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Family Farming

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Dear Reader,

When we decided to have the latest edition of our journal report on the International Year of Family Farming, as the United Nations declared 2014, the first question to arise was what the term actually referred to. After all, having been shaped by our rationally-based German education, and together with the claim to a scientific approach, we definitely needed some sort of category, a pigeon-hole, if you like, that we can put the topic into for the time being and set out from to meticulously unravel it. Of course FAO Director General José Graziano da Silva has no difficulty in presenting us the definition that his organisation has opted for, clearly demonstrating at the same time that family farming is anything but a category for pigeon-holing.

Of course all family farms do share common characteristics. Not only is the farming family the chief source of labour, but it also bears full responsibility for all business decisions (which means that it also incurs the full risk that such decisions entail). Usually, the farm is the family's home, too, and it performs not only an economic but also a social and cultural role. And it is passed on from one generation to the next, so that one can assume that business decisions are taken with a view to long-term viability and sustainability. But this is just about it in terms of common features. Neither the size of the farms nor the type of production they perform plays a role. A 60-hectare dairy farm in Northern Germany may belong to them just as much as a small-scale fisher in the Philippines or a 200-hectare cattle-breeding farm in the Argentinian Pampa.

What makes family farms so important, also for the United Nations, is that they are the main producers of food consumed locally in both developed and developing countries. There are around 525 million family farmers, and they account for well over half of all agricultural production. Thus they play a crucial role in maintaining global food security. To raise awareness of this significance, but also to show governments and society what they have to do to support family farms in performing this important role is the notion behind the United Nations' proclaiming the International Year of Family Farming. We have asked representatives of international organisations, science, agricultural associations and development co-operation and, last but not least, a family farmer himself to show us where they believe the strengths of the family farming model lie and what, from their point of view, needs to be done for family farms to take full advantage of their potential – all of this provided, of

course, that natural resources are used in a sustainable and responsible manner.

Our "International Platform" section also addresses the conservation of natural resources and the use of potentials. First of all, our example from the Mekong River Basin shows how difficult it is for communities to share the valuable resource of water without any of the riparian residents being put at a disadvantage and human activities having a negative impact on watersheds (p. 32).

Of course prevention is always better than cure, but often it is simply too late for the former. Accelerating industrialisation, intensified exploitation of mineral resources, irrigation with polluted water, the overuse of fertiliser and chemicals are just a few of the reasons for a major proportion of usable land being affected by severe soil degradation. Elaborate remediation projects are to help repair damage to the natural landscapes and to initiate ecosystem recovery (p. 38).

Using biogas as a source of energy requires a relatively small effort, but it offers a wide range of advantages. Together with partners in Kenya, the International Fund for Agricultural Development has supported a system that is flexible, easy to handle and transportable. Decreases in deforestation thanks to reduced firewood consumption, a reduced incidence of respiratory diseases and a lower workload for women are just a few of the system's benefits (p. 35).

The last project we present has set itself the task of helping small sorghum farmers in the arid and semi-arid regions of Kenya and Tanzania increase production and productivity and linking them to markets (p. 40). Thanks to an intensive integration of their farms in the sorghum value chain including access to improved seed and fertilisers, service provision and capacity building, sorghum sales by the 2,500 farmers taking part in the pilot project have risen by 130 per cent in a single year.

We wish you inspiring reading!

Silvia Richter



Partner institutions of Rural 21:



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Photo: E. Zaumseil



Photo: KfW-Photoarchiv



Photo: IFAD



Photo: Africa Harvest

Climate protection in agriculture – a risk for smallholders?

Taking the reduction of greenhouse gas (GHGs) emissions from agriculture into the United Nations Framework Convention on Climate Change (UNFCCC) has been discussed since roughly 2009. It is undisputed that numerous agricultural activities contribute both to reducing emissions and to an additional sequestration of carbon in the soil as well as enhancing productivity and the capacity to adapt to the impacts of climate change. However, integration in the international climate process bears a number of risks, in particular for smallholders in developing countries. This issue was debated by the German Development Institute, Misereor and Bread for the World during a side event at the climate negotiations in Bonn, Germany, early in June 2014. The event was a follow-up to a German expert workshop in February that had been attended by representatives from politics, science and civil society.

Adapting to climate change in agriculture is financed by the UNFCCC via a wide range of funds. In spite of its relevance for climate protection, the agricultural sector is not explicitly covered within individual strands of negotiation. Nevertheless, emissions from agriculture are already referred to in many mechanisms. For example, in pilot measures of the REDD+ mechanism (Reducing Emissions from Deforestation and Forest Degradation), emissions in developing countries originating from the transformation of forests into cropland are to be reduced, too. In addition,

developing countries may adopt agriculture in their Nationally Appropriate Mitigation Actions (NAMA).

So far, the technical negotiations in a UNFCCC subsidiary body have made only slow progress. Also, developing countries are divided on the issue, with some of them fearing committing themselves to emission reductions and seeking to establish adaptation as a focal issue whereas others are hoping for additional finance for which they are willing to accept focusing on climate protection and adaptation on a par. And as yet, it is unclear how the topic could be addressed in a future global climate agreement. What also makes the debate so difficult is that this aspect is often associated with the issue of including it in carbon market mechanisms.

■ The role of carbon markets

The integration of agriculture in international carbon markets is to provide farmers with an incentive to reduce emissions while simultaneously generating income to finance adaptation measures. The buyer can use the certified reduced amount of GHGs to meet his or her reduction commitments. The events showed that environmental and development organisations view the additional valuation of cropland by the process sceptically. Financing adaptation measures must not be dependent on volatile carbon markets and proof of climate protection. In addition, pilot

projects such as the World Bank's Kenya Agricultural Carbon Project show that such measures are unsuitable for smallholder agriculture. The initial investments are too high, while the long-term returns from small areas are too low. Moreover, it can be expected that competition for land for various uses and the value of fertile land are going to increase further. Smallholders who often enough do not have formal tenure or land-use rights are set to be the losers from such a development.

Both events also discussed the extent to which other international organisations were addressing the issue. Here, special attention was given to the Food and Agriculture Organization (FAO), which is not only actively participating in the UNFCCC process but is also contributing its own activities to the agriculture and climate change interface e.g. with the Committee on World Food Security (CFS) and the Mitigation of Climate Change in Agriculture Programme (MICCA).

■ Opportunities and risks

In spite of the existing synergies between adaptation and mitigation in the agricultural sector, there is an overall risk that too strong a focus on mitigation aspects could mean that crucial smallholder issues will no longer be sufficiently considered, especially in developing countries. However, climate protection could lose out, too, for carbon sequestration in the soil is always only temporary. In certain circumstances, changes in soil management practices can once again release the carbon stored. Furthermore, measuring such storage is a very elaborate and cost-intensive process if inac-



Photo: J. Boethling

Around ten to twelve per cent of anthropogenic greenhouse gas emissions (GHGs) comes directly from agricultural activities.

curacy is to be reduced to a minimum. Thus, there is always a risk of emission reductions being accounted that do not exist in reality or that are prematurely re-released into the atmosphere. In addition, scarce financial resources are used to calculate emission reductions instead of for supporting food security.

Strategies for climate protection, adaptation and rural development have to be designed coherently. The two events showed the need for promoting cross-sector and cross-policy thinking and acting, both between agricultural and climate policies and within climate policy itself. While investments in agriculture are essential, they ought to be provided above all via public finance. This can strengthen smallholder and sustainable agriculture, which makes the chief contribution to food security in the developing countries and is usually not reached by the private sector. As Jerome

Mounsey of the EU Commission stressed, “The farmer has to be in the middle.” Within the international climate negotiations, integrated approaches ought to be pursued to an increasing degree. At the same time, it has to be remembered that both the right to food and supporting adaptation represent rights that must not be tied to proof of climate protection. It is therefore all the more important that international human rights standards and instruments such as the Voluntary Guidelines to support the progressive realisation of the right to adequate food in the context of national food security (2004) or the Voluntary Guidelines on the Responsible Governance of Tenure of Land, Fisheries and Forests (2012) are applied under the UNFCCC. Functioning complaints mechanisms need to be established, too.

In the industrialised and emerging economies, the focus in emission

reductions should not be solely on food production; lifestyles and eating habits ought to be changed as well, while in developing countries, post-harvest losses need to be reduced.

The processes that will be underway in and outside the UNFCCC over the next few years require critical support by civil society actors. There is a need for independent monitoring of agricultural projects and their impacts on the rural population. Here, lessons learnt by the FAO’s CFS can be of use. Unlike in the climate negotiations, civil society is involved in the processes here.

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No food and nutrition security without resilience

The need to include the issue of resilience in the political post-2015 agenda was repeatedly stressed by the more than 800 participants of this year’s International Policy Research Institute’s (IFPRI) 2020 Conference in Addis Ababa/Ethiopia in mid-May 2014. General issues raised throughout the conference included:

- 1) The importance of building resilience for development. There would not be any significant achievement of food and nutrition security at the various levels if the chronic vulnerability and risks of especially the poor were not tackled.
- 2) The need for a change of perspective in the resilience discussion and concepts. The individuals and communities were not only victims to shocks but at any time, they had a potential for reaction that could be targeted and supported.
- 3) The very site- and situation-specific nature of building or strengthening

resilience of individuals, households, communities or bigger systems. For instance, access to markets would expose smallholders to price spikes, which might cause shocks to them. On the other hand, access to markets could also enhance resilience of smallholders by selling surplus production or buying food should the need arise.

- 4) The need to lower risks of individuals and groups to reduce their exposure to shocks. In this respect, Simon Maxwell of the Overseas Development Institute in the UK suggested a stress test for the food systems. In a similar manner to the stress tests of banks, the food systems needed to be checked on and aligned with the ability to react to and buffer chronic stress and sudden shocks.

All in all, as Joachim von Braun from the Center for Development Research in Germany summarised, a collective will

was noticeable throughout the conference to include the issue of resilience and the challenge of enhancing resilience of especially the poor in the political post-2015 agenda setting. By enhancing resilience, all potential Sustainable Development Goals could be made more effective. However, building and enhancing resilience was an instrument and an issue of investment contributing to the improvement of food and nutrition security rather than a goal of sustainable development in itself. Hence, resilience should not become the next buzzword under which everybody in policy, research and development would try to include aspects of their work, thus overburdening the concept and rendering it no longer operational.

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For a more comprehensive version of the article, see: ► www.rural21.com

“Family farms are key to feeding the world”

José Graziano da Silva, Director-General of the United Nations Food and Agriculture Organization (FAO), on the role of family farms for global food security, the need for sound rural development strategies and the responsibility of governments, the private sector and civil society.

■ Mr. da Silva, why did the United Nations declare 2014 the International Year of Family Farming? What is this meant to achieve?

The declaration of the International Year of Family Farming reflects a growing global consensus that family farming is key to feeding a global population that is expected to reach more than nine billion people by 2050. There are over 500 million family farms spread across the planet, and they are responsible for at least 56 per cent of agricultural production world-wide. In many regions, they are the main producers of the food we eat every day. At the same time, around 842 million people around the world are chronically hungry because they cannot afford to eat adequately. Over 70 per cent of the food insecure population live in rural areas of Africa, Asia, Latin America and the Near East. Many of them are family farmers, especially subsistence farmers, with limited access to natural resources, finance, credit and technology. These conditions prevent them from fulfilling their true potential.

However, with an enabling policy environment, we know that family farmers can boost productivity and foster sustainable local production and consumption circuits which have the potential not only to fight hunger, which is our main objective, but also to boost local markets while sustainably managing natural resources. The International Year was initiated with the understanding that it will create a unique opportunity to develop means for prosperous and sustainable agriculture based on family farms. It is a

call to governments, civil society, the academic community and the private sector to unite their forces, increase their understanding of the potential and challenges faced by family farmers, and take concrete action.

■ How does the United Nations define ‘family farms’?

Most family farms are small farms – in fact the vast majority of the world’s farms are smaller than two hectares. However, family farmers are an extremely diverse group, ranging from smallholders to large farm owners, indigenous peoples, fisherfolk, forest farmers, pastoralists and many others.

At FAO, we have adopted a definition to facilitate policy dialogue throughout 2014 which describes family farms as all family-based agricultural activities. That includes all agricultural, forestry, fisheries, pastoral and aquaculture production which is managed and operated by a family, and is predominantly reliant on family labour, including by both women and men.

I think this definition has proven valid as a starting point for facilitating policy dialogue so far that is allowing us to use the International Year of Family Farming to provide momentum for a qualitative step forward for policy and analytical purposes. This is being done, for example, by achieving common international criteria to facilitate definitions and typologies of family farming at country and regional level. This step would facilitate the identification of effective ways to support family farming in its diversity. Governments, for

instance, are in need of clear criteria so that they can gather adequate statistics on the economic and demographic dimensions of family farming in order to enhance pro-family farming policy initiatives. Furthermore, concerns are being voiced over the ‘invisibility’ of women’s participation in agricultural activities, income and tenure, or how to adequately capture the commonalities and diversities of family farms operating in various agro-ecological regions and social, economic and cultural contexts. FAO is addressing these demands with the aim to deliver criteria and improved knowledge about family farming on a permanent basis.

■ Does family farming represent a model for the future of all regions throughout the world?

Family farmers are the main producers of food consumed locally in both developed and developing countries. They also work a significant portion of the world’s farmland in all world regions: 85 per cent in Asia, 62 per cent in Africa, 83 per cent in North and Central America, 68 per cent in Europe and 18 per cent in South America. There are, however, different models of family farming in different regions. For example, family farms are the main source of rice production in Asia. In the United States, family farmers grow 84 per cent of all produce, working 78 per cent of all farmland and making 230 billion US dollars in sales each year. In Brazil, family farmers working on less than 25 per cent of the land provide 83 per cent of cassava, 70 per cent of beans and 46 per cent of maize, and they account for 38 per cent of the agribusiness value chain.



*José Graziano da Silva,
Director-General of the United
Nations Food and Agriculture
Organization (FAO)*

Photo: FAO

And family farmers in Fiji provide 84 per cent of yam, rice, manioc, maize and bean production, working on 47.4 per cent of the land.

These numbers speak for themselves. If we want to feed over nine billion people in 2050, family farming needs to be part of the equation. Neither is there any doubt that an increase in productivity for poor small-scale family farmers will result in better food security. One important aspect to stress is that we are obliged to increase productivity while preserving natural resources and protecting biodiversity. In this regard, one major asset of family farming is that it tends to run crop-diversification-based agricultural systems, which are essential for safeguarding biodiversity and contributing to healthier and more balanced diets.

■ **What are the main challenges that family farms face world-wide nowadays? And – as a consequence – what kind of support do they need to be ready for the future?**

Climate change is introducing a host of new challenges not just for family farms, but for the entire world agricultural sector and for humanity in general. The degradation of land and water resources and the loss of biodiversity are already taking a toll on farming systems. Together with population increase, this has created enormous and competing pressures for different land uses. I think that multi-stakeholder dialogue that builds consensus and facilitates

concrete action is the answer. In this regard, the Voluntary Guidelines on the Responsible Governance of Tenure of Land, Fisheries and Forests endorsed in 2012 by the Members of the Committee on World Food Security (CFS) sets an important precedent: internationally

agreed-on guidance on what needs to be done to ensure that the use of natural resources support our food security goals. FAO played an important role in the debate that led to the approval of these guidelines and involved governments, private sector and civil society organisations among other actors, and we are working with dozens of countries to ensure their adequate implementation. The Principles on Responsible Agricultural Investment, which are currently being discussed in the CFS, will be an important complement to the Voluntary Guidelines given the impact that investments may have – for better or for worse – on the food security of poor and developing countries.

I also want to stress that we need to pay special attention to women and young farmers. Often, the important role women play in family farming is not recognised in terms of income earned, asset ownership and succession. Men have more access to services than women. There is a need for information and awareness campaigns about women in family farming to fill this gap. Another concern is that in many areas youth are losing interest in agriculture and instead are looking for jobs in urban areas. Governments need to invest more in rural areas and in agriculture. There is a need to develop programmes and projects that target young farmers specifically and provide them with access to land, credit and technical knowledge. I think that a rural development strategy, and not

just an agricultural one, will meet this challenge. Access to adequate goods, services, job opportunities and leisure opportunities would convince more youth to stay closer to the family farm.

■ **What do you expect of the national governments? And what should the international community do?**

Focusing on national policies for agricultural and rural development is of the utmost importance. Facilitating access to land, water and other natural resources and implementing public policies with regard to credit, technical assistance, insurance, market access, public purchases and appropriate technologies are key actions to be implemented by the governments. They need to ensure that this contribution is fully recognised by establishing platforms for dialogue with family farmers' organisations, which are necessary to generate consensus and to build and implement targeted, effective policies and result in tangible improvements. Meanwhile, international co-operation can be fundamental in channelling resources to support country-owned pro-family farming strategies, and international agreements can be instrumental in enhancing these strategies. The combination of national strategies, social dialogue and international support form the enabling policy environment that we need.

■ **What will have changed in concrete terms for family farmers by the end of 2014? What are you hoping for?**

What we hope for by the end of the year is to have the current and potential contribution of family farming to food security recognised by all sectors and supported by the development of agricultural, environmental and social policies that enable sustainable family farming. In the past, family farmers have been considered a problem to be solved, but we need to change that mindset so that they are seen as part of the solution for global food security and sustainable development.

