fruit from the forest. The people believe that the land belongs to their ancestors. Therefore, they see it as the property of the entire inhabitants, with their traditional tribal structures administrating the land rights.

However, the only secure customary land rights recognised by present law go back to the 1949 Hinterland Act, which legalised customary land ownership allowing chiefs to formalise tribal land claims by applying for a deed. Only 13 chiefdoms seized this opportunity at that time, and today, just 2.3 million acres remains registered with secure tenure in the name of these chiefdoms. This land was then exempt from the 1956 Aborigines Law, which claims all lands not protected by private or customary deeds as property of the state. It is only very recently that the appointed land commission submitted a draft of a new tenure law allowing all tribal land to receive deeds.

The Government's perspective is that it can give away land – even if occupied by local people for their survival – to companies as it wishes. The three concession agreements hand over the land with a very far-reaching provision (see also Box above):

"Without encumbrances" is a provision entitling the Government to release the companies from all responsibilities to deal with the local people's claims on their rights on land uses and take over all encumbrances resting on the land itself. Neither are obligations regarding to consultations with the people and settling disputes and grievances the companies' concern any longer, but the Government has taken them over for them. Mechanisms to deal with disputes between the people, the company and the Government are missing altogether in the concession agreements and other arrangements, with a provision only having been set up for disputes between Government and the Company.

Thus the people had no official to consult when the agents of the companies came into their villages to count the plants and trees on the villagers' field in order to evaluate them for the compensation for crop losses after taking the land for oil palm growing. On average, the companies paid about 200 USD per hectare for fields under cultivation for the crops, but nothing for the land as such or the loss of other livelihood activities.

Serious conflicts arose in the case of Sime Darby and Golden Veroleum over the land occupation, because the people did not understand the whole dimension of the land acquisition and felt badly informed and consulted. Protest in the area of Bomi County against Sime Darby boilt over in December 2011 when the Project Affected Communities (PACs) rioted over fears that their farmland would be clear-cut by the company, seizing bulldozers and other equipment. The incident led to a visit of President Johnson-Shirleaf, who admonished PACs to allow government to negotiate on their behalf rather than to cause problems for the company. She also said: "When your government and the representatives sign any paper with a foreign country, the communities cannot change it."

The case of FPIC

From all international regulations, the most stringent and important rule is that of "First Prior and Informed Consent" (FPIC), a principle now enshrined in a number of international laws, economic guidelines and national legislation related to foreign direct investment (FDI) projects:

> ***"Free, prior and informed consent recognises indigenous peoples' inherent and prior rights to their lands and resources and respects their legitimate authority to require that third parties enter into an equal and respectful relationship with them, based on the principle of informed consent."***
> *(UN Commission on Human Rights)*

FPIC implies: **Free:** The absence of coercion and outside pressure, no threats and no implied retaliation if the project is refused by the people. **Prior:** The Project Affected Communities (PACs) are consulted about plans for FDI projects before they are legally fixed or implemented, leaving them sufficient time to collect information and to find consensus among themselves. **Informed:** PACs have all relevant information available reflecting all views and positions. **Consent:** An agreement, statement or memorandum of understanding between the PACs and the Concession Entity is signed in accordance with the decision-making structures of the indigenous communities.

On August 2011, with the assistance of NGOs and advocates, the PACs of Bomi County filed a complaint to the Round Table on Sustainable Palm Oil (RSPO), where Sime Darby (and also Golden Veroleum and EPO) are members. The same month, a similar letter was sent by the PACs of Golden Veroleum. The regulations of RSPO on "New Plantings" contain many standards also asked for by international guidelines, like effective negotiations, transparency, formal democratic control, well-drafted master agreements, and rule of law. The PACs accused Sime Darby of "destruction of our sacred sites, destruction of our crops, damming of our creeks and streams, filling in of our swamps and forceful displacement of our people without adequate compensation". They called on the RSPO to get Sime Darby to "halt all land acquisition and land preparation in Liberia while the current situation is investigated and resolved". What no protest has achieved so far was enabled by the intervention of the RSPO, for the company's losing its certification under the RSPO would mean losing markets in Europe and North America. Sime Darby started a dialogue with the PACs about their complaints, and the company commissioned The Forest Trust (TFT) from Switzerland to make an independent evaluation. TFT's presentation

Photo: R. Buntzel

After clear-cutting a dense bush-forest area, oil palm trees are planted in monoculture.

of their findings turned out to be a strong verdict. What the Government and the company called "consultation" was not sufficiently effective to deliver a sound FPIC process, which was "poorly done", and the compensation process "was a disaster for trust building". As a consequence, Sime Darby offered a renewed process of dialogue and communication procedure.

Liberia's national regulations – better than others?

In spite of recent land concession conflicts in Liberia, the reputation of its concession policy is quite outstanding in comparison with other African countries. For example, all concession agreements have to be passed by Legislature (Parliament). One of the concessionaires, Equatorial Palm Oil (EPO), comes to the following conclusion: "Liberia's concession agreements are recognised as being among the most rigorous of such agreements." And having closely examined twelve case studies on land grabbing in Africa, the International Institute for Environment and Development (IIED) states: "The three contracts from Liberia stand out for their more flexible duration, their clearer identification of the land being transacted, their more specific investor commitments on jobs, training, local procurement and local processing, their greater attention to local food security, and their tighter social environmental safeguards."

However, the strong features (see Box) of Liberia's concession policy do not figure looking at the violation of the people's rights to their land and the failure to conduct proper FPIC according to international standards. And even beyond these fundamental flaws, the national laws and regulations set up for large project concessions have not been followed properly. According to the 2010 Public Procurement and Concession Act (PPCA), a seven-member commission is supposed to invite for bids for a designated project and evaluate the different offers before actual negotiations with the potential investor start.

