

RURAL

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AGROECOLOGY

Key to achieving
the SDGs

FOOD DEMOCRACY

Why we need an agroecological revolution

MIGRATION

Financial literacy is indispensable for sound remittances management

LAND GRABBING

How Ethiopia's resettlement programme endangers food security

DEAR READERS,

In 2008, the authors of the International Assessment of Agricultural Knowledge, Science and Technology for Development (IAASTD) report arrived at the conclusion that “business as usual is not an option” to make global food security sustainable. The radical transformation of the existing food and agricultural system that the report calls for was initially given a lukewarm reception by many international organisations. But the adoption of the Sustainable Development Goals and the underlying three dimensions of sustainability – ecological, economic and social – provided the demands raised in the IAASTD report with new impetus – and so did Food and Agriculture Organization Director-General José Graziano da Silva’s saying at the 2nd International Symposium on Agroecology for Food Security and Nutrition in April 2018: “We need the integrated approach that agroecology can offer.”

This edition illustrates the concept and the different definitions of agroecology. In addition, we asked representatives from various institutions – UN Organisations and research institutions, German and Swiss development co-operation, the German Agricultural Society and non-governmental organisations from the Global South – to inform us about which aspects of the agroecological approach they attach particular importance to and how this affects their own activities. Or, to demonstrate why they view the concept as unsuitable for world food security and for improving the livelihoods of smallholder farmers. In our online presentation, as a supplement, you will find a contribution by the Brazilian organisation ASPTA, which has been campaigning for family farming and sustainable rural development for 35 years, applying an agroecological approach.

The Rural 21 articles demonstrate that during the last ten years, there has been many a change in the public debate on the food and agriculture systems of the future. But in this period, Rural 21 has also undergone a number of changes itself. Having dropped its old title, “agriculture & rural development”, and heralded the

“Rural 21” epoch in 2008, with www.rural21.com, we created a completely new online service four years later. It acts as a supplement to the focal themes of our journal by providing the latest news on projects and policies in rural development, accounts of international specialist events, news from science and research, and information from our partners. In addition, on our French Portal, we regularly supply our Francophone readers with a selection of our print and online contributions. Every 14 days, our Newsletter provides you with an update of the latest articles and news items on our website.

In 2016, we optimised our online services for use in mobile devices. Now you can download the individual magazines as PDF files and also share our contributions with your partners in the social networks. And last but not least, in late 2017, we once again revamped our journal with an entirely new, up-to-date design. Now Rural 21 – The International Journal for Rural Development is truly well prepared for the future.

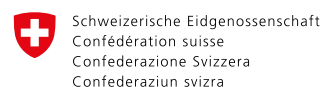
Having been in charge of editing Rural 21 for almost a decade, I am now passing on editorship. I would like to thank you all for the interest you have taken and the trust you have placed in our product. But I will continue to support the editorial team in the future – and I can already promise you an exciting 3/2018 edition on the topic of “gender equity”.



Sincerely yours,

Silvia Richter

Partner institutions of Rural 21



Direction du développement
et de la coopération DDC



Photo: Detlef Overmann

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Photo: Manuel Flury



Photo: ZEF



Photo: Xuesong Zhang



Photo: EDD-Brussels

A BETTER WORLD FOR WOMEN IS A BETTER WORLD FOR ALL

The twelfth edition of the European Development Days aimed to bring together the European Union's commitment to gender equality and women's empowerment with the 2030 Agenda for Sustainable Development.

“Women and girls at the forefront of sustainable development: protect, empower, invest” was the topic of this year’s European Development Days (EDD) held by the European Commission in Brussels, Belgium, in early June 2018. At the two-day event, more than 8,000 participants from over 140 countries discussed ways to improve the situation of women world-wide and enable them to achieve equal participation and ownership. The roughly 120 sessions addressed three overarching blocks of topics: ensuring the physical and psychological integrity of girls and women; promoting their economic and social rights and empowerment; and strengthening girls’ and women’s voice and participation.

SDG 5 – A DOCKING STATION FOR THE OTHER SDGs

“Women are an essential force for the implementation of the Agenda 2030. I advocate for inclusive development that leaves no-one behind.” With these words, Queen Mathilde of Belgium opened the event and simultaneously set the thematic frame for the discussions: the central role of women as designers and developers on the way to achieving the Sustainable

Development Goals and the obligation of the community of nations to strengthen the position of women and girls, which is clearly expressed in SDG 5: achieve gender equality and empower all women and girls.

ECONOMIC EMPOWERMENT – SETBACKS INSTEAD OF PROGRESS

Marie-Louise Coleiro Preca, President of Malta, explained that in terms of eliminating gender inequality, we were not only moving forward too slowly but were in fact partly moving backward – also in the global North. According to the 2017 Global Gender Gap Report of the World Economic Forum, which benchmarks 144 countries on their progress to gender parity, it was shifting into reverse in 27 states. Within the European Union, progress in economic participation of women has slipped backwards in twelve countries. And according to Eurostat, women working full-time in the EU would need an average salary rise of 19 per cent in order to attain the level of men’s income.

A recently published World Bank report containing surveys in 141 countries demonstrates

what this means in terms of prosperity in society as a whole. Because of the lifetime earning gap of women, the global economy is losing out 160 trillion US dollars a year. The President of Niger, Mahamadou Issoufou, took his country as an example to show what this implied for individual women. In Niger, the employment level of men is at 90 per cent, compared to that of women at a mere 40 per cent: Without professional activity and the ability to enrich themselves, women run a greater risk of poverty. “Three out of four people in poverty in Niger are female,” the President noted. In addition, as a rule, women have less access to education and resources, and they are bearing the blunt of climate change, for example through working in agriculture. And in the event of catastrophes, they are the first victims.