More than just a business

Family farming has many different meanings to many different people. While such farms come in all shape and sizes, one thing all practitioners agree on is that family farming is more than a business – it’s a way of life. The following article shows what constitutes this way of life, the challenges that family farms in Europe and throughout the world face and why and how the European Union supports this type of enterprise.

The concept of family farming varies according to culture, region and tradition. Diversity is inherent to the model and consequently, there is no universal definition for family farming. Nevertheless, there are some shared principles that can define family farming as agricultural, forestry, fisheries, pastoral or aquaculture production that is managed and operated by a family and predominantly reliant on family labour, including that of both women and men. The family and the farm are linked, co-evolve and combine economic, environmental, reproductive, social and cultural functions. Definitions of family farming tend to ignore size criteria, especially if they refer to large geographic areas. This is because such farms vary greatly in size, and furthermore what is considered a small holding in one region may not be in another.

Overall, family farming is more than just a business – it’s a way of life and one that is deeply associated with values such as solidarity, continuity and commitment.

While it is true that the majority of family farmers are smallholders who remain highly vulnerable to poverty and hunger, it is important to remem-

ber that this model dominates today’s agricultural landscape: family farms provide 70 per cent of world food production (FAO, 2013), employ a significant workforce and are also a key driver of rural development throughout the planet.

■ Common strengths and common challenges

Reducing poverty in developing countries requires an increased production of staples by family farms. Whether this necessary growth is feasible and sufficient will depend on the prevailing political and economic environment, and the ability of institutions to enable key factors such as the development and the application of appropriate agricultural techniques, the management of land and water access and the ability to maintain open markets, all in the context of ensuring the quality provision of public goods. Many countries have

gone quite a way down this path, but the route is long. Regardless of the level of economic development, targeted policies supporting family farms around the world are crucial to ensuring food security, a resilient rural society and social stability.

The International Year of Family Farming (IYFF) showcases the added value of family farming: its social function (maintaining the vitality of rural areas), environmental benefits (such as maintaining landscapes and soil fertility for future generations) and its economic impact both in terms of food production and employment.

As family farms – of all sizes – look to survive and grow in the context of globalisation and a changing world, they face some perennial management challenges strongly associated with this particular kind of family business, including the need for modernisation and innovation on the farm, prepar-

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Photo: R. Cheyne

ing for succession and encouraging future generations to get involved, and developing economic flexibility via farm-centred diversification and pluriactivity.

■ Closing the gender gap, encouraging the next generation

As the livelihood of farming families depends on the work carried out by each family member, the survival of such farms is highly dependent on the combined effort of both women and men. Rural societies are traditionally characterised by gender-specific roles, and in most cases, men are considered the head of the household involved in decision-making, market exchanges and handling finance. In many cultures, access to land and property is determined by gender. When it is only men who are entitled to inherit land, women are left in a vulnerable position with no legal property rights and in a co-dependent position (International Land Coalition, 2013).

There is a need to elevate women from this secondary role and to make their work in the rural economy more visible, in order to move forward and improve living conditions in rural areas. Public policies that protect women and facilitate their access to land, resources, education and credit are considered a priority in the context of the family farming and rural development agenda. For instance, many countries in Africa have started to reform policies and regulations on rural land to the benefit of women and vulnerable groups (FAO, 2012).

Acknowledging that men and women of all ages are equal actors and can shape the future development of family farms is vital to the survival of sustainable family farms. Young people in particular play a pivotal role in improving the livelihoods of family farms: they provide the family with a long-term per-

Promoting the timely and effective transfer of farm ownership and management responsibilities from one generation to the next is crucial. The Romanian farmer Gheorghe Bangala and his son Madalin prepare to milk the sheep.

spective for their farm and tend to enhance openness to farm innovation.

Promoting the timely and effective transfer of farm ownership and management responsibilities from one generation to the next and facilitating greater access to land for young people looking to enter farming for the first time is crucial. This holds particularly true for Europe, where nine farmers out of ten are older than 55 (EU Agricultural Economics Brief No 6).

■ A focus on Europe

Family farming is the foundation upon which agriculture has thrived in Europe over the centuries. And it remains – by a long way – the most common model of farming operations in Europe today. Some 97 per cent of all farm holdings in the EU are held by individual farmers. By and large, such farmers continue to own and manage land previously cultivated by their ancestors, and this way cultural traditions and values are maintained. Farmers and their families typically carry out most of the farm work themselves, derive the majority of their income from farming, and live on or close to the farm.

In terms of size, family-run farms cover around 69 per cent of the EU's agricultural land, and their average size amounts to 10 hectares (ha). As corporate farms are, on average 15 times larger (152 ha), a common mispercep-



Photo: A. Alex

tion can be that family farms are synonymous with small-scale operations. However, the reality is that in the EU, family farms also dominate the largest farm size class of 100 ha and larger, 60 per cent of which are held by families.

Family farms in Europe also demonstrate significant variability in terms of the wide variety of activities they engage in, the different resources they depend on, as well as their degree of market integration, competitiveness, and the share of labour they make use of in order to run the farm.

■ Policy support for family farms

The EU's Common Agricultural Policy (CAP) focuses strongly on meeting future challenges related to food, natural resources and territorial balance. It supports all types of agriculture in the EU, including the rich diversity found in the family farming sector. While it is not possible here to detail the full range of support provided by the recently reformed CAP, it is worth highlighting some of the policy areas which are of particular relevance to family farming. These include recognition of the value of the environmental services that family farms typically provide, the efforts to boost farm competitiveness and economic diversity and the sup-



Photo: F. Seco

Clotilde Martins and her husband (Portugal) milking their goats. The survival of family farms is highly dependent on the combined effort of both women and men.

port for the continuity of the European family farming model in the future, through schemes to encourage generation renewal.

Innovation, climate and environment actions, and sustainable resource management are the cross-cutting priorities at the centre of rural development programmes throughout the EU. Funding for 'greening' activities (including organic farming and agri-environment-climate support), new entrants/young farmers, innovation, smallholdings and co-operation can be granted under the rural development programmes and combined with other public funding, like direct payments to active farmers.

■ Delivering environmental services

One defining characteristic of family farm management is its clear focus on providing a legacy for future generations and the so-called second pillar of the CAP (rural development policy) supports them in maintaining and developing sustainable land use. For example, low-input agricultural systems are often maintained by family farms in uplands and in other areas with natural constraints, which are threatened by declin-

ing profitability and continued rural depopulation. Payments under the second pillar of the CAP have contributed to halting land abandonment in such areas since 1975. Agri-environment payments co-financed by the European Agricultural Fund for Rural Development have also allowed family farms to continue to support climate change adaptation and mitigation. In addition, the combination of agri-environmental commitments with the development of rural tourism and other businesses (e.g. local food products) has often helped to maintain highly valuable environmental and cultural landscapes, while also generating economic benefits.

■ Innovation and competitiveness

Family farms involvement in innovative projects supported by the CAP is expected to be high, in line with their proven capacity to adapt their traditional businesses to prevailing external conditions, for example by focusing on high-quality food production and participating in short food supply chains.

One way to significantly increase farm profitability is to reduce the number of businesses participating in the

supply chain between the farmer and the final customer. Local food supply chains also make it easier for customers to identify the origin of their purchases, strengthen the relationship between consumers and local farmers and boost regional identity. Certain CAP measures help family farmers to sell their products directly to consumers or at least to become involved in short supply chains, and to better integrate family farms into distribution channels by providing support for quality schemes, adding value to agricultural products and promotion, for example through farmers markets, box delivery schemes or food festivals.

Mixed farming and diversification also help to maximise the utilisation of a farm's assets to improve production, efficiency and profitability. Opportunities to enhance family farm income can arise from career, family and life experiences as well. Social farming, for example, is a special form of on-farm diversification that enhances job opportunities, in particular for women and young people. Very often, a family member not previously involved in the farm business joins and makes use of farm facilities and livestock to develop and offer new services related to sectors such as education, welfare and health. Such initiatives can obtain CAP funds through the support allocated for the creation and development of new businesses.

The article is based on the EU Rural Review – Issue 17, published by the European Network for Rural Development. The publication is available in English, French, German, Italian, Polish, and Spanish.

For details and a list of references, see www.rural21.com

What is so special about family farms?

Family farms are especially well suited to meet the challenges of labour organisation in agriculture. In early stages of development, they play a particularly important role in creating productive employment for the major share of the population. Moreover, they have strong incentives to use their resources sustainably so as to pass them on to future generations. Yet, family farms should not be romanticised. Often, they only survive by working longer hours and accepting lower incomes than people employed in other sectors of the economy.

Farming requires three main factors of production: land, labour and capital. We can distinguish different organisational forms of agricultural production according to the question: Who owns the land and the capital, and who supplies the labour? The most important feature of the family farm is the family organisation of labour. According to the definition presented by FAO Director-General Graziano da Silva (p. 6), a family farm is “managed and operated by a family and predominantly reliant on family labour, including that of both women and men”. Family farms do not necessarily own the land that they cultivate. They may rent it under different land tenure arrangements. In developing countries, family farms are often operated under share cropping arrangements, where they have to give a share of the farm output to the land owner. In early stages of development, family farm capital is limited, consisting mostly of animals and agricultural tools. In industrialised societies, family farms typically operate with high capital inputs in form of machinery and buildings and own these capital assets, even though they rely on bank financing to acquire them.

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■ The socio-cultural dimension

Socio-cultural factors play an important role for family farms. They influence the gender division of labour, i.e. the rules on what activities are carried out by male vs. female family members. While taking care of the children and house-keeping are almost universally the tasks of women, the rules for agricultural activities differ widely across societies. In many African societies, women cultivate their own fields. In other parts of the world, women carry out specific tasks on jointly cultivated fields, such as transplanting rice or weeding, while male family members are in charge of other activities, such as ploughing. Children often have specific agricultural tasks, as well, such as herding livestock,

which may interfere with school attendance. Socio-cultural factors also influence how land is bestowed to the children. In some societies, land is equally distributed among the children, while in others, only one child inherits the farm. In many developing societies, women are only able to access it through male family members (see also article on pages 17–19).

The prospect of passing on the farm to the next generation also creates incentives to keep the farm in good condition, e.g. by investing in soil fertility. However, this does not imply that family farms are always managed sustainably.

In many African societies, children have their own agricultural tasks, as herding livestock.



Photo: R. Birner

Among poor family farms, sustainable natural resource management is often hampered by the high labour demand for techniques such as establishing contour bounds and using manure, and by a lack of access to inputs such as inorganic fertiliser.

■ A look at other types of agricultural production

Family farms can be distinguished from other forms of agricultural organisation, most notably producer co-operatives and companies that use predominantly hired labour. **Producer co-operatives** are a type of organisation that was widespread in the former socialist and communist countries. The land is owned by the families who form the co-operative, and they also supply the labour for the farm operations, but the management of the producer co-operative is centralised. This arrangement essentially turns the cooperative members into agricultural labourers. Producer co-operatives have to be distinguished from service co-operatives, which are formed by family farms, for example, to access inputs or financial services together, or to market farm output jointly, as in dairy co-operatives. In contrast to the producer co-operative, the service co-operative only deals with up-stream and downstream activities of farming, while the management of on-farm production remains the responsibility of the individual farm families.

In the former socialist and communist countries, producer co-operatives were created by force. In some developing countries, governments also made efforts to create producer co-operatives, for example, after the land reform in Peru. Overall, producer co-operatives have turned out not to be successful. Starting in the late 1970s, the government of China replaced the producer co-operatives by the “household responsibility system”, which essentially re-established the family farms with individual management. This change

stimulated unprecedented agricultural growth, an indication of the comparative advantage of the family farm vis-à-vis the producer co-operative. In fact, there are few examples in the world where producer co-operatives have been successful. Those exceptions are linked to special conditions, as in case of the Kibbutzim, which are based on religious principles and emerged within the movement that aimed to create the state of Israel.

Family farms can also be distinguished from **farm enterprises** that mainly use hired labour. These operations may still be owned and managed by a family. In this case, it is ultimately a matter of definition to decide what percentage of the farm labour has to be supplied by family members to still classify the operation as a family farm. One well-known historical example of large-scale owner-managed farms that use mostly hired labour is the “*Junker*” estate in Prussia. Similar types of farm organisations were also established under colonialism in a range of developing countries, e.g. in Southern Africa. These farms are typically characterised by relatively high levels of productivity.

Another organisational type to be distinguished from the family farm and from the owner-managed farm using hired labour is the **corporation** which uses both hired labour and hired management and relies on various forms of capital and land ownership. In the case of state farms, land and capital are owned by the state, and they are managed by state agencies. They were also common in former socialist and communist countries, and have suffered from similar problems as the producer co-operatives. Some countries in sub-Saharan Africa promoted large-scale mechanised farming on state farms, for example, in Sudan, Tanzania and Nigeria. These operations turned out not to be profitable. Companies with private capital and land ownership, which may take the form of joint stock companies, limited liability companies or other

types of corporations, are a more successful type. In developing countries, this kind of agricultural organisation has been prevalent in the plantation sector since colonial times. In some of former socialist and communist countries, large-scale private holdings cultivating up to hundreds of thousands of hectares emerged during the transformation process, e.g. in Russia.

In developing countries, large-scale corporations have come to play an increasing role in recent years due to the large-scale acquisition of land, especially in sub-Saharan Africa. Such “land grabbing” by large-scale farms has led to the involuntary displacement of family farms from their land. Several international initiatives, e.g. by the Committee on World Food Security (CFS), are addressing this challenge.

■ Why family farms remain dominant

Although family farms are not the only way to organise agricultural production, they are by far the most widespread type, both in the developing and in the industrialised world. And family farms prevail in all industrialised societies where they have not been abolished for ideological reasons, as in the former socialist and communist countries. This indicates that, except for special cases such as plantation crops, family farms have a comparative advantage vis-à-vis other forms of agricultural organisation. Why this is the case has been debated for a long time. In 1899, Karl Kautsky published a famous book entitled “The Agrarian Question”, in which he argued that family farms survive in the course of industrialisation because they are able to work longer hours and accept a lower income than farms that rely on hired labour. This ability of “overwork” and “underconsumption” is indeed a characteristic of the family farm, and it has ambiguous effects. Obviously, it has problematic implications for the working and living conditions of farm

families. Yet, as family farms do not have to reach a return to labour and capital comparable to that of other sectors of the economy, family farms are able to secure the livelihoods of a large share of the population in early stages of economic development, where other employment opportunities are lacking. In this situation, family farms are only partly integrated into markets. A large share of them focus on subsistence production.

With economic development, the market integration of family farms expands. They sell an increasing share of their outputs, and operate with purchased inputs, often through service co-operatives. The term “commercial farms” is used for farms that are integrated into markets, but as long as it is the family that manages the farm and provides the major share of the farm labour, such commercial farms are still family farms.

In the course of industrialisation, the number of family farms declines as labour is increasingly absorbed by the non-agricultural sector. Mechanisation allows the remaining family farms to increase the area of land that they can cultivate with their family labour. Therefore, family farms can be rather large in industrialised countries, especially if population density is low, as in the USA or Australia. In the more densely populated industrialised countries of Western Europe, where land is scarce, family farms engage in mixed farming or specialise in livestock production to earn a sufficient return to their family labour, or they switch to part-time farming.

While Kautsky’s theory remains relevant to understand the nature of the family farm, a more recent branch of the economic literature called “New Institutional Economics” has identified another important reason for the comparative advantage of the family farm vis-à-vis other types of organisation: its ability to provide strong incentives for its members in a sector where the

Fish farming at Kibbutz Mashabbe-Sade in Israel. Kibbutzim are one of the few examples in the world where producer co-operatives have been successful.

quality of work is inherently difficult to control. Farm work is difficult to supervise because it is dispersed in space, unlike industrialised work that can be concentrated within a factory. Moreover, it is not easy to assess, since outcome depends on many factors besides the worker’s effort, such as weather conditions. In addition, many farm activities, such as milking cows, require diligence and care and cannot be standardised in the same way as industrial activities. This contributes to the difficulties in supervising hired labour. Family farms are especially well suited for such types of work as they can rely on familial obligations and the prospect of inheriting the farm to motivate their members to work hard and apply the required diligence.

■ A conducive policy environment is needed

Since family farms occupy the largest share of the population in low-income countries, far-reaching development effects can be achieved if agricultural policies aim at improving their income opportunities, most notably through an increase in productivity. In fact, there is virtually no example of mass poverty reduction in modern history that did not start with sharp increases in productivity among small family farms. However, to reach this goal, family farms need a conducive policy environment. Investment in agricultural research, extension and education is particularly important in increasing family farm productivity. To enable family farms to access markets, public investment in infrastructure,



Photo: A. Shabli/lair

such as rural roads, is essential. To what extent family farms require subsidies has remained to be one of the most contested questions in the current development policy debate. Subsidies often benefit the better-off and politically well-connected family farms more than the needy ones. Yet, past experience shows that subsidies can play an important role in introducing new technologies and in kick-starting markets. As already mentioned, family farms also benefit from the opportunity to form service co-operatives and to act collectively when accessing input and output markets. Family farms can increase their income through contract farming with agribusiness enterprises as well, but such arrangements need a conducive policy framework, too. Last but not least, family farms benefit from a political environment that allows them to form farmers’ associations and develop political voice. This is essential to overcome the widespread political bias against agriculture in development policy, and to use family farms as an engine of poverty reduction, economic growth and prosperity.