Concession agreements in Liberia must contain:

a) specifications for recruiting nationals for unskilled and skilled labour, and require compliance with national and international labour laws;
b) precise regulations on outgrowers' schemes with the kind of division of labour among the government and the investor;
c) provisions about also producing food to overcome bottlenecks on the local food market;
d) an obligatory benchmark for domestic marketing of produce;
e) compulsory investment by foreigners in processing of the raw products inside Liberia.
f) social obligations regarding to their own employees and dependents, obligatory yearly fees for a Community Development Fund and a Commodity Development Fund (research);
g) a compulsory schedule for investors to fully develop the total concession area, in order to avoid unproductive speculation with land;
h) an inflation-bound index of the yearly lease;
i) a clear demarcation by maps of the total area of the concession. In case of Sime Darby and Golden Veroleum, they have the option to select their concession area from a consignment suggested by government of an area larger by a third than what they can actually use;
j) an obligation for an environmental and social impact assessment before the project gets started and prior to every next step of expansion inside the concession area. The contracts refer to compliance with national environmental laws and the standards of RSPO.

In reality, in matters of our cases this process was not followed. The Government of Liberia did not select the area, did not make a public tender to invite for bids, and there were no competing bids for the potential concessions. Instead the companies approached the Government with their intention to expand their existing (small) estates to a wider concession area and the Government went into negotiations with them right away. The law also prescribes that the proposed concession be posted in the areas where the investment will occur prior to its ratification. The researchers found no evidence of this having taken place.

The agreements have to be ratified by Parliament. The quality of the Legislative Hearings, their announcements, reporting on them, the list of invited speakers, their being held inside the difficult-to-access Parliament building, the time rush for offering inputs by the civil society – all of this is bias against a meaningful participation by the PAC.

In practice, the effective operating of all instruments and mechanisms according to their mandate is severely restricted. Also, the mandates of all involved agencies are ill-described and limited. Some areas of regulation are not covered at all, especially those referring to land conflicts, the rights of the people affected, or the monitoring and review mechanism. A real dispute settlement between the local people on the one hand and the companies and government on the other hand is absent.

Conclusion

The Government of Liberia's efforts towards a stringent frame of regulations to introduce the rule of law, transparency and social responsibility must be appreciated. But giving away the land free of any encumbrances is a big mistake that threatens livelihoods and peace for the vulnerable country. The neglect of customary rights to the land contradicts international law and is a violation of the Right to Food.

Microfinance lending for farming in Congo – a worthwhile risk?

Agriculture is the basis for the livelihoods of the rural Congolese population. Yet despite its considerable potential, the sector and its many small-scale producers are barely served by microfinance institutions. The lack of adapted financial products for development of the farming sector is one of the reasons for the country's continuing dependence on food imports.

Life is quiet in the small village of Kinsambi on the Mansi plateau. It is rare to see a vehicle on the road, just a few goats, chickens and pigs. On plots that are sometimes only 25 square metres in size, manioc, plantains, peanuts, tomatoes and other kinds of vegetable crops are growing. Livestock farming is only of secondary importance because the farmers do not have the necessary land or, especially, water. Outside the rainy season there is very little rainfall. Today the sky is typically cloudless, and a scorching heat is making its presence felt; the roads and surrounding fields are parched.

Despite the problem of irrigation, the area has potential for intensified agricultural production. The farmers themselves point out the fertile soils of the plateau, which bear two harvests per year. In good years they might be able to sell almost half of the harvest; furthermore, the port city of Matadi with its 300,000 inhabitants and bustling markets is only 45 kilometres away. Nevertheless, the majority of the harvest is used for personal consumption or saved as seed for the following growing season.

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Barriers

Why is that the case? In 2011 the Democratic Republic of the Congo (DRC) ranked in last place on the Human Development Index. What it lacks above all else is infrastructure. Although the gigantic Inga hydropower dams are only 15 kilometres away, there is no electricity here. Farmers are forced to spend a lot of money on powering water pumps. Mechanisation of production is non-existent – it would cost 200 US dollars a day to hire a tractor. A further problem is the availability of any means of transportation. Although the road to the province's capital is asphalted and in good condition, few inhabitants can afford to own vehicles. Only from time to time, a trade intermediary shows up in Kinsambi and the surrounding villages on the plateau, in order to buy products directly from the producers in situ.

Shortage of capital as a starting point

"With loans we could do something about the existing obstacles," says one farmer during a meeting. "We could club together with neighbours and hire a tractor. We could invest in an irrigation system and buy diesel for the water pumps. We could pay labourers to help us with preparing the fields." But there is no culture of credit in the rural districts of Congo, which makes it hard to obtain the necessary capital for accessing markets and selling products, for investing in machines and managing soils more productively, for building storage facilities and minimising crop failures.

Some farmers are certainly aware of the risks entailed by loans, both to customers and banks in rural areas: "If we had taken a loan in the 2011/2012 harvest season, we would not have been able to pay it back," comments one. That was a season when a lack of rainfall led to massive crop failures in the region.

Nevertheless, the question is how financial institutions can better serve

Photo: J. Lutz

The port city of Matadi. The majority of microfinance institutions in DRC are investing in cities; the bulk of the clientele are traders.

the needs of rural areas and agricultural production and counteract the shortage of capital by providing adapted financial products.