Strengthening family farms in Mercosur

For a long time, the agricultural policies of the Mercosur states ignored family farming, focusing on promoting individual crops and export production instead. Rural development was not on the agenda. Only after the turn of the millennium did a process of rethinking set in.

In the early 2000s it was not easy to find recognition of the existence of family farming in our region. Agricultural producers were large, medium and small, technically advanced – capitalised, or engaged in self-subsistence and decidedly poor and part of the problem that the lack of rural development posed.

Farming and/or agricultural policies were “vertical”, organised by produce types. Technologies were available for wheat, cattle, soy or rice and there were credits for wheat, sunflower, citrus or the dairy production. That was how the policies, instruments and resources were organised. They reached top-down to the territories individually, and were oriented towards those producers with the corresponding technical or market conditions, or with previous accumulation, and capable of receiving the instruments and adopting them as their own.

Family farming was not even recognised as an economic category of accumulation, as a social category of

rural development, or as a productive category responsible for the production of a more than relevant share of the food consumed in the countries in question and worldwide. Everything was dumped into one single category – Agriculture – with infrastructure investment decisions that were typically mistimed, detached and split from the production and social needs in rural areas.

The old approach was excessively market-oriented, and the size of the economic scale was a key determinant in the model; it favoured those producers and/or traders that had the potential of actively inserting themselves to increase exports, making the most of our countries’ comparative advantages. However, conversion policies were developed for those producers who were unable to meet the demands of the markets. They would initially remain in the same industry, to later change to other areas of the economy. Ultimately, compensatory policies were generated,

In the region, there was a paradigm shift in the concept of public investment policies for rural areas at the beginning of the 21st century, redefining the role family farms play in reducing poverty.

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with projects and transfer programmes more or less linked to the production of food for self-sufficiency, for supplying local markets and finally marketing the surplus in the domestic markets.

■ Rescuing the sector

Since 2000, and all along this fourteen-year process (2000–2013) in which the FIDA Mercosur Programme acted as a facilitator to support the construction of the platform for dialogue on public policies for family farming, there have been several changes in the political scenario, in the economic, commercial and financial environment, as well as several changes in the social context.

In the late 1990’s and early 2000’s, and led by Brazil, the governments in the region experienced an ideological shift, which resulted in changes in their approaches and public policy investment priorities on a macroeconomic scale, at a social level and in each sector. Governments started to focus on how to overcome the terrible economic crisis



Photo: J. Boethling

which the region had experienced as a consequence of the 1997/1998 Asian Crisis – with the devaluation of the Real in Brazil, the collapse of the Argentinean economy in late 2001 and the banking crisis in Uruguay in 2002. The aim was to alleviate poverty and indigence, redistribute income among the underprivileged and encourage the production sectors to go from the domestic market towards exports.

Almost a decade and a half have already elapsed, also coinciding with the most notable reversal of historical trends in the terms of trade concerning the price of agricultural commodities, particularly that of food. Thanks to this economic phenomenon, all the Mercosur countries, being net food exporters (at least prior to the accession of Venezuela in 2012), have achieved a very significant and steady growth.

The poverty and indigence rates that the countries dragged since the above-mentioned crisis have been reduced. Starting in late 2002, the agriculture-related gross product has grown uninterruptedly, and farming has increased its share in the economy of these countries. Additional public investment resources became available, and investment in social and human development was clearly prioritised, and so was the development of food production, rescuing family farming as a sector.

Under the leadership of Brazil, the region began to recognise the socio-economic status of family farming; a major paradigm shift was observed in the concept of public investment policies for the social and economic development of rural areas. A number of players were involved in the process, including leaders of social organisations representing family farming in the region, together with governments, through their Ministries of Agriculture and Rural Development. In turn, the International Fund for Agricultural Development – IFAD – played its recognised role of facilitator and partner for the design of effective

The FIDA Mercosur Programme

In 1999, the International Fund for Agricultural Development (IFAD/FIDA) approved the first grant for the governments of Mercosur (which was then Argentina, Brazil, Paraguay and Uruguay and has since been joined by Venezuela), plus Chile and Bolivia. The aim was to support the institutionalisation of policies that promote rural development and alleviation of poverty. Since then, the programme has been extended several times. In 2012 the Programme passed to depend on CLAEH, the *Centro Latinoamericano de Economía Humana*. CLAEH is a Uruguayan non-governmental organisation that campaigns for democratic and socially-balanced regional development and a university institute.

and efficient policies and instruments to channel public investment. Together, the players gathered experience in the Mercosur legal and political framework, which certainly helped promote the paradigm shift, which is based on two premises.

First premise. Family farming in the Mercosur area is not synonymous with rural poverty. Actually, family farming is a broad and heterogeneous category, and across the world, the term is used to encompass not only families of poor farmers, but also families with a huge capacity for working, processing, investing, handling and managing their production systems – often with linkages to the markets.

Second premise. Family farming is part of the solution to the poverty issues in rural areas as long as it is recognised as such, and if it is addressed with differential public policies to guide investment and public services. The aim should not be to compensate those left out of the market, but to promote capacity building and associations and the development of appropriate technologies that incorporate value to products and facilitate trade, and to encourage private business partnerships.

■ Policy dialogue as a methodology for the design of better public policies

In 2004, after four years of preparatory discussions and actions, Brazil proposed creating the Specialised Meet-

ing on Family Farming of Mercosur (REAF). This is an advisory body of the key executive organs of the political/commercial block, as well as being an institutionalised policy dialogue platform on differentiated public policies for family farming.

The Mercosur countries have experienced that Policy Dialogue can be a very effective instrument for the improvement and strengthening of the regional integration process, providing an opportunity for the orderly participation of civil society. It has guided the discussions about the opportunities that stem from the integration of the nations in the political/economic block and about how to prevent the necessary adjustments to the process from falling on the backs of the weak and of a rural population that is strategic for the balanced development of the region.

The policy dialogue process has given rise to more and better public policies for family farming in each country, enriched and harmonised by the exchanges between countries from the beginning. One example of this is the process through which all the countries in the region have passed new rules and regulations to incorporate family agriculture as a core supplier in the states' public procurement programmes as they implement their food security strategies.

This requires not only an analysis and exchange of views to adjust and to implement any changes required in the existing regulations; it also demands



A farmer in Paraguay delivering his produce.

Photo: R. Birner

policies that empower family farmers and their organisations so that they can become state suppliers (by providing them technical assistance and outreach as well as financing and investment in farms and rural organisations). Only then will they be in a position to act as government “reliable suppliers”, respecting best price conditions, ensuring timeliness in delivery, quality and – first and foremost – ensuring food safety and the respect for plant and animal health rules and standards.

In the ten years of REAF’s history, four indicators have been used to show the progress made by the region in terms of public policy for family farming:

(a) The number of legal/administrative instruments (laws, decrees, resolutions) aimed at creating tools to support family farming that can be identified in each country.

(b) The new modern and enhanced public framework that has been incorporated in the countries of the region, comprising e.g. the Secretariat for Rural Development and Family Agriculture of the Ministry of Agriculture, Livestock and Fishery of Argentina, the General Directorate for Rural Development of the Uruguayan Ministry of Agriculture, Livestock and Fishery (MGAP), and the Directorate for the Support of Family Farming of the MAG of Paraguay.

(c) The increase in the population covered (more beneficiaries).

(d) The increased budget; from 2004 to 2013 budgets were increased by 308 per cent in Argentina, 450 per cent in Brazil, 306 per cent in Paraguay and 1,029 per cent in Uruguay.

In REAF’s Policy Dialogue discussions, the six countries have addressed topics such as:

- Risk management and farm assurance;
- Rural financial services and access to finance;
- Appropriate technologies;
- Access to land and agrarian reform processes;
- Concentration and foreign ownership of land in Mercosur;
- Gender vision in family farming policies;
- Settlement of the rural youth;
- Climate change adaptation and mitigation;
- Social seal for family farming products;
- Volunteer family farming national records;
- Public procurement and
- South/South co-operation, by governments and organisations, and between the countries, to exchange experiences and learn together.

■ More than a mere commemoration

In the three or four years before the United Nations General Assembly designated 2014 as the International Year of Family Farming, the social organisations that represent family farming in the different continents and regions, supported and encouraged by the World Rural Forum, raised the issue and put it on the table for consideration by the international community. Social, professional and political support, as well as that of unions, was gradually obtained until consensus was reached after some debate, and the Delegations at the Assembly promoted and voted the appropriateness of designating 2014 as the International Year of Family Farming (IYFF).

The great challenge for social actors and promoters of the IYFF has been to move from remembrance (legitimate and well deserved) to the ratification of the institutional, political and budgetary space that would facilitate a sustained improvement in income, quality of life and opportunities for progress and social justice for the rural dwellers, including the families engaged in agriculture.

Today, we have an opportunity to make the International Year of Family Farming go well beyond a mere commemoration. The people’s representatives, law-makers and political leaders from a range of philosophical backgrounds should learn about and debate these concepts, new paradigms and new instruments of public policy.

Preparing ourselves to meet the challenges of the future is not enough; the future must be built. The focus of the coming years will be to build upon what has already been consolidated and to continue to “open” and “refreshen” the agenda with new proposals.

Women – the untapped potential for food security

Despite the crucial role of women in family farms and small-scale agriculture, gender inequality is still present in many ways – jeopardising the food and nutrition security of millions of people.

Family farming by definition is a means of organising agricultural, forestry, fisheries, pastoral and aquaculture production. It is managed and operated by a family and is predominantly reliant on non-wage family labour, provided by women, men and children working together on the family's farm. In this concept, the family and the farm are closely linked, co-evolve and combine economic, environmental, reproductive, social and cultural functions. In most of Africa and South Asia, small farms run by the family still account for the largest share of agricultural output.

The role of women in these smallholder agricultural systems is particularly remarkable as they provide the bulk of the agricultural labour force. They mainly produce food for household consumption and local markets, whereas men work more often in wage labour or cash crop production. Despite this vital role of women in small-scale agriculture, gender inequality is still present in many ways. Women, for example, have less access to productive resources, services and assets, and their vital contribution to the family farm is often still ignored. Consequently, closing the gender gap and recognising women's rights and role in family farming is one of the core objectives of the

International Year of Family Farming (see also articles on pages 6–10).

For this reason, the following article provides an overview of the various tasks, challenges and responsibilities of women in family farms across the global South. In addition, negative consequences of gender-biased politics and its effects on food and nutrition security are illustrated. Conclusively, gender-sensitive methods and approaches are presented that have been field-tested in various rural development programmes implemented by Deutsche Gesellschaft für Internationale Zusammenarbeit (GIZ) on behalf of the German Federal Ministry for Economic Cooperation and Development (BMZ).

■ Nothing works without women: a wide range of essential responsibilities

The gender-based division of labour in developing countries assigns women

a diversity of tasks in smallholder agriculture, livestock husbandry and households, making them responsible both for meeting basic needs and the survival of the family. In addition, it is the women who cook the food and spend a total of roughly 40 billion hours a year fetching water.

Women assume important activities in family food production, ranging from seed management through the cultivation of agricultural produce to storage, processing and marketing of certain products. In the smallholder or subsistence economy, their role is of particular significance since men are more involved in marketing-oriented production. In animal husbandry, women are mainly responsible for poultry and small livestock, feeding and milking, cleaning out the coops, barns and sties as well as composting the manure. It is up to them

Men and women planting vegetables together in Senegal. In sub-Saharan Africa only 15 per cent of land-owners are women.

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Photo: B. Schuriani/KW

Some facts on rural women

- Presently, around 842 million people are suffering from hunger world-wide, especially in Asia and sub-Saharan Africa. Sixty per cent of them are women and girls.
- Women make a significant contribution to family farming.
- Women account for an average 40 per cent of the agricultural labour force. The share reaches from 20 per cent in Latin America to 50 per cent in East Asia and sub-Saharan Africa, and in some West African countries, it is up to 80 per cent.
- Only around five per cent of all agricultural extension services reach and benefit women farmers. Topics of special concern to women are frequently only insufficiently addressed by male advisors, while just a few advisors are women.
- Women benefit from a mere 10 per cent of financial support for agriculture and forestry or fisheries.

to maintain the animals' health and to process animal products such as eggs, milk and wool. In addition, women tend the household and kitchen gardens, which often secure the families' food supplies in times of poor harvests. In this way, women ensure their family's healthy and diversified nutrition but also contribute importantly to the absorption of shocks by increasing the household's resilience. They are also heavily involved in the fisheries sector. In Asia and West Africa up to 80 per cent of fish catches and shellfish is marketed by women. This shows that women play a key role in family farms across the world. Moreover, they are the key actors regarding survival strategies and minimising risk to households. The relevance and diversity of their activities make women important knowledge-bearers with respect to the sustainable use of natural resources, climate adaptation strategies and agrobiodiversity. In spite of this, the work performed by women is generally unpaid, and often they can only earn an income by selling surplus agricultural produce.

■ Making use of the potential

In many regions, wars and conflicts, disease, HIV/Aids and the growing migration of male family members to urban areas or abroad are resulting in a trend towards a feminisation of agriculture, with women bearing the sole responsibility for production as well as

the household. While the absence of men makes the efforts of women more apparent, an ever increasing number of women have to take on additional tasks.

Despite this key role in family farming, women are denied or enjoy only restricted access to and control of productive resources such as land, livestock and water. Women lack access to information, knowledge, and inputs (fertiliser, seeds or financial services) and face mobility constraints in many regions. In developing countries, 80 per cent of staple food is produced by women, but they only own an average of ten per cent of cultivated land. For example, in sub-Saharan Africa, 85 per cent of land-owners are men due to legal and cultural hurdles posed by inheritance. In Mali, women own a mere five per cent of cropland. Often, land is only registered in the name of a man, even if his wife has bought or inherited the land or added it to the household when marrying. Moreover, various studies show that the disadvantaging of women in times of crisis or in the wake of natural disasters is on the increase. Women are bearing the brunt of shocks and crises and are the first ones to make do without food for the benefit of their families.

As a result of this inequality and gender gap, women smallholders produce 20 to 30 per cent less per area unit than male producers. Thus the potential that the family farm bears is not made use

of optimally. The Food and Agriculture Organization of the United Nations (FAO) estimates that women could raise yield by this percentage, if they had equal access to productive resources, inputs, information and services. Overall agricultural production in developing countries would grow by up to four per cent, and the number of people suffering hunger would drop by 100 to 150 million people. In addition, experience has shown that if women generate their own income and enjoy land ownership as well as control of financial resources, this will have a direct positive effect on their children's nutrition, health and education. Thus one of the most important factors in food security is closing the gender gap by greater participation and support of women as producers, ensuring their ownership and access to inputs, services and information as well as the elimination of structurally and culturally conditioned gender discrimination.

■ More effective approaches in securing better opportunities

GIZ is conducting a wide range of measures to promote women as well as gender mainstreaming in order to eliminate gender-conditioned development obstacles in rural areas. The following examples clarify this.

Capacity Development as a key to equitable rural development helps women to decisively raise their access to and control of natural resources and other inputs. Specific training as well as integrating women in rural organisations have proven to be particularly effective. GIZ is supporting this approach in the Fizi Region of the Democratic Republic of Congo. In addition to improved agricultural production practices, the women are trained in the organising and management of civil society and producer groups in order to enhance their role and their self-confidence in the family and in local decision-making structures. The male

village population and local authorities are sensitised to improve the division of labour in the family and thus give women better protection and the opportunity to earn their own income. Local services have been reactivated and advise the whole farming family, men and women, on modern cultivation. By selling excess field produce at local markets, women and families receive an additional income. Village committees, supported or newly founded by the project, arbitrate in cases of conflict, usually over land rights. Together with traditional authorities and in cooperation with judges and lawyers, traditional law is being revised and aligned with national law, supporting women's access to land.

GIZ uses **policy advice** to create a political and institutional environment that is favourable to women in the formal and informal agricultural sector. Experience has shown that an adequate political and legal framework is indispensable in ensuring women equitable access to resources and means of production and control of them. In Nepal, the rate of official and registered land transfer to women has increased three-fold thanks to a special incentive system in land taxation involving a ten per cent tax exemption for any land registered in a woman's name.

Ensuring and institutionalising a **balanced and equal participation** of women and men in all administrative and decision-making committees is a further

A family processing cereals in Peru. In Latin America, women account for on average 20 per cent of the agricultural labour force.

success factor. Having an equal say in decision-making processes enables better access for women to resources and production factors such as land, water, capital and markets. This becomes apparent, for example, in inland fisheries in Burkina Faso, where targeted involvement of women actors through participatory management approaches along the fish value chain has significantly increased family income and food security of households.

Creating **transparency and gender-sensitive awareness** of existing gender imbalances among the population in rural areas is a further necessary step. This is accomplished with the aid of key actors such as village chiefs, elders and spiritual leaders, which is also how awareness was raised among men of the important contribution made by women in the milk industry in a joint GIZ and Oxfam project in Nicaragua. In a series of meetings organised by gender specialists, the participants of the project discussed the different roles of women and men. The sessions addressed quality requirements and related task distribution, included services provided to women and men by the co-operative and provided training on communication skills between husband and wife to promote joint decision-making as a business unit. By



Photo: C. Haeuser/GIZ

changing their bylaws, the two participating and already existing co-operatives made it easier for women to join them, which caused the share of female members to rise from eight to 43 per cent. In addition, the women started to formulate their needs and demands more clearly and specifically request services. As a result of their key role, donors began reorienting their strategies and assigning more financial resources to women.

■ Conclusions

Sustainable rural development that contributes to food and nutrition security as well as poverty reduction still requires full acknowledgement of the roles and responsibilities of women in rural areas and the provision of adequate support. On family farms, women make an essential contribution to food production and thus significantly increase food and nutrition security in rural areas. However, much potential is still unused. Rural development approaches and measures therefore have to clearly reflect this reality and focus their activities more on supporting women and closing the existing gender gap. This is a precondition for reducing hunger, strengthening rural livelihoods, and sustainably improving living conditions in rural areas. The IYFF is the right time to shed light on women's role in family farming, raise awareness and start with action.

No one-size-fits-all solutions

In most countries, discrimination of women is still present and therefore reducing the inequalities between the genders, and strengthening the role of women remains a great challenge. However, context-specific analyses and approaches are required according to the particular socio-cultural, economic and ecological conditions. There are no one-size-fits-all solutions. The work of GIZ has shown that even in areas such as Afghanistan, where women's discrimination is still high and gender relations as well as the promotion of women remain a big challenge, much can be achieved in rural development, namely at village and family farm level, if sensitive methods and context-specific, adapted approaches are applied. Furthermore, gender-sensitive action needs to be based on a broader process of creating awareness that supports the change of mind set of rural families, communities and decision-makers.

“We have inherited not only a piece of land, but also the responsibility to turn it into a home”

A focus edition on family farming would hardly be credible without giving the family farmers themselves an opportunity to speak. We talked to Moses Munyi, the owner of a six-hectare farm in Embu, Kenya, about his everyday life and about his views of the prospects for farming in the future.

■ Mr. Munyi, does the expression “family farming” mean anything to you?

The expression itself doesn't. But I have read some reports on how boosting small-scale farmers could help especially in the attempts by the government to curb urban immigration.

■ Have you always been a farmer?

I grew up on a farm, so farming has always been a big part of my life, as well as of that of my whole family. I have 13 siblings, and each of us has got his or her own farm. And although the sizes may vary, we all cultivate tea and coffee and rear livestock among other food crops. Each of us received

a piece of land from our late father in accordance with our traditions. But the responsibility to turn that piece of land not only into a farm but also into a home was left on our hands. Since I retired from civil service eleven years ago, I have been a fulltime farmer.

■ What does a normal working day look like on your farm?

Here, every day is a working day, whether we are in the fields or not, there is always something to do. The cows must be milked three times a day. So basically, our day starts at four o'clock in the morning, when the first milking is done. And then the milk must be delivered to the collection point by not later than five thirty. After breakfast, the various errands around the farm have to be seen to. For instance, on days when we are picking tea or coffee, we are out in the



Photo: F. W. Munyi

For 67-year-old Moses Munyi, farming has always been more than just a business.

fields by six in the morning and work until three or five in the afternoon. But we work more often in the tea plantation than in the coffee plantation. The tea crop needs regular pruning if it is to blossom.

Meanwhile, the cows are fed at least every three to four hours and are milked for the second time at noon, which is when we also get to have lunch.

After the tea has been delivered to the buying centre, there is no guarantee when it will be collected by the factory transporters. So you have to keep an eye on your product. Thieves are always waiting for an opportunity. The last chores at my farm are cutting and transporting the Napier grass, cleaning the cowshed and the third round of milking the cows. Grinding the Napier grass and mixing it with other vegetation such as banana leaves or hay is done every day, so that the cows have food for the next day.

■ Do you hire labourers to help you with farm work?

In the past I used to hire three or four permanent employees and several casual workers, but that has



Photo: F. W. Munyi

Moses Munyi's son Anthony Muriithy harvesting avocados.

changed in recent years. Labour has become difficult to find and when it is available, it is very expensive. Occasionally, we get some casual workers who help with either harvesting the tea and coffee or other tasks around the farm.

■ **Tell us a little bit about the marketing of your products.**

In Kenya, the tea industry is generally divided between small farms and large estates. The small-scale sector is controlled by the Kenya Tea Development Agency (KTDA), which manages all smallholding tea factories, determines the prices and is also the direct buyer from farmers. The Tea Board of Kenya manages the tea industry in Kenya on behalf of the Government.

Coffee, on the other hand, is sold through the co-operative societies, which service most of the small-scale farmers. The co-operative societies process their coffee through their factories, serve as the custodians of the coffee for their members and are supposed to benefit individual members through economies of scale. As for the dairy, after years of selling milk to processing companies with little success, I resorted to selling it locally to restaurants or hotels and brokers who buy from us and then resell the milk at a profit to other remote parts of the country.

■ **Are prices sufficient to make a profit?**

The prices of both tea and coffee have dropped, and this is a nationwide problem. One other aspect that negatively affects income is the changes in the seasons. Compared to earlier times, the dry seasons are longer now, and sometimes the rain comes at times when it is not expected. So often, there are many months when the tea leaves dry out and don't have the quality to be harvested.

■ **If you compare farming today with say, 20 years ago, what has changed?**

A lot has changed, both for better and for worse, I guess. For instance, paying for educating my children with the income from my farm was easy back then. Today, farmers can barely afford to feed their children or send them to school, let alone pay for their higher education, as I was able to. So the introduction of free primary education was a big step forward and also reduced cases of child labour. The other major change is the availability of labour. There are several reasons for this, the chief one being epidemic diseases such as HIV/Aids. Sick people cannot work, which is affecting agriculture in the whole country. In addition, changes in lifestyle in the rural areas mean that many young people find it embarrassing to be called a farmer. They would rather seek minor jobs in the cities even when they are less well paid than working on a farm. Urban immigration is a huge challenge, not only in this region, but in Kenya in general.

■ **Are food losses a big problem on your farm?**

During the high seasons of tea and coffee, we have a lot of losses because the produce is not collected on time, and sometimes, after days of waiting, the tea leaves and coffee beans are dried up or rotten. Other food crops such as maize and beans are lost

due either to lack of labour or lack of proper storage.

■ **Let's get back to marketing aspects. How do you get the necessary information?**

As far as tea is concerned, the Kenya Tea Development Agency offers farmers a field day once a year when, among other things, new techniques are demonstrated and farmers learn more about the marketing process.

■ **Do you feel that farmers are fairly represented in the marketing chain?**

Basically, farmers are there to cultivate the product and deliver it to the respective buyers. The rest is taken over by the responsible organisations or co-operatives and a good number of middlemen who are responsible for the marketing and binding and determine the prices. With so many brokers in the marketing chain, farmers can only get a raw deal.

■ **What about farmers' organisations or co-operatives?**

As I mentioned earlier, coffee is sold through co-operative societies, and for dairy farmers, we have milk processing companies or mini dairies. In general, milk marketing is done by the Dairy Board of Kenya and Kenya Co-operative Creameries (KCC). But what I think lacks is some kind of formal association that is organised by farm-

The Munyi farm

Moses Munyi runs a six-hectare piece of land in Embu County, in the eastern province of Kenya. Tea and coffee are the major cash crops. In addition, he cultivates and sells small amounts of avocados, passion fruits and macadamia nuts. Also, he keeps six milk-producing cows, three expectant heifers and three calves. Their milk production fluctuates throughout the year. During low seasons, some months after cows have given birth, in dry seasons or when one or two of the cows fall ill or die, they produce about 25 litres a day. At peak times, they can yield more than 80 litres.

To feed his cows, Moses Munyi grows Napier grass (*Pennisetum purpureum*). For family consumption, he cultivates maize and beans, potatoes, pineapples, sugarcanes, green vegetables and bananas.



Photo: T. Bexten

Tea and coffee are the main cash crops of the farm.

to continue this tradition, but very often, young people only see farming as a kind of job for those who have no other choice. They lack the passion for farming.

Since many young people are unemployed despite having studied, one might think that inheriting a life-long source of income is a good thing. Nonetheless, inheriting a farm won't guarantee its future if you don't know how to run it.

Meanwhile, there are also those who inherit a farm but cannot live on it because of jobs in the cities. Previously, managing a farm from a distance was easier since labour was available. But these days, it is difficult to find somebody who is reliable and willing to work fulltime on a farm. Unfortunately, farming is losing on many fronts.

ers for farmers and acts as the direct contact to the buyers. Then there would be fewer brokers in the marketing chain, which would also reduce corruption. The situation today makes farmers like myself helpless and puts them at the mercy of some very influential middlemen.

■ **What is hindering the establishment of such an association?**

Besides the fact that the involved middlemen will stop at nothing to make sure that they stay in business, there is also the general lack of knowhow. Most rural farmers don't care how the entire production and marketing process of their products works. Naturally, since most are not highly educated, they find such a complex process rather challenging. So it is easier to leave it to those out there who seem to know better just as long as the farmers get their pay, however little it may be.

■ **What other kind of obstacles do you see for making farming more profitable?**

Of course there are the general challenges such as poor infrastructure, low prices, climate change and its impacts, and lack of labour. And

whenever conflicts and controversies arise in the intricate relationship between the various organisations and stakeholders or when political instability develops, it is the farmers who suffer. Besides, there is a general lack of sustainable investments to fund agriculture and agricultural policies in favour of small farmers on the part of the government.

■ **How do you see the future of farming – in general and for you personally?**

It doesn't look very promising to me. As long as the conditions to make farming attractive to the younger generation are missing, our future in general will be compromised.

As for me, now that all my children have left the nest, it is only my wife and I who are left to work and manage the farm. I'm happy that I could offer all my children a good education. As a result, however, none of them want to live in the village and work on the farm now. Of course this makes me sad. It is important to understand that to most of us, at least those of my generation, farming is part of our culture. Owning land and working on it means not only making a living out of agriculture, but also pursuing the traditional way of life of our forefathers. We would like

■ **What can be done to cultivate young people's interest in farming, considering that agriculture is said to be the backbone of Kenya's economy?**

The government has to try and give back pride in farming through boosting not only the agricultural sector in general but also small-scale and local farming. If farmers are well paid and can afford a decent live, then no shame will be linked to it. I think it is the notion of poverty associated with farming that makes youths afraid of. This is also because to most rural folk, farming is linked with traditional methods of farming – which indeed it often is. So the farms have to be modernised – not just as a way to feed one's immediate family, but also as potentially successful businesses that can have a much wider impact.

Olive Bexten conducted the interview.

Machinery rings – a mechanisation concept for African farmers?

African agriculture is mainly characterised by small-scale structures, and the level of mechanisation is very low. European farms faced a similar situation after the Second World War. With the aid of machinery rings, they quickly achieved a higher degree of mechanisation. Furthermore, it became apparent that machinery rings can significantly contribute to socio-economic development in rural areas by boosting income generation, enhancing livelihoods and contributing to food security.

In this context, leading representatives – small as well as large-scale farmers – of the Southern African Confederation of Agricultural Unions (SACAU) had been invited by the German Farmers' Association (DBV) to a one-week study tour to Germany in May 2014 to discuss key conditions for the success of machinery rings. The ideas and impressions obtained are to support the development of a tailor-made strategy for African countries.

But what exactly is a machinery ring? It is an association of individual farmers with the aim of sharing agricultural machinery and equipment. Thus the concept improves access to technology for farmers, as it provides a financing strategy to purchase and share agricultural machinery, including technical maintenance and repair services. The farmers can contribute to minimise production costs, improve working conditions, provide operational

assistance for social welfare (*Betriebshilfe*) and optimise management structures through consultation and exchange of workers and services. In some parts of Germany, machinery rings represent an important economic factor and create employment in rural areas. The first machinery rings in Germany were established in the 1960s. Today the Federal Association of Machinery Pools (BMR) has 263 machinery rings and 193,100 members. The Federal Association is divided into twelve sub-national associations.

What are hurdles for the establishment of machinery rings in Africa? Which framework conditions are needed? These were some of the key questions to be answered during the tour. "It is not only about the establishment of a single machinery ring, it's about the development of a comprehensive strategy which considers the whole value chain," Theo de Jager, President of SACAU, stressed. He had a long-term perspective for the development of machinery rings in mind. Southern Africa especially lacked functioning value chains, financing, technology and expertise, Mr de Jager said. Mechanisation, particularly through the establishment of machinery rings, could be the key to addressing these issues. In order to succeed, contributions from and co-operation among different stakeholders (e.g. farmers, the government, investors, contractors, donors, the

machinery ring itself, other machinery rings) were needed. It was necessary to include solutions for steering, management, financing, organisation, administration, legal framework, (advisory) services and maintenance in a long-term strategy, he stated. One option could be to start with pilot machinery rings in selected countries and subsequently establish a machinery ring at regional level (Southern Africa). In this case, there would be co-ordinating structures at national levels, whilst a regional organisation could take over duties such as training, IT support, donor liaison or liaising with SADC. "We will not get Africa's under-utilised land under production with a hand hoe," Mr de Jager said, emphasising the importance of mechanisation.

During discussions on the development of a concept note for framework conditions, it was proposed that existing organisation structures be used as "docking stations" for machinery rings provided they met some basic conditions, for example the existence of producer organisations, functioning structures at all levels, business and service orientation, information flow, etc. Further, a healthy membership base, capacity for management, sources for finance (domestic and/or external), capacities/skills for operating machinery and access to markets should be in place. While large-scale farmers especially needed support in leasing, smaller farms required help with loans, the participants stressed. They were convinced that the concept was applicable in their countries. This assessment was also shared by Willi Kampmann, Head of the DBV Unit International Relations in Brussels, who stated: "Farmers need to be politically and economically independent. Machinery rings are one successful example of efficient organisation and how it can contribute to the sustainability of family farms and to achieve food security. What has succeeded here does not necessarily work in other countries, but German experiences can provide a useful input."



Photo: DBV

Participants of the study tour from Lesotho, Malawi, South Africa, Tanzania, Zambia and Ghana visiting a family farm and machinery ring member in Lower Saxony. The tour was organised within the framework of the German Federal Ministry for Food and Agriculture's bilateral programme. "Farmers' Exchange across Continents" is a series of events organised by DBV since 2012, providing a platform for African and German farmers to exchange experiences and expertise in agriculture.

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Development Cooperation Scout,
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Agricultural biodiversity: the foundation of resilient family farms

In a world of rapidly changing conditions, enhancing the adaptability and hence the resilience of family farms is crucial to their viability. Here, diversity plays an important role, as the following article demonstrates.

Farmers world-wide are now dealing with extreme weather, new threats of pests and diseases, changes in land management and a growing and hungry population. Can we find solutions which not only ensure that farmers can cope with our new reality but also allow farmers and communities to continue to develop? These are core questions that scientists – including at Bioversity International – are exploring with urgency.

According to the Stockholm Resilience Centre, resilience is the capacity of a system, be it an individual, a forest, a city or an economy, to deal with change and continue to develop. Here, agricultural biodiversity has a vital role to play, for it is helping farmers to bounce back from shocks and hardship. Smallholder farmers have relied on the evolutionary service of biodiversity for hundreds of years – in other words, on allowing crops to evolve and adapt to changing environmental conditions, and diversifying them to reduce vulnerability.

The majority of the world's food insecure population live in rural areas in developing countries, and many are subsistence producers who may not

grow enough to meet their families' needs. Smallholder farmers often lack the institutions and structures to manage their natural resource base, which is increasingly degraded and – given that most of these crops are also grown in rain-fed conditions – particularly vulnerable to external shocks, including those induced by climate change.

Managing diversity, of systems, crops, varieties and trees, can provide options and increase the resilience of households and communities to produce even in times of stress. **First**, agricultural biodiversity is connected to nutrition and food security. **Second**, it can help farmers manage risks from new pests and diseases. **Third**, it can lessen the effects of sudden natural disasters. **Fourth**, diversity allows natural adaptation to the environment – vital in the face of climate change. **Fifth**, diversity reduces the risk of crop loss and contributes to productive, healthy farms. Research is showing that the use and conservation of agricultural biodiversity is critical to resilient farms and landscapes and to helping farmers to recover more quickly from hardship.

■ Diversity and nutrition

Today, only a few crops make up the basis of the world's food supply. Out of more than 7,000 varieties of food crops in the world, we rely on only three – rice,



wheat and maize – to supply over half of our plant-derived calories. And, within those crops, we rely on only a few varieties. Together, only twelve crops and five animal species account for 75 per cent of global calories. This is especially true in developing countries, where people obtain up to 80 per cent of their energy from staple grains and have less access to nutrient-rich sources of food.

This has not happened by chance; it happened by design. For years, we thought if we only produced more calories, we could reduce hunger. So, we invested in new varieties of rice, wheat and maize that would increase yields. However, reducing hunger is more complex than simply producing more food. In this context, Bioversity International is co-ordinating the **Biodiversity for Food and Nutrition initiative**, with rich case studies of work under way. One example is the **Soils, Food and Health and Communities project** in northern Malawi. In this project, engaged smallholder farmers from Ekwendeni village selected and tested mixtures of diverse legume species for growing with maize using the 'doubled-up' legume technology promoted by the project. Project results show that intercropping maize with legume mixes has resulted in improved nutrition for children in

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Farmers evaluating wheat varieties in the Tigray Region, Ethiopia.