New developments in the finance sector

Since the start of the new millennium, the finance sector in DRC has been growing, favoured by a relative stabilisation of the political situation. In a joint initiative the state, donors and finance institutions are endeavouring to simplify access to investment capital, and thus encouraging the development of the private sector. Finance institutions have only built up a modest presence so far, confining their activities to a few large cities. In 2011, only around 2 per cent of the population were customers of banks.

The expansion of the microfinance sector is aimed at ensuring "financial inclusion": with an offer that is tailored to micro, small and medium-sized enterprises (MSMEs), even small investors will be given the opportunity to invest or borrow money securely and on regulated terms. The trend in the DRC as elsewhere is moving towards professionalisation of the sector, i.e. growth spearheaded by accredited banks and microfinance institutions (MFIs) with international experience, and a concentration of finance cooperatives in mutual associations with nationwide coverage. The central bank, whose role is to regulate the sector, has closed down inadequate cooperatives and MFIs in the past few years and attempted to establish quality standards. The majority of donors, like Germany's KfW Development Bank, are supporting experienced finance companies who have made a commitment to the "double bottom line" (see Box below). The aim is to create jobs in supported MSMEs so as to improve the situation of the poorer people on a broad scale.

Production and processing still cold-shouldered

Following this logic, the majority of MFIs are investing in cities where the high costs of setting up a new branch are worthwhile, thanks to comparatively good infrastructure and customer density. In the main, the customers are established companies who can demonstrate adequate capital resources and guarantees. The bulk of the MFI clientele are traders – from the woman who sells beans in the marketplace to electronics shops importing their own stock. The producing and processing trades (farming, crafts, refinement of raw products) have difficulty in obtaining loans, considering that their turnover is generally lower, their profit margins more uncertain and the turnover periods longer than for purchases and sales. Motivated by these same arguments, entrepreneurs are more likely to go into business as traders than to manufacture goods themselves. One consequence is the widespread absence of local products in the markets in major cities – finished products are always imported, and even vegetables and fruit in season are sourced from abroad instead of the surrounding countryside.

Barriers for MFIs

Given the size of the country, the disastrous state of the roads apart from the few primary axis routes, the intermittent power supply and perennial security troubles, it is unrealistic to expect MFIs to make rapid inroads into all the provinces and achieve blanket coverage. "We lack the expertise for agricultural lending, and in view of the high investment costs, the profitability just isn't there," says a member of staff at the newly opened Oxus microfinance bank, for example. The reasons for this are multifaceted:

- High investment costs of meeting security standards, and minimal existing infrastructure.

Double bottom line – microfinance joins the debate

The double bottom line involves linking financial with social objectives throughout company activities. The original idea of microfinance – money for the poorest, so that they can free themselves from poverty – is now combined with the principle of the financial independence of institutions. On the one hand, this leads to high interest rates to compensate for the transaction costs of serving numerous small customers and to amortise possible defaults on repayment. On the other hand, the maxim of profitability ensures that the safest possible customers are recruited after detailed checks of their credit standing, to minimise the risk of over-indebtedness. Consequently, the microfinance sector tends to strive for larger customers, where the ratio of transaction costs to returns is more favourable.

- Few potential customers and low production output of small-scale farmers.
- No dependable sales markets for local production, no value chains.
- Inputs and production aids difficult to obtain.
- Advisory services from state agronomists barely exist.

Agriculture is dependent upon external factors in the most favourable circumstances, but in these conditions it is so uncertain that small producers can scarcely satisfy the terms of an MFI risk analysis.

No government support

The challenge of improving the production and sales conditions for small farmers by giving them access to capital is huge. Market studies looking at potential demand in peripheral provinces are a start, in order to convince the MFIs that start-up investments might be profitable. These studies are already available for a few provinces and need to be carried out in the other regions in future. It is also vital to make the government and donors aware that the agricultural sector needs support. In the words of a representative of Mecreco, a Congolese association of finance cooperatives: "Agriculture can help us to combat poverty. But up to now there has been absolutely no support for the sector. In India, finance institutions must set aside an amount for agricultural loans. Likewise in the Congo, the state should find ways to ensure the redistribution of money and opportunities across the totality of its territory." So far the government has relied on major infrastructure projects known as "les cinq chantiers" and on special economic zones along well-connected development axes. If the aim is seriously to shift the focus onto tackling food security and poverty reduction in rural regions, too, making these the basis for improving living conditions in the DRC as a whole, reinforcement of the agricultural sector and small producers must be driven forward in the next years.

How can rural regions be supported with microfinance loans?

Bearing in mind the potential of agriculture, the domestic market, jobs in the agricultural sector and the precarious food situation in the DRC, promotion of the agricultural sector on different levels should be prioritised – ideally in the following constellation:

The **state** creates incentives and enabling conditions for the microfinance sector by:

- offering subsidies/tax concessions for MFIs which open branches in structurally disadvantaged regions;
- expanding transport routes and the electricity supply to improve production conditions and access to markets;
- promoting producer cooperatives for the optimisation of production, storage, processing and marketing, and
- establishing an efficient advisory service.

Donors and meso-level institutions provide financial and technical support (e.g. via the Microfinance Promotion Fund (FPM) for financial inclusion) by:

- exerting influence on the government and the finance sector to promote branches and financial products in rural regions;
- tying support for MFIs to quotas for investment and lending for the agricultural sector;
- carrying out potential analyses in peripheral regions (already in progress under the auspices of the FPM).

Microfinance institutions develop adapted products:

- extending the range of provision for farmers (adapted repayment modalities, harvest insurance products);
- conducting market analyses and gathering experience from comparable countries on extending the product range and integrating neglected economically-active groups.