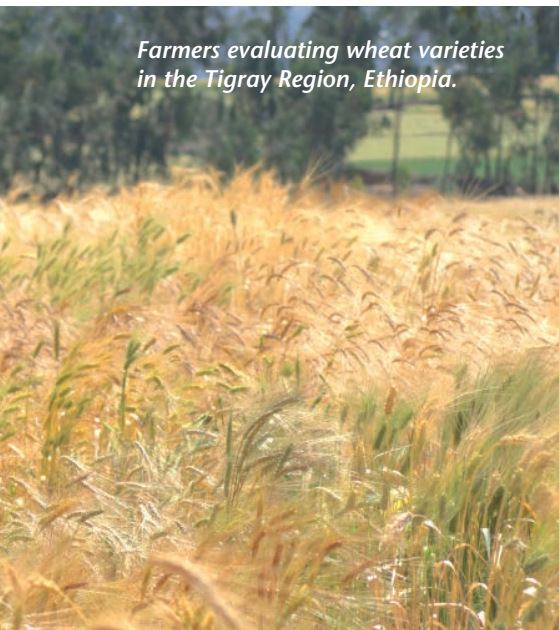


Photo: J. Van De Gevel/Biodiversity International

communities where the project is being implemented. Also, farmers and community members have become change agents, adopting the practices informed by their own research findings. Over 9,000 Malawian farmers have adopted this technology to date. Through this project, communities are better able to cope with hardships, including increasing population, severe land degradation causing drops in crop yields, food insecurity and malnutrition. This is resilience at work through biodiversity.

■ Management of pests and diseases

Outbreaks from pests and diseases that attack farms and gardens cause a significant amount of crop loss. Research shows that diversity acts as insurance against damage from these pests and diseases. A greater number of varieties leads to a reduction in disease severity, which ultimately translates into less crop loss/higher yields. Diverse farms are more resilient to pest and disease outbreaks because they lower the risk of complete devastation.

Biodiversity International and our partners have been working with farmers world-wide to plant different varieties

of the same crops next to each other in their fields, to see which combinations provide the most effective control against which pests and diseases. Initial results from around the world indicate change. For example, Ugandan farmers have seen the presence of weevils that attack banana plants reduced by 75 per cent when planting different varieties together. In addition, smallholder farmers in Ecuador who planted diverse common bean varieties harvested their crop in spite of a heat wave due to the drought/heat resistance of varieties, while those who invested in one commercial variety only lost everything.

■ Recovery after natural disasters

Biodiversity also provides a formidable barrier against natural disasters, a type of “farmland security”. In coastal communities, for example, a combination of mangroves, coral, trees, and control of soil/sand erosion are some of the tools that help lessen the damage during natural disasters, while of course providing ecosystem services to wildlife and people as well. The call for the restoration and enhancement of coastal protected areas following Hurricane Katrina and the 2004 Tsunami also highlighted this important role of diversity as “natural defenses”. Without these defenses, coastal communities are more vulnerable to hardship as our weather becomes more extreme.

The same logic applies to farms. There is a relationship between more diverse land use and less damage caused by landslides, for example. A survey conducted in Central American hill-sides after Hurricane Mitch showed that farmers using diversification practices such as cover crops, intercropping and agroforestry suffered less damage than their conventional monoculture neighbours. These farms had 20 to 40 per cent more topsoil, greater soil moisture and less erosion and experienced lower economic losses than their conventional neighbours (Holt Giménez 2000).

In another example, 40 days after Hurricane Ike hit Cuba in 2008, researchers conducted a farm survey in the Provinces of Holguin and Las Tunas and found that diversified farms exhibited losses of 50 per cent compared to 90 or 100 per cent in neighbouring monocultures. Likewise, agroecologically managed farms showed a faster productive recovery (80–90 per cent 40 days after the hurricane) than monoculture farms (Rosset et al. 2011). This ability to recuperate and suffer less damage in the face of natural disasters demonstrates how diversity can increase the resilience of agricultural landscapes (or agriculture at the landscape level).

■ Adaptation to climate change

The latest report from the Intergovernmental Panel on Climate Change

Shrinking diversity: The heavy reliance on a narrow diversity of crops puts future food and nutrition security at risk

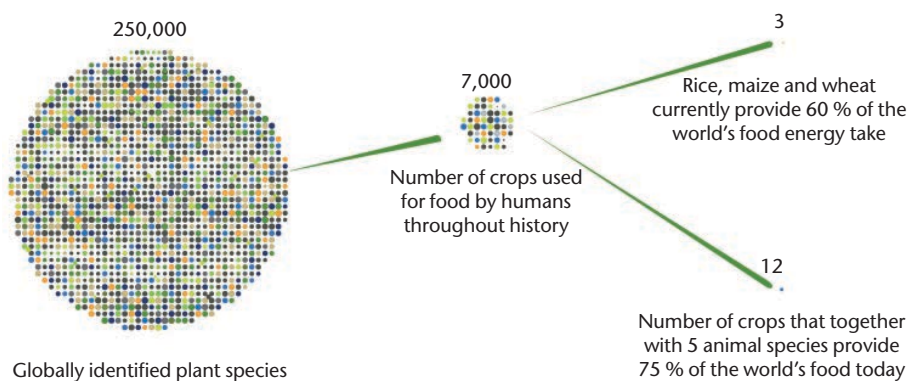




Photo: P. Quek/Bioversity International

A farmer standing among taro varieties in Papua New Guinea.

reinforces that climate change will affect everyone – and is happening now. In addition to poverty and hunger, we are dealing with a triple threat of extreme weather.

The use of agricultural biodiversity is a powerful tool for adapting to climate change and reducing climate risk. Bioversity International's **Seeds for Needs initiative** is part of the CGIAR Research Program on Climate Change, Agriculture and Food Security. We are working with farmers in India, Papua New Guinea, Kenya, Tanzania, Ethiopia and Honduras to identify crop varieties that are better suited to existing or projected conditions, providing farmers with seeds to test in their own fields, and then working to strengthen local seed systems so that farmers always have access to the seeds that fit their changing needs. Seeds for Needs uses modern Geographic Information Systems (GIS) technology to identify gene bank accessions that have the higher potential to be adapted to current and future climatic conditions. The selected accessions are tested in the field to better characterise them under the present conditions. Men and women farmers were asked to evaluate the accessions to select those which better meet their needs. Bioversity researchers developed

a mechanism based on community genebanks to ensure availability of the preferred accessions to farmers, and raised awareness among local farmers and decision-makers of the risks posed by climate change, sharing information about how the use of better-adapted varieties can support vulnerable farmers to protect livelihoods and ensure food security. Access to diversity and better knowledge of varieties empowers farmers to choose what is most suitable for their fields, and gives them options to be more resilient to erratic weather and shifting climatic patterns.

■ Productive, healthy farms

Biodiversity lessens vulnerability to loss and helps manage risks, and it also contributes to productive, healthy farming systems. Bioversity International researchers and partners have developed and tested a set of indicators to determine the resilience of agricultural landscapes. Their research found that Nepal's Rupa and Begnas landscapes had high capacity to absorb stresses due to diverse production systems and strong social organisation. Reforestation and sustainable management of forest resources, for example, play a strong role in ensuring the delivery of important ecosystem services, such as soil erosion control, food and firewood. Diverse land use and livelihoods has allowed community members to spread risk and adapt to changing times and climate. Strong collective action and knowledge exchange in the communities has led to more sustainable farming practices throughout the landscape; and strong seed networks have allowed farmers to have access to a wide range of agricultural diversity. Much of the adaptive capacity of the Begnas landscape can also be attributed to strong local institutions and NGOs such as LI-BIRD that have supported community-based biodiversity management over time. These strategies need to be developed to strengthen resilience through the sustainable use of agricultural biodiversity.

■ Biodiversity for a resilient future

The challenge ahead of us is complex. Across the world, 842 million people are currently food insecure, a number that is set to rise as weather variability induced by climate change takes its toll. Meanwhile, we must also boost food availability by 60 per cent by 2050 to feed nine billion mouths, both nutritiously and without further encroaching on our natural resource base.

Bioversity International's refreshed strategy aims to ensure that agricultural biodiversity contributes to four strategic objectives:

1. Low-income consumers have expanded access to and use of affordable, nutritious diets.
2. Rural communities have increased the productivity, ecosystem services and resilience of farming systems, forests and landscapes.
3. Farm households and rural communities have increased access to a diversity of quality seeds and other planting materials.
4. Policy-makers, scientists and rural communities have safeguarded and assessed and are monitoring priority agricultural biodiversity.

We know that biodiversity is linked to all of these issues and that the same biodiverse principles can be helpful throughout the world. Biodiversity is a tool for sustainability and resilience, and research can bring us the much-needed answers.

Bioversity International is a global research-for-development organisation that investigates the conservation and use of agricultural and forest biodiversity "for improved nutrition, livelihoods, sustainability, and productive and resilient ecosystems". It is a member of the CGIAR (Consultative Group on International Agricultural Research) Consortium.

➤ www.bioversityinternational.org

Tangible sustainability

Family farms are often associated with greater sustainability. But the definition of sustainability is a highly disputable topic. The School of Agricultural, Forest and Food Sciences (HAFL) in Switzerland has developed a method enabling a more objective evaluation of sustainability in agriculture. Response-Inducing Sustainability Evaluation (RISE) covers ten sustainability indicators and supplies the foundation for agricultural advice.

Nowadays, there is general agreement that only sustainable agriculture will be capable of feeding the world's population without destroying the environment and the natural resources. However, opinions are divided on what sustainable agriculture should look like. Everyone, ranging from grassroots organisations through farmers' federations to the manufacturers of pesticides and fertilisers, claims to be supporting sustainable agriculture. To some, only organic and /or smallholder agriculture is sustainable, whereas others also include industrialised agriculture.

The reason why these views diverge is that sustainability is defined in different ways and different priorities are set. For example, the emphasis may be more on ecological criteria or more on economic criteria. This is why various initiatives are trying to enable an optimally objective and generally applicable evaluation of sustainability. One of these initiatives was started by the Swiss School of Agricultural, Forest and Food Sciences (HAFL) and has resulted in the development of the so-called *Response-Inducing Sustainability Evaluation (RISE)*. RISE has been in use since 2000, and has

been applied by various organisations to hundreds of small, medium-sized and large farms. The method has already been applied in five continents, also among large numbers of family farms in developing countries. Commissioned by the German Federal Ministry for Economic Cooperation and Development (BMZ), GIZ has been working with RISE since 2012, too. For this purpose, it has acquired a licence from HAFL, and several staff have been trained to use the method.

■ One method for all farms

The aim of RISE is to make the sustainability of production more measurable and communicable. The examination focuses on the farm. RISE evaluates the ecological, social and economic dimensions of sustainability. The indicators used have been derived from the sustainability definitions of the United Nations Food and Agriculture Organization (FAO) as well as a large number of scientific publications on the topic. This enables a by and large objective and holistic evaluation of sustainability.

RISE has not been conceived for the certification of farms but supplies the foundations for agricultural advice.

All RISE results are based on interviews with farmers.

The farms interviewed are given a written assessment of their sustainability and recommendations for action. By examining a group of representative farms, development projects can identify deficits and develop appropriate project or advisory strategies for a larger number of farms in a given region.

By using reference and standard values, no special measurements are required for the application of RISE as a rule; all results are based on interviews. The method can be applied to any farm, regardless of its size, level of commercialisation and location. Each farm that has been examined receives swift feedback on the results that is combined with suggestions for improvements. Thus the farm manager benefits directly and can, should the need arise, introduce measures to improve sustainability. For each farm, a full day is required

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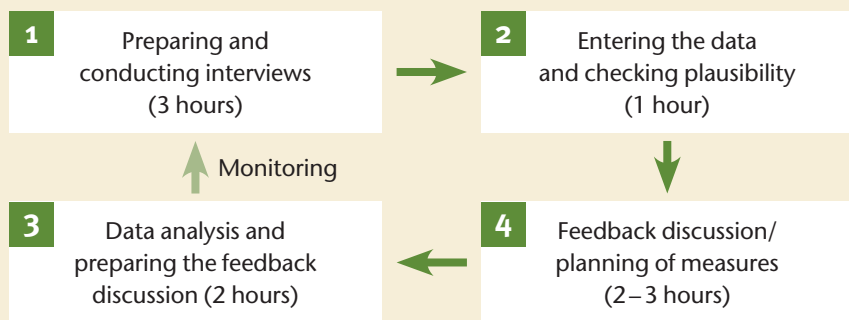
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Photo: E. Mill/giz

RISE – four steps towards sustainability evaluation

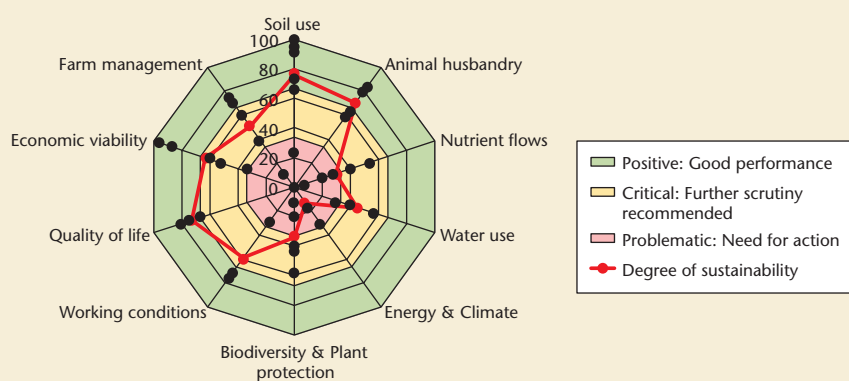
The four RISE application steps



The application of RISE is based on four steps (see Figure above). Activities centre on interviews with the farm manager and other people working at the farm (e. g. spouses, employees). The answers provided by the interviewees are entered into a software that performs a sustainability assessment for ten indicators relating to the economic, ecologic and social dimensions of sustainability with the aid of predefined parameters (see Figure below). Before the interview is carried out, specified regional data such as climate, average yield and average income has to be compiled, unless it is already available in the RISE data bank.

The results of the analyses are summarised and represented in a polygon with the aid of the RISE software (Figure below). A red line links up the values for the indicators. The larger the area within the red line, the more sustainable the farm. Values in the green area demonstrate a high level of sustainability. In addition, a detailed tabular representation of the sustainability evaluation per parameter is compiled. With the use of these representations, strategies can be developed to improve sustainability.

A polygon resulting from a RISE evaluation



for the interview and the feedback discussion.

RISE in German development co-operation

So far, GIZ has applied RISE in seven countries: Bolivia, Nicaragua, Zimbabwe, Ghana, Kirgizstan, Ecuador and Tunisia. The extent of examinations

and the use of the results vary considerably. As yet, the most extensive operation has taken place in Bolivia, where more than 200 representative farms were analysed in an agricultural development programme. For this purpose, project staff and agricultural extension employees were trained at local level in applying RISE. The results were made use of to focus advice for the targeted enterprises on the important problems.

If RISE is applied repeatedly, it can also be used for monitoring.

The example of RISE application in the context of German development co-operation so far shows that farms in a certain region often demonstrate similar patterns, so that the number of samples can be kept small. Even though family farms have been examined in most cases, sustainability levels are often poor. This is what the development projects address, and they offer targeted support. In addition to advisory services for farms, RISE can also supply valuable details for policy consulting. For example, if all enterprises in a region demonstrate poor sustainability regarding certain parameters, this may be an indicator for unfavourable framework conditions.

Potential for improvements

Even though RISE can be a great help for farms, agricultural extension services and development co-operation projects, applying the method in practice still presents a number of challenges. The HAFI has compiled a *Code of Conduct* to ensure quality in the application of RISE. For example, to apply the method, users have to be trained by HAFI, and its first use in the field must be accompanied by a HAFI staff member – this ensures a high standard in the application of RISE, but represents a fairly elaborate procedure. Also, given that HAFI capacities are limited, alternative training models are currently being discussed. However, the biggest problem that users refer to is the large amount of time that the method requires. In addition, many farmers refuse to reveal confidential income and asset details. And yet it is this information that plays an important role in assessing economic sustainability. Moreover, some of the RISE questions do not seem to be sufficiently adapted to smallholder agriculture in developing countries. Based on feedback from the practical application of RISE, the HAFI is continuously improving the method.

Family farming – a model with a future?

Is there good reason to make family farms a focus of global attention for a year? Or is it not rather reckless to advocate a concept while completely disregarding the fact that the necessary conditions are often not in place? A few entirely personal thoughts on the International Year of Family Farming.

Initially it sounds like a good idea: an “International Year of Family Farming”. The idea, then, is to promote a concept which consumers, landscape designers, environmentalists, climate researchers and many others associate with a “(more) ideal world” and “(more) vital” rural development; which is often thought of as a guaranteed route to the much-vaunted goals of sustainable development and food security. The implication of the latter, however, is that family farming is not seen merely as an organisational model for society in rural regions but as an economic organisational unit, a supporting pillar contributing directly to the development of rural regions.