Investment in rural regions will not yield the same guaranteed returns in the foreseeable future as investment in urban centres. MFIs cannot operate at a loss if they want to serve customers in the long term and keep shareholders satisfied. If a share of the risks could be borne by a guarantee fund co-financed by donors, it might motivate MFIs to finance start-up business ventures and more risk-laden regions. An auditing body must ensure that the introduction of such a fund in no way distracts from the rigorous checks on customers which protect both lenders and customers from over-indebtedness.

Study and further reading

In 2012 an advisory team from the Centre for Rural Development (SLE) at the Humboldt University in Berlin carried out a study commissioned by KfW Development Bank on the effects of microfinance products on economic empowerment in the DRC. Economic empowerment encompasses an economic and a social perspective: effecting changes in profits and consumption and in the scope for decision-making about the use of resources. The results showed mild positive economic effects and limited positive social effects. Pronounced differences came to light between the genders (structural discrimination against women was exacerbated), economic sectors (trade was favoured over productive sectors) and regions (structurally weak regions were neglected).

Documentation of the study (in French):
Erik Engel et al.: Pour mieux se débrouiller? Autonomisation Économique par l'accès aux produits de microfinance en République démocratique du Congo. Berlin: SLE 2012. **www.sle-berlin. de**

A conflict-sensitive approach is needed

Despite good potential for food production, South Sudan's agriculture is not feeding its population. The impacts of decades of armed conflict are posing enormous challenges for the sector. Farmer Field Schools seem to be a promising instrument to improve food security and livelihoods of small-scale farmers in the country.

Moses, a typical local farmer, lives in Morobo, located in the very South of the greenbelt of South Sudan. This region has a high potential for agriculture and food production. Rainfall above 1,200mm distributed in two rainy seasons per year and virgin clay soils render this area capable of feeding the entire population of South Sudan. As population density is low access to land is not limited. Nevertheless, Moses cultivates only one hectare of land. He mostly grows food crops, such as sorghum, maize, cassava, beans and groundnuts, on traditional rain-fed systems to feed him, his wife and five of his children – without any kind of mechanisation. He generates low yields and hardly markets any of his products. Markets are too far away, and he does not even have a bicycle. Additionally, like many others, he lacks appropriate storage facilities, and streets in the new country are in bad repair and hardly passable in the rainy season, which discourages traders to come to his village. These are some reasons for a very low income and why only one of his five children can attend a secondary school. Apart from digging his own land, he occasionally helps on other farms or produces charcoal to generate some cash.

Moses was born in Morobo, but spent half of his life in a refugee camp in Uganda, with limited access to education. In 2002, after the situation calmed down at his home land, he and his family moved back to Morobo.

The post-conflict situation in South Sudan

After nearly five decades of warfare, the new Government of South Sudan faces immense challenges in building the new state. The repatriation of citizens from exile, the diversification of the country's oil-dependent economy, as well as securing peace within the country's borders, are some of the major issues to be tackled. State building is still just getting off the ground.

As more than 50 per cent of all South Sudanese live in absolute poverty, and 80 per cent of the population earn their living from small-scale farming, agriculture is a strategic sector for the Government. Without appropriate investment in agriculture, it will be impossible to lift the majority of the South Sudanese out of poverty and food insecurity. However, related support institutions, like training centres and governmental services as well as private partners for potential co-operation are rare and hardly work. Educational level is low.

From self-help groups to Farmer Field Schools

In 2006, Moses and 22 other small-scale farmers formed the Alotto farmers group. Many of those groups have

Groups selected for the farmer field schools should have a realistic chance of being linked to markets.

Photo: I. Hoffmann

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been built around Morobo with the aim to help each other and improve their production as well as to facilitate access to support provided by donors. Two years later, a GIZ DETA project (see Box on page 39) offered support based on the existing group structure and conducted a needs assessment. In 2012, Moses' Alotto farmers group was selected, amongst others, for including it into the Farmer Field School approach (see Box below). The criteria were that the groups were easily accessible and road-connected, thus having the realistic chance of being linked to local and national markets and therefore being likely to contribute to increased national food production. In total, 26 farmers groups composed of 452 small-scale farmers, have been selected or formed, out of whom 166 are women, and organised in 13 Farmer Field Schools.

Moses' weekly routine and thinking has changed since the FFS was formed. Instead of just farming his private land, he meets once a week with farmers from three different groups and a facilitator on the jointly owned FFS field. The facilitator supervises group activities and contributes knowledge on state-of-the-art agricultural technologies. The topics of the FFS are mainly production oriented and include planting techniques, weeds, pest and disease management, post-harvest techniques, and soil and water conservation practices.

Photo: I. Hoffmann

166 of the 452 farmers participating in field schools were women.

Furthermore, Moses is proud of acting as its secretary. He is one of only five group members who can read and write, which helped him be elected. The only literate woman has the post of treasurer. Other posts include the chairperson and the respective vice-positions. When Moses now works in his own fields, he applies what he has learned within the FFS.

First results ...

FFS provides farmers with technical and organisational skills. Since Moses attended the FFS, he has tried to apply improved practices in his individual fields as well as possible and also talks about them with non-FFS participants. He very much appreciates what he has learned, such as row planting and prober spacing. He states that these techniques "have brought large effects". He ranks row planting high because it makes weeding easier. In the past, weeding was a woman's activity. Today Moses does it, too.

During the period of the SLE study, when the first harvest after the introduction of the FFS activities was under way, Moses and other members of the group interviewed expected higher yields.

The majority of participants are highly motivated. On average, more than two thirds of the group members regularly participate in the FFS activities. Farmers have described their common interest in keeping the group together and helping and learning from each other. Access to improved agricultural practices, the increase of knowledge and the training that they are getting have finally helped them to improve the lives of their families. Nevertheless motivating the youth is still a challenge as young people see agriculture as an unprofitable occupation. Moses' two oldest children are not keen to get engaged in farming. They grew up in refugee camps and have no connection to practical agriculture. The oldest son already lives in a city and is trying to make a living from offering taxi services using a motorbike that he has rented from a big businessman.

Moses and the majority of other farmers very much appreciate the practical approach, which is suitable

The Farmer Field School approach

The FFS approach was developed by FAO in the late 1980s in the context of Integrated Pest Management (IPM) in South East Asia. Since this time, the concept has been further developed and adjusted to many different contexts, also considering the complexity of livelihoods. The FFS approach and its various forms (e.g. AgroPastoral Field Schools, Farmers Live Schools, Junior Farmer Field Schools) have become very popular in development work but also in transition aid. FFS is a participatory approach where group members identify topics of common interest that they want to learn about. Generally, production and marketing-related issues are covered. FFS participants combine their local knowledge with new information to adjust their referring actions. The process builds self-confidence and teaches decision-making, problem-solving and management skills.

The FFS approach in the greenbelt of South Sudan

The concept of FFS was developed by GIZ DETA and the local government. Facilitators are in charge of training of the farmers and follow-up in the individual farmers' fields. They are backed by the DETA project and the master trainer, the director of the Agricultural Advisory Organization, a private agency. The approach is financed by GIZ DETA, which pays facilitators a small incentive. Farmers are not contributing money to the FFS system yet.

for adults with a lower level of education. However, since 70 per cent of his group are illiterate, facilitators and support services are facing the challenge of finding suitable methods for dissemination of new knowledge. Furthermore, when it comes to market orientation, vulnerable people with low capacities are easily left out.

... and long-term vision

The FFS itself does not need to be sustained. However, to assure the impact of FFS, including farmers' capacities to do farmer-to-farmer extension and to look for further knowledge providers needs further strengthening. The aim is to increase production and to strengthen the commercialisation of agricultural products by promoting appropriate storage and gradually linking farmers to markets. The goal is also to achieve self-sustained groups, through subsequent actions such as collective marketing of produce and lobbying through farmer networks, savings groups and other associations.

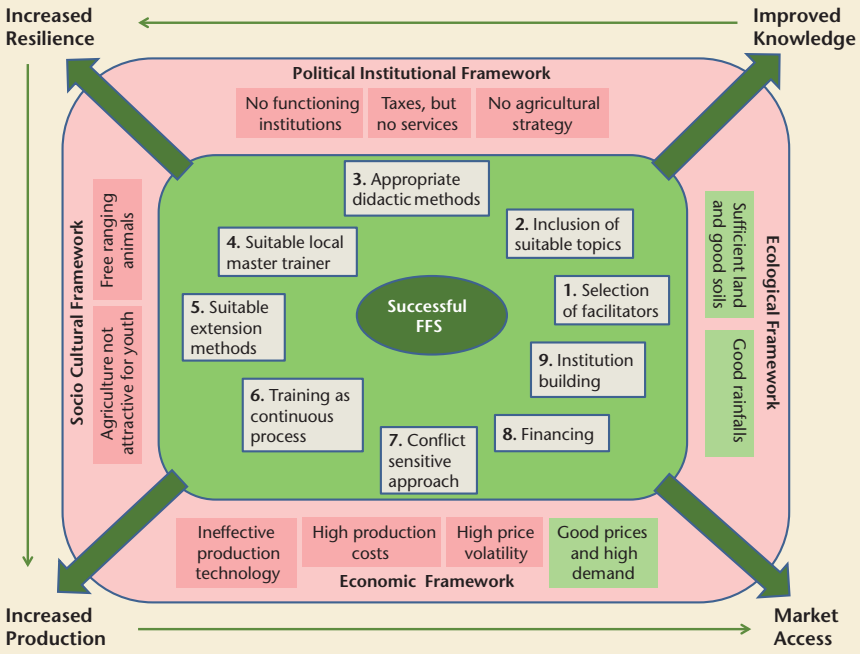
In sum, the FFS approach is suitable in post-conflict situations to rebuild agriculture, improve food security and sustain farmers' livelihoods. However, when it comes to training of facilitators and the gradual handover to facilitators that are members of the FFS as well as accompanying measures such as infrastructure development and building up related knowledge, brokers are necessary to guarantee the long-term success of FFS achievements.

A key challenge for FFS for rehabilitation of agriculture is to find an appropriate balance between meeting short-term needs and the long-term desire to change. Short-term funding of donors' engagement in transition situations is contrary to the need of fundamental changes in behaviour and knowledge transfer as well as setting up related institutions. All this requires a long-term effort.

FFS scope of action and main success factors

The FFS scope of action is given by the framework, consisting of the four elements represented below. Within this scope, the success factors shall contribute to improve farmers' knowledge, strengthen their resilience, increase their production and finally market products to generate a reasonable income.

Most of the success factors are of general validity. Success factor 7 implies that a conflict-sensitive approach based on Do No Harm is required in the project area. This is because the repatriation process has not yet been completed in some parts of the greenbelt region and others are still facing inter-ethnical conflicts.