If this is the case, then is it enough to “celebrate” such a year in order to encourage policy-makers to reconsider the merits of family farming and thus position it as an engine of sustainable rural development – in the hope that this will improve the living conditions of farmers in developing and newly industrialising countries? Many problems faced by farmers in these countries today were just as familiar to family farms in Germany and the European Union a few decades ago. This being the case, it is worth taking a look at how these evolved, whether they contributed to rural development and, if so, over what period of time and under what enabling conditions. Now I can already hear the objections – it’s wrong to make comparisons with developments in this country; the underlying conditions in industrialised and developing countries are too far apart; the political framework conditions are too different, etc. – but still: we can, and indeed should, learn from experience.



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■ A personal experience

Having grown up on my parents’ farm holding in Schleswig-Holstein in the north of Germany, after an agricultural apprenticeship I initially worked for a few years on my parents’ farm. There followed university studies of Tropical and International Agronomy in Germany and England. Subsequently I worked for over twelve years in agricultural development projects in Africa and Asia before working for the German Agricultural Society (DLG) in the field of international agribusiness co-operation. Against the backdrop of this experience, when it comes to family farms I certainly have my own way of looking at things. How did “our” family farm – which was of quite a manageable size – come into being, and how did it develop? And which parameters contributed to this at the time?

In post-war Germany, all essential commodities were in desperately short supply. The precious little that was available was unaffordable; scarcity was the overriding principle. The owner of my parents’ family farm (my father) came back from the war after five years. During that time, his wife lived on the farm with three children. Together with the last surviving elderly relative on my father’s side, they barely managed the most necessary work to keep the farm running. The war years and the resultant need to help feed the extended family depleted the substance of the farm’s capital.

After the war was over, solutions were sought to make Schleswig-Holstein’s agricultural holdings productive once again and to improve the supply of food. At the same time, the aim was to build a new livelihood base for a large number of exiled farmers. After long negotiations, the result was that the large estates in Schleswig-Holstein voluntarily provided 30,000 hectares of agricultural land for a resettlement programme. In the course of the homesteading programmes for exiled farmers from eastern territories, land reform was implemented which also included the relocation of urban farms, including our family farm, to the countryside in 1949. A land settlement company valued the reformed land allocations in the form of land securities. The necessary long-term loans

which had to be serviced by each family farm were recorded in the land registers.

There were three “types” of farm holdings:

- “smallholdings” (Kleinsthofsiedlungen), only ever intended as part-time livelihoods,
- “half farm holdings” (Halbbauernstellen) on which at least one family member should earn a living from something other than the farm, and
- “full farm holdings” (Vollbauernstellen), like ours, where agriculture was the main source of income.

For my parents’ family farm it was a total new beginning. The new site was a specially consolidated plot of land, newly allocated as a relocated farm. At that time, access was via a sandy dirt track to the main road, which led to a small town with a market just 5 kilometres away, with corn trade and a dairy. (The nearest major city was Hamburg, around 100 kilometres away). The only vehicle the family owned was a two-horse open coach, with a simple coach box and a small load-bed. The coach served as a “milk cart” for the daily milking (done by hand), as a means of transporting anything anywhere, but also for Sunday outings to visit relations. The farm provided a living for the owner’s family including three children. Two elderly relatives on my mother’s side not only drew expellees’ pensions but also received old-age maintenance in kind from the farm (*Altenteil*, see below). Up to the end of the 1950s, the owner’s family was also supported by a housekeeping apprentice and a „young man”, who received free board and lodging on the farm as well. Before very long, however, the farm was no longer in a position to support these workers’ wages.

Over the years, the countryside farm turned into the ideal vision used in today’s food advertising: arable and grazing land, cart horses, dairy cows with offspring, sows with their own boar and fattening pens, laying hens, fattening geese, guinea fowl, ducks, a farm dog and a house dog, eleven cats and the usual menagerie of small animals. The farm was worked by plough, harrow, seeder and reaper-binder, all horse-drawn. Hired labourers came to thresh the harvest until 1961. As early as 1955 the first (second-hand) tractor was running on the farm. At the end of the 1950s the roads

were developed and surfaced in asphalt. The house was progressively enlarged and modernised. In 1957 the horses were replaced with a brand-new all-wheel-drive tractor.

Up until the end of the 1970s, the then 25-hectare farm was sufficient to support a family of five. However, this burdened the family with an extremely high workload and tied them completely to the farm, even the children, who were integrated into the farm’s routines like proper workers. With the onset of the 1980s, the underlying economic conditions for this family farm had deteriorated so much, mainly through the assimilation of agricultural prices on the global market, that soon the farm’s income barely sufficed to finance the *Altenteil*, the maintenance agreed in cash and in kind to support a farmer’s parents in old age in return for keeping the farm in the family.

■ Lessons learned

So what was the driver of this agricultural (and rural) development process, which only prevailed for a certain period but nevertheless was relatively successful, and what conclusions can be drawn from it – against the background of my experience in Africa and Asia – in relation to the IYFF?

First of all, the following conditions must be met: soil and climate – in whichever region of the world – must be suitable to support agriculture. There must be existing agricultural know-how, demand for agricultural products and a market for them. Moreover, farming families must be willing to work together to improve living conditions, assert their interests and develop what is commonly known as “entrepreneurial practice” – be it of the most basic standard. Once these factors are in place, I see the following four points as the vital keys for positive development of agricultural holdings and rural areas:

1. Land law, land use and long-term security of tenure (heritable, acceptable as collateral)
2. Infrastructure
3. Market access reasonably close at hand, so as to have access to all kinds of inputs (even such simple items as nails or wire to fence in livestock and thus secure valuable property) and be able to offer the farm’s own products and exchange information
4. Energy supply

So what is the status regarding these points in the rural developing regions of this world?

1. Even at the first point, we often draw a blank. How should a subsistence farmer or a smallholder develop and extend his farm when he lives with the uncertainty that tomorrow, or the day after, he may have to leave his land? Bigger,



Homestead farm
in Germany

Photo: M. Lüth

Family farming in the Central Mahakam area, a 24-hour boat journey from the nearest market town of Tenggarong, East Kalimantan, Indonesia.



Photo: M. Lüth

- longer-term investments for the future – and larger-scale plans, e.g. for irrigation or drainage – are not carried through under this uncertainty.
2. Agricultural products are normally bulky; transporting these to market by rustic means over impassable terrain (a concrete example from personal experience: pushing rice sacks in a dugout across swamplands) can be a sheer impossibility. Certainly a dealer – a middleman – will also collect goods from the farm; but because he bears the cost and laborious effort of transportation, he will drastically force down the price. Then the farmer's work no longer pays!
 3. Market access is a very critical element in rural development. I have been in regions and villages in Africa and Asia without a market within a radius of hundreds of kilometres! Even small purchases were not possible. Everything had to be procured from the provincial capital. A smallholder cannot afford to go on shopping trips; nor does this task fit into his "entrepreneurial portfolio".
 4. The speed and quality, the turnover and quantity of work processes can only be improved if energy in some form is applied, and this is no less true of small agricultural holdings. Without an energy supply the productivity of the farmer's family is limited to the number of hands or the amount of animal power. It wears families out and holds back their entrepreneurial engagement.

Of course there are many other factors like the agricultural extension service (which, it is to be hoped, actually speaks with the farmers!), a functioning banking system with access to short-term and long-term loans, market information services, and communication, etc. The functionality of these additional development factors, however, is directly linked to the four points mentioned above. A loan system will only function if corresponding securities can be lodged, such as land-title or at least a long-term land-use right. A market information system is only worth having if the market can be reached while the information is still current. Costly energy use only makes sense if the surplus harvest can be transported away without undue effort. Naturally, a lobby or a mouthpiece – e.g. a farmer's organisation – is a helpful structure for asserting the sector's interests vis à vis other branches of a national economy.

■ A brief conclusion

The IYFF is a well-intentioned initiative and is, after all – as the UN writes on its website – addressed to policy-makers. Merely turning the focus on family farming is not enough, however. The fortunes and misfortunes of a family farm depend on local circumstances, the underlying conditions listed under points 1 to 4, and whether a region or country is in a position to develop and establish these. These enabling conditions are existential for family farms. And this, in my view, is the core problem: which developing or newly industrialising country can pull that off, which politicians are strong enough to campaign for it and unlock the resources? All of that has a great deal to do with good governance.

Whether we like it or not: the global actors, the multinational corporations which invest in agricultural production in developing and newly industrialising countries are so welcome there because they bring everything with them. They commit their own resources to financing the technology, the infrastructure, the marketing, and so on. That leaves few opportunities for the family farming that is commonly considered so desirable. Therefore another question that arises is whether it is defensible – in ethical terms, too – to advocate family farming for developing and newly industrialising countries and to urge farmers' families into the entrepreneurial model of the family farm, knowing only too well that the necessary conditions are only met in rudimentary form or cannot be established adequately. On the other hand, if the said enabling conditions are created and consistently fostered, then family farming can certainly become a supporting pillar of sustainable rural development.

Integrated Watershed Management – an approach with a number of stumbling-blocks

Integrated Watershed Management represents an option for the management of water catchment areas. However, what may sound good in theory often proves to be very difficult when it comes to practical implementation, as an example from the Lower Mekong Region shows.

The rice farmers in the community of Hoa Le, in Vietnam's central highlands, agree that water scarcity on the one hand and floods on the other are among the greatest challenges that farming in the region has to cope with. However, they realise that they are doing well in comparison to the people elsewhere in the valley. The head of the community, who has to attend the talks for official reasons, is smiling happily, for after all, the government built a dyke in the region some years back in order to prevent flooding. In addition, a reservoir for rice paddy irrigation has been enlarged, and the canals have been refurbished. Communicating with the government authority at district level is said to work well, and money, it is emphasised, gets to where it is meant to go.

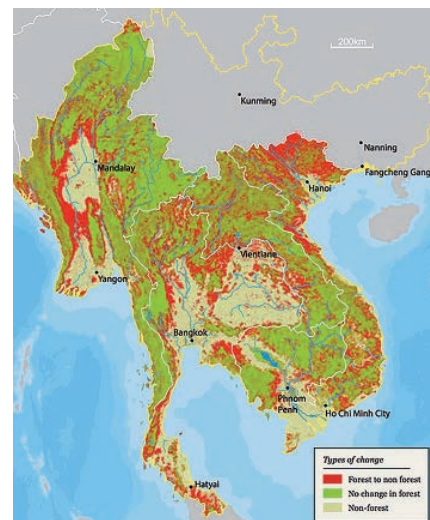
■ IWSM is to accommodate a wide range of interests

This interview was conducted during the evaluation of two German projects in the water sector in Cambodia, Laos, Thailand and Vietnam (see Box on page 34). The Mekong River Basin

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is of considerable importance to these countries. More than 80 per cent of the population in the Lower Mekong Basin depend on its resources. They use the river for irrigation in farming and fisheries, for navigation and transport and in energy production. Up to 300 million people in Southeast Asia live on the food produced here. Increasing industrialisation and a growing tourism sector also require much water. Often, however, the use of the land and water resources to meet this wide range of demands does not fulfil the principles of sustainability. Frequently, the negative effects of flawed management practices such as soil degradation and water pollution or the higher intensity and frequency of flooding and droughts owing to climate change are not effectively addressed due to a lack of co-ordinated management.

In order to promote a sustainable handling of such problems, the projects examined were to introduce the concept of Integrated Watershed Management (IWSM, see Box on page 33), adapt it to local conditions and create the necessary preconditions for its dissemination. This was to result in improvements being achieved in co-operation between authorities, civil society and citizens, initially in one pilot water catchment area per country. At the same time, strategy plans were



Deforestation in the Mekong Region 1974–2009.

Source: WWF Greater Mekong Programme

compiled to optimise the water situation in each pilot area. Taking good practices into account, experts from the education sector, civil society and the authorities were trained while advice was simultaneously provided on introducing IWSM in national structures.

■ Identifying appropriate solutions

Deforestation was one of the key problems for the target group of the projects (see diagram above). Sensitisation campaigns conducted by staff trained in IWSM have led to a decline in deforestation aimed at creating cropland in the region, but it is not only the farmers who fell trees but above all the commercial timber industry. Timber firms are destroying the livelihoods of farmers through what is often an illegal export of lucrative tropical timber. Moreover, it was reported that in the 1990s, members of the Hmong minority migrated from northern Vietnam to the central highlands and were now carrying out slash-and-burn farming deep in the jungle.

Ethnic minorities were not reached by the sensitisation campaigns. For one thing, they were not specially addressed in the campaigns. Besides, the training material was not available in the languages required. Moreover, such training can only make sense if alternatives to the non-sustainable sources of income, such as slash-and-burn farming, are presented. This is where, for example, the integration of innovative financing mechanisms such as Payment for Environmental Services (PES), in which people are paid for conserving the forest as an ecosystem, would suggest itself. In one concrete case, PES was referred to in the training material, and a Vietnamese non-governmental organisation was supported in implementing a PES system.

■ Involving civil society from the start

However, it has become apparent again and again that efforts to conceive such plans to create alternative sources of income are frequently half-hearted. For example, in the community of Bantea Srey in Cambodia, the villagers had been retrained as vegetable growers by non-governmental organisations. However, there was a lack not only of installations required to store the water needed for this venture but also of knowhow, the participants in the scheme explained. The corresponding projects run by the district government were often poorly implemented, like in the case of a water reservoir, which was sited unfavourably and had started to leak hardly had it been built. Measures did not meet local requirements, and residents were not consulted or involved in activities.

This shows just how important the promotion of civil society groups for the political representation and advocacy of local interests is in the success of Integrated Watershed Management. In the cases reviewed, some representatives of government local authorities had been invited to training measures. But there

Integrated Watershed Management (IWSM)

An area in which all runoff goes to a common outlet is the definition of a watershed. The IWSM-approach promotes close co-operation between the authorities and the water users at this local level, with boundaries between political sectors and local authorities often being crossed. Co-operation focuses on concrete problems in the watershed. In this respect, IWSM is not a product but a process; its aim is not to provide a specific blueprint for a given water management problem. Rather, it gives a broad set of principles, tools, and guidelines to be tailored to the specific context of the area.

The projects at hand considered a watershed not simply as a small hydrological unit but also as a socio-political-ecological entity which plays a crucial role in determining food as well as social and economic security and provides life support services to the rural population. Hence, human activity forms part of watersheds, and affects the watersheds and vice versa.

had been no systematic, targeted support of civil society at local level. Local training and organisational consulting measures could lead to more local participation in the political process and hence to a use of finance focusing more on citizens' needs and less corruption.

There have been reports from some discussion partners at local level in Vietnam on successful problem solutions involving all stakeholders. In Krong Bong District, there was a resource conflict between rice farmers and a hydro-electric plant. Damming and the spasmodic release of water complicated the systematic irrigation of the rice paddies further down the river. Following negotiations supervised by the authorities between the plant operators and delegations of rice farmers, spills from the power station

were, albeit reluctantly, co-ordinated with the irrigation system of the farmers. One interview partner assumes that the resolution of the conflict was thanks to the civil servants taking influence.

■ Watershed Committees – a tiger without teeth?

So this successful co-ordination of conflicting users' interests was not directly due to the setting up of the local Watershed Committees. It was not only in Vietnam that the effectiveness of the Watershed Committees, which after all are one of the central institutions in the IWSM concept, showed weaknesses. In Thailand and Cambodia, the members of the potential committees have already been chosen. But they have no



Deforested hillsides in Laos.

Photo: J. Ferguson



Photo: A. Kayumov

Focus group discussion with officials from the Krong Bong District.

money and “no stamps” enabling them to do their work, a WSC co-ordinator reports. While committees had also been set up in the pilot regions in Laos, their influence “beyond planning” had only been slight. Disputes between the two districts responsible for the watershed complicated an institutionalisation of the WSC in this case, and financing beyond the end of the project was not ensured. If the setting up of a WSC was successful, this frequently coincided with the involvement of strong leadership figures giving the committees sufficient clout. Recruiting such leaders at all levels was part of the project strategy.

■ Weaknesses and success factors

It was with this in mind that consultations among the responsible ministries, e.g. of forestry, agriculture and water, took place at national level in National Working Groups (NWG). Key figures from the local, sub-national and national levels, some of them in senior positions, got together regularly in these committees to discuss national topics related to IWSM and exchange information. Thanks to their (unpaid) involvement in the NWG, these change agents were supported in contributing to a change in awareness in their authorities. Since the first decade of the new millennium, sets of regulations have been adopted in Cambodia, Laos and Vietnam that enable better co-ordi-

nation and planning in terms of IWSM. However, the evaluation also showed that without a formalisation and funding of the NWG by national authorities, no further support of the IWSM approach was provided by the NWG.

In spite of the poor effectiveness of the Watershed Committees, one is satisfied at district level with what has been achieved so far, above all with regard to awareness-raising and capacity development. Positive references are also made to advising the authorities on compiling recommendations on settling water use conflicts. A Thai civil servant explained that the concept of Watershed Management was already familiar. But through co-operation with the Germans in the context of the projects, the focus, which had previously been set more on technical solutions, had now been complemented by social aspects. In this manner, the role of the local population in planning and implementing IWSM measures was strengthened. Thus the potentials of the sustainable use of bio-resources in the watershed could be tapped more effectively.