Background of the study

Since 2008, the Deutsche Gesellschaft für Internationale Zusammenarbeit (GIZ) has been implementing a Development-Oriented Emergency and Transitional Aid (DETA) project in South Sudan. The project works across the three states of Greater (Western, Central and Eastern) Equatoria to support host communities, returnees, and Internally Displaced People (IDPs) in reconstructing their lives. In co-operation with the local government, GIZ DETA has been running a pilot phase of Farmer Field Schools (FFS) in the Central Equatoria State (CES) since April 2012. The goal of the FFS is to foster farmers' productivity and market-oriented production.

GIZ DETA has asked the team of the Centre for Rural Development (SLE) to assess the pilot phase of the FFS in Morobo County (CES) for (i) potential improvements and (ii) possibilities of scaling up the GIZ DETA FFS approach to the Eastern (EES) and Western Equatoria States (WES). Data was collected in the three areas. In Morobo, ten out of thirteen FFS have provided information on their socio-economic situation and first impacts of the FFS. In EES and WES farmers groups, individual farmers and other key persons gave input to access the situation in these areas.

Further reading:

Ilse Hoffmann et al.: Achieving Food Security in a Post-Conflict Context, Recommendations for a Farmer Field School Approach in the Greenbelt of South Sudan. Berlin: SLE 2012. **www.sle-berlin. de**

Moving towards resilient farming in northern Ethiopia

Improving watershed conservation and household food security has been one of the major development challenges in the semi-arid areas of northern Ethiopia. The initial survey by ILRI's Improving Productivity and Marketing Success project has revealed that physical conservation measures alone do not result in higher farmers' income. However, the introduction of market-oriented commodity development such as beekeeping, sheep-fattening, and high value crops resulted in farmers' income rising fivefold from 2005 to 2009.

Rainfed dependent crop-livestock mixed farming has been a common practice in the drylands of Atsbi-Womberta district of northern Ethiopia, where rainfall is extremely variable. With increasing population pressure, the cultivation of crops and farming expanded to hilly sites unsuitable for cultivation of crops. The cutting and use of trees for wood, fuel and other purposes reduces the vegetation cover substantially. The reduced vegetation cover resulted in severe erosion in the hilly sites and the burial of fertile bottomlands by infertile gravels from the upper hilly sites. In aggregate, these developments ultimately led to land degradation and many food insecure households in the Barka-Birki watersheds, Atsbi-Womberta district of northern Ethiopia.

Reversing watershed degradation and food insecurity has been one of the major development challenges in the semi-arid areas of northern Ethiopia. As an entry point, the government of Ethiopia launched and mobilised community based physical soil and water conservation at village and watershed levels. Conservation was initiated on cultivable lands and gradually extended to watershed levels. The conservation and enclosure of watersheds have resulted in improved water retention capacity and recovery of perennial bee forage plants in upstream hilly sides, and revitalised surface and groundwater in the downstream of the watersheds.

The project "Improving Productivity and Market Success" (IPMS-ILRI), directed by the International Livestock Research Institute (ILRI) and funded by the Canadian International Development Agency (CIDA), concluded in its first survey that despite the intensive interventions in watershed conservation and recovery, the contribution to the economy of smallholder farmers had been low. The watershed approach had been useful to harmonise the use of soil, water and vegetation in a way that conserved these resources and improved household income. The IPMS project argues that the watershed management can be improved with market-oriented commodity developments along the watershed resources gradient: upstream, valley bottoms and downstream.

Photo: ILRI

Transforming land degradation into sources of feed and water through cut-and-carry systems.

In order to increase benefits to farmers, the IPMS project, in collaboration with public partners, mainly the district Office of Agriculture and Rural Development, introduced and tested market-oriented commodity development interventions along the resources gradient of the Barka-Birki watershed of Atsbi-Womberta district, northern Ethiopia. The interventions were participatory, demand driven, skill and knowledge based. The introduction, testing and promoting of market-oriented commodity development in Atsbi-Womberta district started in 2005/06. The objective of this paper is to present the response to the inte-

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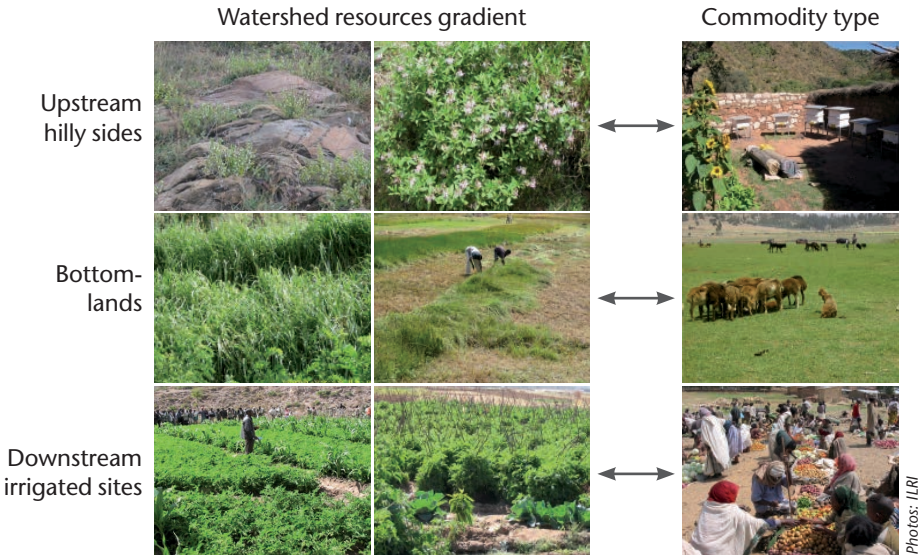
The synergy of the watershed-based conserved resources gradient (left) with market-oriented commodities (right), Atsbi-Womberta district, northern Ethiopia



Photos: ILRI

grated interventions along the watershed resources gradient.