The effectiveness and sustainability of the projects is also based on national training institutions such as universities as well as non-governmental education centres having been integrated in the training measures. There, the IWSM approach and the corresponding methods continue to be taught and adapted to local conditions. The authorities integrated in the projects carry on using IWSM-related methods, and one often hears of a commitment to involving all stakeholders in the watershed more strongly. Also, many interview partners praised the information portal mekonginfo.org that had been developed in the course of the project as well as the training material prepared on the basis of insights gained from the pilot regions. However, it was emphasised that this material had to be translated into the languages spoken by the ethnic minorities and, very much in line with the process-oriented IWSM approach, that it required continuous updating.

The example referred to at the beginning of this article shows that a lot still remains to be done. An interview later on revealed that the dyke that the discussion partners from Krong Bong District had applauded because it secured their harvests had in fact worsened flooding in neighbouring Lak District.

Information

The Evaluation

Evaluating was carried out from July till November 2013 and was commissioned by the GIZ Unit for Monitoring and Evaluation in co-operation with the Centre for Rural Development (SLE) at Humboldt University Berlin. Two projects run by GIZ (Gesellschaft für Internationale Zusammenarbeit, formerly GTZ and InWEnt) on Integrated Watershed Management were examined in Cambodia, Laos, Thailand and Vietnam: “Sustainable Management of Water Catchment Areas in the Lower Mekong Basin” (2002–2011) and “Potentials of Rural Areas in the Mekong Countries” (2005–2008).

The Survey

What has remained? – An ex post Evaluation of Watershed Management in the Mekong Region; can be downloaded from: <http://edoc.hu-berlin.de/series/sle/254/PDF/254.pdf>

*The Team

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FlexiBiogas – a climate change adaptation and mitigation technology

Access to modern renewable energy services are a key input to poverty eradication and in ensuring food security. Biogas is a renewable energy option suited to provide clean, modern and decentralised sources of energy. Portable systems, such as FlexiBiogas, offer a lot of advantages over traditional fixed dome systems.

Today, 2.5 billion people rely on traditional biomass fuels (wood, charcoal, and dung) as their principal source of energy for cooking and heating, and more than 80 per cent of them live in Asia and sub-Saharan Africa. Women are most affected by the consumption of firewood and charcoal. The smoke inhaled from the combustion of these traditional biomass sources causes chronic respiratory diseases and eye infections. The drudgeries related to daily firewood collection lead to back pains and exhaustion. According to the World Health Organization (WHO), more than one million people died from chronic obstructive respiratory diseases (COPD) in 2011.

Since May 2012, the International Fund for Agricultural Development (IFAD) has been assessing the potential of renewable energy technologies (RETs) to provide clean, modern and decentralised sources of energy. One of the promising RETs identified is the new-generation portable biogas systems, such as FlexiBiogas, developed by the Kenyan company Biogas International Limited (BIL).

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Photo: IFAD

Using the FlexiBiogas system, 1 000 litres of cooking gas can be generated from 20 kg of fresh cow dung.

These systems have been installed as part of a project titled Making Biogas Portable: Renewable Technologies for a Greener Future, under the Initiative for Mainstreaming Innovation. The initiative is funded through IFAD by the UK Department for International Development. IFAD has also facilitated South-South co-operation between Kenyan engineers and the Indian Institute of Technology (IIT), which has provided a platform for scaling up the system internationally.

■ The potential of biogas

Biogas is a renewable energy obtained from biodegradable organic material such as kitchen, animal and

human waste. Cost-effective technologies like biogas systems can stem methane emissions from livestock manure by recovering the gas and using it as an energy source. The organic material is inserted into a sealed digester, and in the absence of oxygen, anaerobic bacteria consume the organic matter to multiply and produce biogas which can be piped directly to a cooking stove.

In most of sub-Saharan Africa, biogas technologies (fixed dome and floating drum digesters) have been available since the 1950s. These two main types of biogas system, which have been implemented around the world, require large quantities of bricks, concrete, and steel, making transportation to rural areas costly. Their construction depends on land security, skilled technicians, transport and logistics of building materials, all leading to significant initial investment costs of a thousand US dollars or more.

It is estimated that at least 18.5 million African households have the technical potential to implement biogas digesters, and yet adoption rates remain low.

■ FlexiBiogas: portable, expandable, efficient

Biogas International (BIL) has installed 200 FlexiBiogas systems in Kenya since 2011. Since April 2012, IFAD has worked in partnership with Biogas International to install nine sys-

tems on dairy farms as part of the IFAD-supported Smallholder Dairy Commercialisation Programme in Nakuru and four systems in an orphanage school in Naivasha. At the school, the systems use kitchen and human waste to produce electricity for lighting and to provide Internet access.

The FlexiBiogas system is portable and expandable. It has a shorter retention period (the time it takes for organic material to break down) than fixed dome systems. It consists of a plastic digester bag, similar to an open-ended pillow case, housed in a greenhouse tunnel. The tunnel acts like an insulated jacket, trapping heat and keeping the temperature between 25 and 36 degrees Celsius. The combination of the tunnel and the plastic bag increases the volume of gas production and reduces retention time, ensuring a high rate of fermentation and gas production.

The system has a comparative advantage over other biogas digesters in rural areas as it can be transported easily on a bike or donkey to remote areas. Neither does it require skilled labour such as bricklayers. The unit can be installed by merely flattening the ground as opposed to transporting gravel, stones, bricks, sand and cement, and it begins to produce sufficient volumes of biogas faster than other systems.

In other words, the FlexiBiogas system has the potential to tap into rural markets where firewood consumption at household level is highest and leads to increased deforestation and land degradation. With the adoption of biogas, methane emissions, which are 22 times more damaging to the global atmosphere than CO₂, can be reduced through better livestock manure management. In addition, the bioslurry is a good alternative to chemical fertilisers and can support the rebuilding of soil health and reduce dependence on fossil fuels.

Cow power

One cow produces 15 to 30 kg of dung every day. Estimates suggest that about 20 kg of fresh cow dung will yield 1,000 litres of cooking gas in the FlexiBiogas system, enough for a household of five to seven members. Adding an extra 20 kilogrammes of dung to the system will run a 5-horsepower engine for one hour. This could be coupled to an automotive alternator, which will charge a battery (using a chaff cutter) and a converter to run small items such as lights, a computer or a television set.

■ A whole range of benefits

The FlexiBiogas system exemplifies how the climate-energy-agriculture nexus can be harnessed to help rural Kenyans expand energy access, generate income, preserve the environment, and bolster community resilience. Additional social benefits include gender empowerment, enhanced health, and expanded educational opportunities.

Lessons learned from the adoption of FlexiBiogas biosystems have been gathered throughout the past two years with the collaboration and support of IFAD investment projects in Kenya, Rwanda, Orissa/India, and in São Tomé e Príncipe. The new systems are proving to be a significantly better alternative than fixed dome systems.

Environmental benefits. From an environmental perspective, the initiative seeks to address climate change mitigation and adaptation activities by reducing the level of greenhouse gases released into the atmosphere. The main environmental benefits are reduced firewood consumption at household level (2 kg per day) leading to decreases in deforestation and land degradation and reduced methane emissions from better livestock manure management.

Bioslurry is a good alternative to chemical fertilisers and can support the rebuilding of soil health. One underestimated income generation opportunity is the promotion and use of organic fertiliser (bioslurry) from livestock, kitchen and human waste produced by the digesters which can increase soil fertility and reduce environmental degradation (soil erosion and deforestation) and therefore ideally contribute to higher crop yields.

Socioeconomic benefits. The results of the studies show that a regular supply of biogas has reduced the daily task of gathering firewood (especially for women and girls). On average about two hours a day are saved, providing more time for women and girls to engage in other activities such as handicraft manufacture, livestock maintenance, attending to chores, study, play and rest. The technology is user-friendly, allowing illiterate farmers to install, maintain, operate and troubleshoot effectively.

Studies in Kenya and Rwanda also note that on average, each farmer in the two countries has extended his or her cropping by 0.5 hectares because of the additional time made available. Evidence shows that it became easier to cook during the rainy season, when the kitchen was transferred indoors to protect the biogas stove. This is facilitated by the fact that no bad odour is associated with FlexiBiogas as it digests 100 per cent of the organic substrate. Nor does it attract flies.

Additional economic benefits include improved health, bioslurry replacing chemical fertilisers, better nutrition from home gardens using bioslurry and improved education of children.

Technical benefits. Based on research and field surveys in Kenya and Rwanda, it was documented that traditional fixed dome systems are more expensive (1,200 to 1,800 US dollars) and

require three to six dairy cattle. Ownership of land is a further pre-requisite, and skilled labour is needed to install, maintain and operate the biogas unit efficiently if long-term sustainability is to be ensured.

The main technical advantages of FlexiBiogas systems include:

- Easy to transport (50 kg), and installation takes two to three hours as opposed to seven to ten days for the fixed dome.
- The system can work with different types of organic feedstock that is available locally.
- Cross-flow methodology ensures that bioslurry is fully digested; there is no residual methane or pathogens.
- The system is expandable and can thus accommodate more energy requirements as needs and income increase.
- Training of technicians to install and provide operation and maintenance services is simple and done adopting a learning-by-doing approach.

Health benefits. The studies document that the FlexiBiogas systems lead to reduced chronic obstructive pulmonary diseases (COPDs) and eye infections by eliminating smoke from the kitchen. The daily diet can be improved through better home gardening using bioslurry as a fertiliser leading to improved nutrition. Adopting FlexiBiogas may

also improve homestead sanitation as a result of better management of livestock manure.

■ Outlook

The goal of promoting FlexiBiogas by IFAD is to foster clean, modern and decentralised sources of energy as an alternative to traditional biomass sources such as firewood and charcoal for cooking and kerosene for lighting.

With just one or two cows in an integrated farming system, the Flexi-Biogas technology can provide 60 to 100 kilogrammes of high-quality fertiliser, 1.2 cubic metres of biogas daily for cooking and 12 litres of milk. IFAD's pilot project has opened up new channels and potential partnerships for globally testing the 'One Cow model' (see Box on page 36).

In the long run, potential environmental risks must be considered in the case of a more large-scale introduction of FlexiBiogas systems. Firstly, the long-term impact of the heavy use of plastic and lead acid in automotive/solar bat-

teries must be considered. Secondly, the actual reduction in firewood consumption in rural areas is inconsistent. Although a large majority of users do in fact use firewood significantly less, some still prefer firewood for cooking. In other instances, although farmers realise that they no longer need to use firewood, they still sell bundles to their neighbours as a source of income.

Nevertheless, the 'One Cow model' has the potential to create employment in rural areas and address two of the major problems in sub-Saharan Africa, nutrition and the availability of renewable fuel, as well. IFAD is also playing a crucial role in diffusion and scaling-up of proven strategies for strengthening national and regional policy frameworks. The biogas compression and bottling model that IFAD is piloting in Kenya jointly with supplementary financing from the Government of Finland is fostering regional and local renewable energy industries through capacity building of entrepreneurs, thus stimulating investment in the renewable energy sector and opening new frontiers for business development.



The biogas system brings numerous advantages for rural families. Women's firewood-gathering workload is reduced, bioslurry applications raise harvest yields, bought-in chemical fertilisers are no longer needed. The money saved can be used for the children's schooling.

Photo: IFAD

Rebuilding soil natural capital

Throughout the world, demands on finite soil resources are ever increasing, and can lead to irreversible soil degradation, as the soil is used beyond its “bio-capacity”. A quarter of the inhabited land area has already been affected by human-induced soil degradation. Against this background, soil remediation is becoming more and more important. Focusing on the rehabilitation of oil-contaminated soil in Kuwait, the following article shows how it works, and where the problems lie.

Soils and soil biodiversity are the foundation of all terrestrial production systems that generate ecosystem services such as the provision of food, fodder, fibre, clean water and control of greenhouse gases and crop pests. Soil contains an enormous diversity of organisms. Soil biodiversity represents a vast gene pool of potential value to humans, including new antibiotics and use in industrial goods. Soil biota contributes to the delivery of all soil functions and is responsible for global cycles of carbon, water and nutrients.

But this precious resource is always at risk from degradation – by erosion, salinity, contamination, nutrient depletion, desertification, deforestation, overgrazing and other results of mismanagement. Some 17 per cent of the Earth’s land surface has already been strongly degraded, and the area affected is still growing. Soil degradation ranks amongst the greatest environmental challenges, impacting soil micro flora, water, biodiversity and emission of greenhouse gases. The magnitude of this threat starts from local level, but has global implications, bringing in social and political instability and threatening pro-poor growth and food production. An estimated 24 billion tons of fertile soil is lost each year.

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Human-induced soil degradation has affected 24 per cent of the inhabited land area.

■ Soil contamination in Kuwait

This holds also true for Kuwait. Over 114 square kilometres of Kuwait’s soil was damaged by crude oil released when retreating Iraqi troops detonated 798 oil wells in Kuwait in 1991. The flow of crude oil and seawater used to extinguish the burning oil wells accumulated in depressions in the desert areas, contaminating over 40 million cubic metres of soil. The historical legacy of Oil & Gas Exploration & Production operations in Kuwait has also harmed the natural desert environment, particularly the soils. Around 6,840 contaminated sites have been identified by the Kuwait Oil Company. Typical non-operational redundant polluted features include effluent pits (produced water is dis-

posed), sludge pits (recovered oil from spills/leaks is disposed), contaminated soil piles (oil-soaked soil); gatch quarry pits (for construction purposes), etc. The oil affected soil properties including physical, chemical, and geotechnical properties. Contamination also caused extensive plant and animal mortality, seeped into the soil layers where it reached the freshwater aquifers in Kuwait and continues to impair ecosystem functioning. Hence, it was recommended to remediate the contaminated soil along with clearing these areas of UXO (Unexploded Ordnance) to reduce its impact on the environment or use the contaminated soil for engineering purposes.

■ The SEED project

In 2012, the SEED (Sustainable Environmental Economic Development) project was launched for remediation

Nearly 7,000 contaminated sites have been identified by the Kuwait Oil Company. Part of the land is now to be remediated through the SEED project.



Photo: B. Bordoloi

of soil in the Burgan Oil Fields, considered to be the world's second largest oilfield and containing most of Kuwait's oil. The project, funded by the United Nations, covers remediation of various contaminated features of oilfield properties to acceptable levels and restoring ecological functions of the soil. It aims to remediate approximately 0.9 million cubic metres of soil and 0.16 million cubic metres of sludge and recover 0.8 million barrels of free phase oil by 2016. In total, 25 sites with an average area of 45,000 square metres are to be remediated.

The pre-remediation phase of the project included activities like radiological surveys, UXO/Explosive Ordnance Disposal activities, installation of groundwater monitoring wells for conducting Environmental impact assessment (EIA) studies and site characterisation to estimate the actual volume and type of contamination. The oil and sludge existing in the features posed a challenge for activities like detecting UXO and thus causing delays to dependent activities like site characterisation. In the remediation phase, the project is utilising a combination of technologies like soil washing, thermal desorption, and bioremediation (in-situ and ex-situ) to clean up oil-contaminated soils.

■ Step-by-step soil improvement

Soil washing technology removes contaminants from soils by dissolving and/or separating, suspending contaminants on soil particles into the wash water and by concentrating contaminants into a smaller volume of soil through particle size separation. **Bioremediation** uses a consortium of crude oil-degrading bacteria derived from various naturally occurring and non-pathogenic bacterial cultures. Within four months, these biological organisms eat up the contaminants (mostly organic compounds), convert them into carbon dioxide and clean up the surrounding area without any harmful

Soil contamination and remediation projects

Accelerating industrialisation, intensified irrational exploitation of mineral resources and its related emissions, long-lasting irrigation with polluted water, atmospheric deposition triggered by human activities and the use of chemical fertiliser and chemical pesticides have all severely aggravated soil contamination across the world. In China, 30 per cent of the usable land is considered contaminated. Soil remediation expenditures in China are predicted to reach 6.4 billion US dollars (USD) per year by 2015 or 15 per cent of the total USD 40 billion World Site Remediation Market that year. Canada has begun the second phase of a 15-year plan to remediate 22,000 sites of various size and type from small areas of soil contaminated by spilled fuel to very large abandoned mine sites that are contaminated by heavy metals and other toxic substances, requiring USD 7.7 billion. The cost of remediating Canadian soil and water contaminated by petroleum hydrocarbon is estimated at USD 1 billion. The Russian government has allocated USD 620 million for cleanup in three zones designated as nature reserves. Taiwan's Environmental Protection Agency (EPA) has identified more than 2,000 contaminated sites nationwide to date.