Watershed resources gradient and commodity interventions

The conserved Barka-Birki watershed is characterised by a variation in resources abundance (water, soil and vegetation) along the watershed continuum-upstream hilly sides, bottomlands and downstream sites. The upstream hilly sides are usually with shallow soil depth and moisture retention, and can support the seasonal growth of perennial vegetation, particularly under rainwater harvesting and retention measures. The bottomlands with deep soil depth and high moisture retention can support annual and perennial vegetation, and plants stay green longer than the unprotected watersheds. The downstream sites are usually rich with surface and groundwater resources and are suitable for irrigated crops development such as vegetables and fodder.

The types of market-oriented development interventions were varied according to the resources gradient of the watershed (see Figure above). Beekeeping development interventions were targeted in the upstream hilly sites, where there is high cover-abundance of bee forage plants. Sheep fattening development interventions were focused on the bottomlands, where the lush growth and biomass of forage availability is high. Most of the bottomland forage sources were transformed from open grazing into a cut-and-carry system of livestock feeding. With increased vegetation cover in the hilly sites and bottomlands, runoff decreased, infiltration increased and direct loss of moisture by evaporation was reduced. This enriched the surface and groundwater in the downstream sites of the Barka-Birki watershed. High-value irrigated crop development interventions were targeted in the downstream of the watershed.

The key interventions by IPMS and partners in market-oriented commodity development included technical knowledge and skill development of farmers, extension service providers and other relevant partners along the commodity value chain development. The value chain-based interventions comprised improved technologies, processing and establishment of market linkages and access to improved inputs of beekeeping, sheep fattening and high-value irrigated crops. Beekeeping value chain interventions included improvement in bee forage availability, colony multiplication, improved hive use and management, honey harvesting techniques, storage and grading, and market linkages. Similar intervention approaches followed for sheep fattening. For high-value irrigated crops, interventions comprised the selection of high-value crops (onion, tomato, pepper and garlic), supply of planting materials, implement demonstration, operation and maintenance, and market linkages.

Contribution to household income

Results of the development interventions show that in the upstream watersheds, the average net income of the beekeeping adopter households increased by about threefold between 2005 and 2009 (see Figure 1 on page 42). A honey productivity trend of adopters and non-adopters was consistent over several seasons where the rainfall amount and distribution varied considerably.

In the bottomlands, the increase in forage covers slowed down runoff and increased infiltration and soil trapping. During the dry season, stubbles were maintained at 10–20 centimetres. The stubble soil cover reduced the unproductive loss of water through evaporation. Better soil moisture retention and fertile soil trapping in the bottomlands increased the frequency of annual forage harvest to three. Aggregately, total forage biomass grew about fivefold following the introduction of the cut-and-carry system of livestock feeding interventions. Similarly, the number of fattened sheep and income had increased fivefold in the bottomlands by 2009 compared to 2005 (see Figure 2 on page 42).

The net income of adopter farmers rose ninefold in the irrigated down-

stream of the watersheds as compared to the income of farmers from the non-intervention watersheds (see Figure 3, left). The increase in household income was associated with the shifts in cropping pattern from traditional low-value cereal crops (barley and wheat) to high-value crops such as vegetables and spices (see Figure 3, right). Because of the seasonal supply of water in the irrigated sites, farmers shifted to intensification and diversification of high-value crops such as pulses (faba bean and field pea) to exploit market niches during the dry season. Pulses have been a preferred food for workers in the sesame growing lowlands of north-western Ethiopia. The harvesting of irrigated pulses in April or May coincides with the peak demand in the lowlands, and irrigated-pulse growers fetch higher prices (40–50 % higher) without competition from the rainfed pulses, which are harvested in October. Moreover, the integration of pulses into a vegetable system has proved to break insect and disease cycles and to improve soil fertility.

Figure 1: Honey production value (birr/household, left) and honey productivity (kg/hive/year, right) of beekeeping adopter and non-adopter households in the upper hilly sides of the watershed, Atsbi-Womberta district, northern Ethiopia

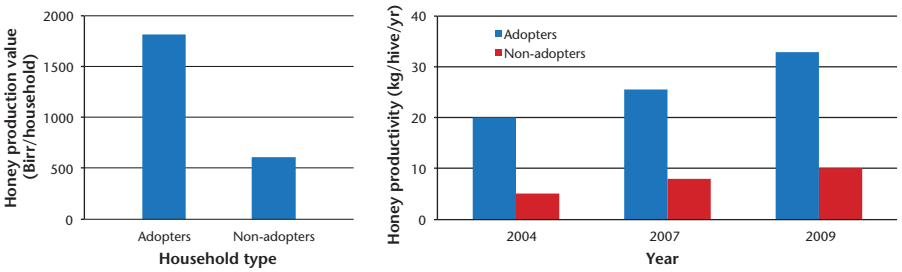


Figure 2: Forage biomass (t/year, left) under improved and traditional grazing, and number of fattened sheep (number/year, right) in the bottomlands of the watersheds, Atsbi-Womberta district, northern Ethiopia

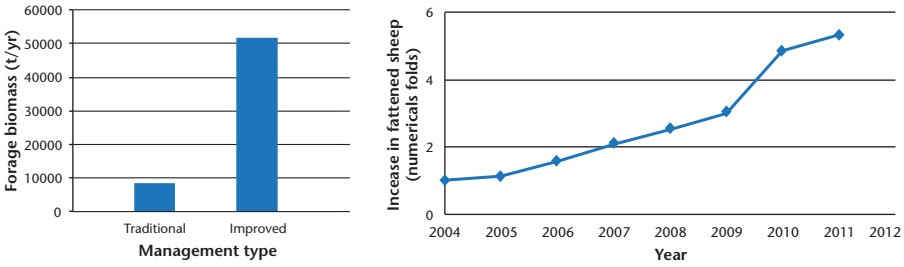
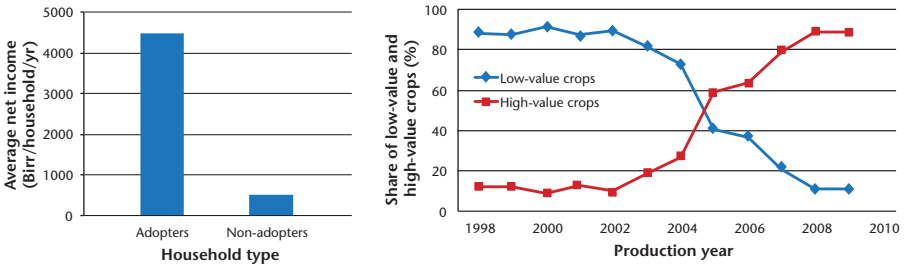


Figure 3: Average net income (birr/household/year) of adopter and non-adopter farmers (left) and shifting in cropping pattern to high-value crops (right) in the downstream irrigated sites of the watersheds, Atsbi-Womberta district, northern Ethiopia



Promotion for improved uptake of successes

Market-oriented commodity (beekeeping, sheep fattening and irrigated crops) development along the watershed resources gradient has been successfully implemented for the improved benefit of the rural community. The processes and results of integrating market-oriented commodity development along the conserved watershed resources gradient has been demonstrated and promoted through awareness creation, discussion forums, field visits and tours for selected farmers, community leaders, experts, researchers and decision-makers outside the tested watersheds. Integrating market-oriented commodity development into the conserved watersheds has become part of the district programme. The discussion forums and field visits were found to be the most successful approaches to promote the success of market-oriented commodity development along the conserved watershed gradient.

Conclusion

In the upper stream of the conserved watershed, bee forage plants, mostly with deep-rooted perennial shrubs, are able to extract moisture deep in the soil, stay green and blossom longer than in the unprotected sites. Drained water from the upper stream has contributed to the development of year-round green forage in the bottomlands, which improves the performance of fattened sheep and household income. Runoff slowdown along the upper stream and in the bottomlands contributed to the development of surface and groundwater in the downstream of the watershed. This is the source of water useful for irrigated crops development to sustain crop production in seasons when the traditional crops fail to produce grain and declined livestock productivity in the non-intervention sites.

In brief

Vegetation slows global warming

As temperatures rise, plants generate more gases which contribute to cloud formation and hence to cooling. In this way, vegetation slows global warming. According to a study by international scientists, temperatures in rural and forested regions could rise up to 30 per cent less than in regions with little vegetation. Globally, however, the mitigation effect on global warming will only be around 1 per cent. The gases released by the plants form aerosols with particles less than one micrometre in size. In their study, the researchers showed that these particles increase with rising temperatures. Aerosols affect the earth's climate in two ways. First, despite their small size, they reflect sunlight. Second, they form seeds on which water can condense, ultimately forming cloud droplets. The new results show that aerosols of biological origin slow temperature changes across continents. However, the researchers emphasise that these complex processes cannot be documented without extensive long-term observation. *(Tropos/ile)*

Resource-friendly animal feed

A research collaboration between Stellenbosch University/South Africa and the Cape Town-based animal feed company AgriProtein has won the Innovation Prize for Africa (IPA) 2013. It was recognised for its innovative approach to nutrient recycling – a method that uses waste and fly larvae to produce natural animal feed. The AgriProtein solution collects biodegradable waste and feeds it to flies; they in turn produce larvae that are ground into protein. According to the scientists, the larva meal is a good protein source for animals; the feed they have tested thus far produced the same (or even better) results as fishmeal and always better results than soy. The chemical and amino acid composition of larvae protein is very similar to fishmeal. It will be priced lower than the products it competes with, the scientists say. Another benefit of this project is that waste that would otherwise end up in landfill sites is now used as a valuable, controlled breeding area for these insects. Besides, it saves the seas, for nearly one third of the fish taken from the seas, some fifty million tonnes a year, is used in industrial agricultural and pet food industries. *(IPA/AgriProtein/ile)*

Cleaning water with a copper plate

Scientists at the University of Dhaka, Bangladesh made some interesting findings on the destruction of diarrhoeal germs in drinking water using simple copper, zinc and brass plates. The idea to carry out the trials stemmed from a news item that brass doorknobs in hospitals have less germs on them compared to aluminium doorknobs. The research findings show that isolated copper destroys diarrhoeal germs. The scientists took pond water in ice cream boxes with brass, copper and zinc plates. The boxes were left for varying periods ranging from 24 hours to 72 hours. After 24 hours no coliform bacteria including *E.Coli* could be detected in the box containing the copper plates. In a further trial, the scientists added 1 ml of ascorbic acid to 400 ml of pond water in the box with copper plate. This accelerated the process. All coliform bacteria including *E.Coli* were destroyed in two hours. In practice, ascorbic acid could potentially be replaced by lemon juice. However, the long term effect of copper or zinc on health needs to be ascertained before these techniques are widely publicised. But for short term and emergency use, a copper plate in an ice cream box may become a prize technique world over. *(University of Dhaka/ile)*

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