Legislation relating to soil remediation is widespread, and there are efforts at local, national and world level. Fundamental to these regulations are European Union Directives such as the Environmental Liability Directive, the Water Framework Directive and the Soil Framework Directive, Superfund (United States), the Contaminated Land Management Act (New South Wales, Australia) and the Environmental Management Act (Canada).

residue or side-effects. In the first two years of the SEED project, more than 36,000 tonnes of contaminated soil was remediated by bioremediation, the target being 200,000 tonnes by the end of the project. **Thermal desorption** technology utilises heat to increase the volatility of contaminants such that they can be removed (separated) from the solid matrix (typically soil). The volatilised contaminants are then either collected or thermally destroyed. The Thermal desorption units currently used remediate about 20–30 tonnes of soil per hour. Around 0.8 million cubic metres of contaminated soil is to be remediated through the thermal desorption and soil washing technology. Afterwards, the features are to be backfilled with remediated soil, and native plant species like *Astragalus spinosus*, *Rhanterium epapposum*, etc. are to be established to initiate ecosystem recovery, reduce desertification and use the remediated soil for future engineering purposes.

The SEED project has proved successful in repairing damage to the natural landscapes. The project will be able to monitor and compare the effective-

ness of various remediation approaches using the established native plant species as performance indicators.

Given ever-increasing global demand for commodities and soil ecosystem services, improving soil management could be a key opportunity for supporting sustainable economic development. Remediation technologies like thermal desorption, soil washing, bioremediation etc. are critical to controlling soil degradation, so that economic and social development can be sustained. With growing pressure on land in the developing world, the economic value of soil remediation is set to increase. However, various problems need to be tackled. In the SEED project, for instance, the enormous quantity of fresh water for the soil washing technology poses a new challenge, and the project struggled to source water in summer months and had to scout for recycled water.

The views expressed herein are the personal views of the authors and are not intended to reflect the views of any organisation.

Boosting commercial sorghum production and marketing with the “aggregator model”

How can the private sector contribute to the fight against hunger, poverty and malnutrition in the remote areas of sub-Saharan Africa? This article looks at a model that has been applied in Kenya and Tanzania, addressing the right tools, skills and knowledge to make smallholder production a success.

Since 2009, Africa Harvest Biotech Foundation – in partnership with the International Crop Research Institute for the Semi-Arid Tropics (ICRISAT) – has adapted various iterations of the “aggregator model” in increasing the production and marketing of sorghum among smallholder farmer groups in the Arid and Semi-Arid Lands (ASALs) of Kenya and Tanzania. The aim was to address barriers and bottlenecks along agribased value chains. The project used the whole value chain (WVC) approach to increase production and productivity as well as to link smallholders to markets for surplus produce. This is a sustainable approach to household food and nutritional insecurity, incomes, natural resource management and the overall development agenda. Smallholder farmers were organised into development and commercially focused smallholder production and marketing groups (SHPMs). Using a market-pull strategy, Africa Harvest worked with the SHPMs to align downstream value chain activities to specific end-market demand parameters (variety, quality, quantity, timeliness and consistency). The process started with the identification of a ready market where demand outstrips supply, with the household nutritional needs as a critical first stop. Experience

has shown that risk-averse smallholder farmers will first produce what satisfies their household needs before turning to markets. The value chain has to appeal to these needs before commercialisation can be adopted.

“Aggregator model” is a term which originates from E-commerce, defining a business model where a firm (that does not produce or warehouse any item) collects (aggregates) data and information on goods and/or services from several competing sources at its website. In our case, the model means a close co-operation of all stakeholders in the sorghum value chain. Adaptation ranges from direct intervention by Africa Harvest in service provision to the current iteration where an entrepreneurial sorghum farmer or trader is identified and supported to provide both downstream (input services to farmers) and upstream (linkage to market) services, on a commercial basis. Our experience is that this farmer or trader often starts as a community or opinion leader; as the individual builds confidence and business gains traction, the aggregator is formalised into a business.

Seed funding to work on the model came from the United Nations Development Programme (UNDP), through the Africa Facility for Inclusive Markets (AFIM) programme. The funding was to kick-start activities such as community mobilisation, producer groups formation and initial training. The funds were also catalytic to the process of initial proof of the concept phase, which involved piloting the model in Kenya and Tanzania explained below. Other donors included the International Fund for Agricultural Development (IFAD) and the European Union (EU).

■ The sorghum value chain challenges

The Arid and Semi-Arid Lands (ASALs) in Kenya and Tanzania are all remote rural areas, lacking good infrastructure (road and communication networks), having limited options for livelihood support, and generally being neglected

The aggregator in Tharaka, Kenya, with her tractor and thresher. Provision of input services as well as linkage to market is part of the aggregator model.

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Photo: Africa Harvest

in development initiatives. Nonetheless, these areas have huge tracts of idle and virgin land that is good for agriculture and get sufficient rain to sustain drought-tolerant crops like sorghum, cowpea and others. Communities living in these areas have limited options for commercial crop production, given their over-reliance on rainfed agriculture. With the right tools, technology, skills and knowledge, they can intensify production of cereals (like sorghum) and pulses (e.g. cowpea).

The dispersed pattern of habitation and the dilapidated road networks in these rural areas do not attract the traditional business person, who will seek low transaction costs. Also, changing weather patterns and especially the incidence of drought have rendered these areas more disenfranchised given the dearth of risk mitigation tools and limited knowledge and skills to enhance adaptation and coping mechanisms. Yet these rural areas are home to 70 per cent of the entire population in Africa and will continue to play a critical role in feeding rising populations in the future. This bottom of the pyramid opportunity offers a huge pool for potential buyers of manufactured products and suppliers of inputs that should contribute to poverty eradication if well harnessed.

The main bottlenecks to raising production and productivity in these ASAL areas include:

- limited to no access to inputs: improved variety seeds, information, crop protection inputs, and financial services;
- limited skills and knowledge in good agronomic practices required to exploit the full potential in improved inputs (particularly seeds);
- limited knowledge of market requirements;
- limited knowledge in harvesting and post-harvesting management;
- limited access to labour-saving machinery for land preparation, harvesting and threshing, to minimise the drudgery of labour-intensive agriculture;

Success factors

For the aggregator model to succeed, the following critical factors should be in place or be developed:

- Willing commercial **end-market players**. In the case of sorghum in Kenya and Tanzania, East African Breweries Limited (EABL) took a strategic decision to have sorghum as part of its input in beer manufacturing.
- An entrepreneurial individual (a farmer and/or trader) willing to provide **aggregation services**
- A network of **sub-aggregators** for services at village level.
- A **capacity building partner** (“value chain champion”) to intermediate the process and ensure good governance in the value chain. Africa Harvest plays this role. This partner is also involved in the provision of information and market intelligence and may have to sustain activities before the aggregator is well entrenched. In addition, Africa Harvest helps streamline value chain bottlenecks as they occur before handing over to other players/stakeholders, supporting government (e.g. county government) in facilitating value chain activities from a policy point of view.
- Other service providers, including banks and microfinance institutions.

- limited capacity to operate as economic units that appeal to value chain players, particularly large corporations with an eye on the bottom line.

Adapting the model to sorghum production

In the course of implementing various sorghum development projects, the aggregator model was identified as a good option to address the gulf between end-user markets (excess demand) and smallholder farmers (lacking in capacity and motivation to produce for commercial markets). End user markets require commercial quantities of raw materials at reasonable input prices while farmers need access to inputs, information, capacity building, and aggregation of low produce quantities into commercially feasible units as well as land preparation, harvesting and threshing facilities.

The aggregator therefore intermediates the value chain at that remote location by providing access to inputs required to increase production and productivity, while facilitating access to markets through their business development capacities. He also provides a cen-

tral point through which financial intermediation as well as other value chain enhancement interventions can be directed to target smallholder farmers.

In addition, the aggregator requires a system of sub-aggregators (such as cereal traders) scattered around the remote villages that provide sub-aggregation services (buying of marketable produce) for a fee. This helps to make the entire system sustainable and inclusive since packing the produce and loading it onto trucks requires labour. It also ensures a good system through which seeds and other inputs can be accessed in remote villages. In the ideal situation, the aggregator should be empowered to provide all services required by smallholder farms including extension, setting up of demonstration plots as well as banking facilities.

Adding a nutrition component

The model could be enlarged by a nutritional aspect: Adopting the production of other drought-tolerant crops – particularly legumes and pulses – has the dual benefit of first providing a rotational crop for sorghum production. This improves soil fertility and provides nutritional benefits through



Photo: Africa Harvest

A sorghum demonstration plot in Tharaka, Kenya. The provision of improved seeds is one of the core aspects of the sorghum development projects.

– opens up local economies, improves nutrition of rural households through consumption of eggs and chicken meat, increases incomes from sale of chicken products

access to plant protein as well as vitamins and minerals from the edible leaves of these legumes. Cowpea is a good example of such duality with its leaves used as vegetables (vitamins and minerals) and the bean providing plant protein. Here, the basket of choice for the farmers can be expanded to include an array of legumes and pulses that are developed by the centres of the Consultative Group on International Agricultural Research (CGIAR) and national agricultural research centres, e.g. cowpea technologies developed by the International Institute of Tropical Agriculture (IITA).

Researchable areas could also include the use of bio-fertilisers in improving soil fertility/nitrogen fixation and how this could improve productivity in sorghum. The aggregator would still provide the services of linking SHPMs with improved quality seeds, training on best practices and onward linkage to markets for surplus produce.

■ Diversification of livelihoods

The sorghum value chain also provides a base for a number of other job creation avenues in rural settings. There are good opportunities for livelihood diversification strategies through implementation of an integrated farming systems approach. Adding a component of short-cycle livestock – traditional as well as improved-chicken breeds

and improves the household asset base. Youth and women would particularly benefit from this enterprise since it requires less input in terms of capital and is easier to manage. Using sorghum as chicken feed would also open up entrepreneurial opportunities for local-level industries to supply chicken farmers with feeds, further unlocking value for sorghum farmers.

Other alternatives could include the introduction of dairy goats whose feed would come from sorghum stovers while improving household nutrition through milk production and increasing household assets (improved goats). An agro-forestry component using dual-purpose shrubs (e.g. *calliandra* and *leucena*) for fodder (goats) and soil fertility management can further complement this diversification strategy while enhancing natural resource management (soil fertility).

■ Promising results

Between September 2012 and August 2013, Africa Harvest carried out a pilot project on the efficacy of the aggregator model in both countries in Kenya and Tanzania. The pilot was implemented among 2,500 smallholder farmers who had set aside a minimum of three acres of land for sorghum production (monocrop) and used inputs to increase productivity. Key achievements from this pilot were:

- Enhanced awareness, among smallholder farmers, on the availability of regional markets for sorghum grain (15,000 farmers were reached by the project);
- Access to improved seeds and other inputs (including fertilisers) for 2,500 smallholder farmers in both Kenya and Tanzania;
- Enhanced capacity of these farmers to increase production and productivity in sorghum from 450 kg/acre to 1,000 kg/acre (on average);
- Increased quantity of sorghum grain reaching commercial markets by 129 per cent – from 2,388 metric tons (MT) to 5,469 MT – in Kenya and Tanzania (through the aggregators);
- Enhanced capacity of aggregators to provide services to farmers through direct facilitation and linkage with financial service providers. The total volume of sorghum grain delivered to East African Malting Limited (a subsidiary of East African Breweries Limited, EABL) by the five aggregators working with the project was 5,469 MT. This grain had a market value of over 2 million US dollars (USD). The total amount made by smallholder farmers was over USD 1.5 million (72.7 % of the market value of the grain traded), within twelve months of project implementation.

These preliminary findings provide evidence that the aggregator model has the potential to catalyse improvements and impact among smallholder farmers involved in sorghum production in ASALs. Corporations ought to play a greater role in enhancing food security, income generation and the reduction of malnutrition among the rural poor. The use of inclusive business models like the aggregator model to address barriers and bottlenecks along agri-based value chains should be promoted as they can help unlock superior economic value, provide much needed jobs for youth and women and improve livelihoods.

For more information:

► <http://africaharvest.org>

In brief

■ Increasing CO₂ may threaten human nutrition

A new study by the US-based Harvard School of Public Health (HSPH) concluded that, at the elevated levels of atmospheric CO₂, anticipated by around 2050, crops that provide a large share of the global population with most of their dietary zinc and iron will have significantly reduced concentrations of these nutrients. Given that an estimated two billion people suffer from zinc and iron deficiencies, resulting in a loss of 63 million life years annually from malnutrition, the reduction in these nutrients represents the most significant health threat ever shown to be associated with climate change, the scientists of the study say.

"This study is the first to resolve the question of whether rising CO₂ concentrations threaten human nutrition," said Samuel Myers, research scientist at HSPH, and the study's lead author. The researchers analysed data involving 41 cultivars (genotypes) of grains and legumes from the C₃ and C₄ functional groups from seven different locations in Japan, Australia, and the United States. The level of CO₂ across all seven sites was in the range of 546 to 586 parts per million (ppm). The researchers tested the nutrient concentrations of the edible portions of wheat and rice (C₃ grains), maize and sorghum (C₄ grains), and soybeans and field peas (C₃ legumes).

The results showed a significant decrease in the concentrations of zinc, iron, and protein in C₃ grains. For example, concentrations in wheat grains were reduced by 9.3 per cent, 5.1 per cent, and 6.3 per cent, respectively, compared with wheat grown at ambient CO₂. Zinc and iron were also significantly reduced in legumes; protein was not. C₄ crops appeared to be less affected by higher CO₂, which is consistent with underlying plant physiology, as

C₄ plants concentrate CO₂ inside the cell for photosynthesis, and thus they might be expected to be less sensitive to extracellular changes in CO₂ concentration.

The researchers were surprised to find that zinc and iron varied substantially across cultivars of rice. This finding suggests that there could be an opportunity to breed reduced sensitivity to the effect of elevated CO₂ into crop cultivars in the future. (HSPH/wi)

■ On the trail of cassava frog skin disease

Scientists at the International Center for Tropical Agriculture (CIAT), in Cali/Colombia, developed a diagnostic technique to identify the frog skin disease in cassava. The new diagnostic method they developed relies on reverse transcription polymerase chain reaction (RT-PCR) – a very sensitive technique that detects viral diseases based on low levels of RNA molecules. Cassava frog skin disease (CFSD) is an economically important root disease affecting cassava in several South American countries. Propagated clonally, the disease causes plants to produce thin roots that accumulate little or no starch. Except in the case of some cassava landraces, infected plants generally look vigorous, showing no noticeable disease symptoms in the stem or leaves. Cassava growers don't realise the plants have been damaged until harvest.

Since the 1970s, every five years or so, researchers in Latin America reported the presence of a different pathogen associated to CFSD, when in fact there has always been a mix of them infecting a diseased plant. "With current techniques, we can detect all of them at once and focus on improving diagnostics and disease control. The RT-PCR protocol we developed is already contributing to safer cassava germplasm exchange," CIAT plant virologist Wilmer Cuellar notes. (CIAT/wi)

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The screenshot displays the Rural 21 website interface. At the top, the navigation bar includes 'Home', 'Contact', 'Subscribe', 'E-alert sign up', 'About', and 'RSS'. The main header features the 'Rural21' logo and the tagline 'The International Journal for Rural Development'. A search bar and language options ('English', 'Français') are also present.

News

Making agriculture work for Africa's progress (21.05.2014)
By boosting agriculture, which affects two thirds of the continent's population, Africa can not only reduce poverty and inequality but also has the potential to feed itself. However, in the absence of a flourishing agricultural... [more]

Scientific World

More ARICA varieties released (21.05.2014)
The first ARICA varieties were released mid 2013 by the African Rice Center (AfricaRice). A further six varieties are now to follow. [more]

Opinion corner

Appropriate agriculture can lessen the destructive impact of typhoons (21.03.2014)
Devastation brought by Typhoon Haiyan on the Philippine island of Leyte in November 2013 need not have assumed such awesome proportions if the island's original natural environment had not been destroyed by deforestation and inappropriate... [more]

COMING EVENTS

2-13 June 2014 - Wageningen UR, Netherlands
"Food Security in an Urbanizing Society. From home gardens to agro-parks: working towards resilient agrifood systems serving densely populated areas"
Information: [Website](#) | [Contact](#)

4-6 June 2014 - Cottbus, Germany
2nd European Agroforestry Conference: Integrating Science & Policy to Promote Agroforestry in Practice
Information: [Website](#) | [Contact](#)

17-18 June 2014 - GIZ in Eschborn: Dag-Hammarskjöld-Weg 1-5, 65760 Eschborn, Germany.
Eschborn Dialogue - World in motion: mobility, migration, digital change
Information: [Website](#) | [Contact](#)

18-20 August 2014 - Brisbane, Australia
International Symposium on Indigenous Vegetables
Information: [Website](#) | [Contact](#)

2-11 September 2014 - Karl Kübel Institute for Development Education, Coimbatore, India
10 days training Workshops on "Food and Nutrition Security - FNS"
Information: [Website](#) | [Contact](#)

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The screenshot shows the Rural 21 Facebook page. The page header includes the Facebook logo and the text 'Rural 21 - News & recent events'. The main content area features a post with a video player and several images of people working in rural settings. The post text reads: 'Rural 21 The International Journal for Rural Development'. Below the post, there are sections for 'Liked', 'Following', and 'Message'. A post from 20th April is visible, stating: 'Today, more than half of the world's population lives in cities. As the urban population grows and the effects of... worsen, our cities have to evolve: - your city green on this...'. A post from 24th April is also visible, stating: 'For the thousands of undernourished children, the ripple effect is just not happening!'. The page also shows a 'Like' button with '209' likes and a 'Share' button.

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