ONE OF THE MOST DEVASTATING HUMAN RIGHTS VIOLATIONS

Violence against women and girls in all its forms was a second recurring theme at the event. As the numerous examples once again demonstrate, it is a world-wide phenomenon, cutting across all generations, nationalities, communities and spheres of our societies, irre-

spective of age, ethnicity or other background. In the EU, for example, one out of every three women over the age of 15 years has been a victim of physical or sexual violence, one out of 20 has been violated, and 55 per cent of women are victims of sexual harassment. And rape continues to be applied as a military weapon. Only recently, this was once again revealed in the course of terrorist attacks in the Sahel region, which were condemned by several speakers, including Denis Mukwege, President and Founder of the Panzi Hospital and Foundation in the Democratic Republic of the Congo. In his hospital, which was opened in 1999, this gynaecologist and surgeon treated at least 50,000 survivors of sexual violence. “In conflicts, rape has become a weapon par excellence,” Mukwege, who holds numerous awards, told the meeting, referring to the devastating consequences regarding the physical and mental health of women that usually lasted a lifetime. Based on his experience, he tried to start local consciousness-raising campaigns, which however proved to be extremely difficult. After all, it is the soldiers themselves, i.e. those who are there to protect people, who are the authors of the crimes. For years, Mukwege has been campaigning for a unanimous condemnation of sexual violence and for bringing rapists to court to charge them with crimes against humanity – which led to him being threatened with murder in his home country.

SUCCESS STORIES

Although there is still a long way to go, the speakers were also able to refer to a number of positive developments towards gender equity. In Malta, for example, five years after access to free childcare centres had been created, there was six per cent more female work participation, President Marie-Louise Coleiro Preca told the meeting. The Prime Minister of Norway, Erna Solberg, personally prescribes parental leave for male representatives of her Cabinet, for: “Strengthening the role of fathers is an important part of promoting gender equality.”

Government representatives of numerous African nations also reported on reforms that have been implemented or that are in the pipeline – from education and health to the role of women in economy and decision-making. For example, Rwanda’s President Paul Kagame has introduced an insurance scheme guaranteeing women further payment of their salary during maternal leave; in the course of the most recent parliamentary elections, the President of Liberia, George Manneh Weah, raised the 30 per

cent proportion of women demanded by the national elections commission to 50 per cent in his own party. Not only is there a female vice president in his government, the country now has its first woman deputy chief of staff of armed forces, as he proudly reported.

“ *Equality is not about destroying differences between women and men; it is about creating a context in which each and every person can pursue their legitimate aspirations and be respected in the fullness of their human dignity.* ”

Marie-Louise Coleiro Preca,
President of Malta

In Burkina Faso, the school enrolment rate for girls is now at around 86.4 per cent. In addition, vocational trainings and measures for job creation had been specially introduced for young girls, President Roch Marc Christian Kaboré told the meeting. In order to address the uneven distribution of resources, 34 per cent of land made available by the state had been given to women. In the coming five years, Niger’s President, Mahamadou Issoufou, intends to double the level of education of girls and reduce disparities by school drop-outs. Above all young girls ought to be kept in education till the age of 16. Not only

is this to help them be better prepared for jobs in modern economic sectors; the President also hopes to bring an end to child marriage and early pregnancies through education – a measure by which, according to a World Bank study, the country could increase its GDP by 3.8 per cent.

In this context, journalist Zain Verjee reminded the meeting that each year, 214 million women in developing countries seek to avoid pregnancies, but lack access to contraception. And yet this was a cost-effective policy. Just nine US dollars per person and year was needed to ensure women’s sexual and reproductive health – while right now, only half of that amount was being invested, Verjee criticised.

A CHANGE OF MINDSET IS NEEDED

Also, there had to be an end to discriminatory legislation, such as in inheritance or family law, many of the speakers demanded. But even if legal and political measures are good, they will not address the root of the problem as long as mental and cultural leaps continue to exist. Or, as Liberia’s President put it: “Discrimination, violence and marginalisation are embedded in our cultures”. As long as exercising gender-based violence in conflicts was accepted behaviour, nothing was going to change. “We need persistent efforts to change the mindsets of people”, he concluded.

Silvia Richter

WHAT TO TAKE BACK HOME?

By the end of the EDD’s, some key facts and demands concerning the three keywords “protect, empower, invest” had emerged:

- It is high time to hold leaders accountable against female genital mutilation and child marriage.
- Sexual violence has to be prosecuted; the survivors should be integrated in peace-building processes.
- In preventing conflict, international organisations should rely more on early warnings of women’s groups on the ground.
- Gender equality is not just a moral and fairness issue, but is also important for economic development.
- A fairer distribution of time and labour between women and men would be good for both.
- Seventy per cent of decisions about household consumption are made by women, so it is women who should drive change.
- If we want to close the gender gap we have to make sure that women are economically empowered – through education, capacity-building, access to finance and access to decision-making.
- Migration puts women in vulnerable situations, but can help them to reach a better economic status.
- Digitisation holds a huge potential to empower women and girls. Moreover, it is a crucial factor in achieving disabled women’s participation.



WHY WE NEED AN

Governments and international organisations have mainly taken an interest in agroecology over the last few years because of the system's environmental benefits. However, our author believes that there are other important reasons to support an agroecological revolution. It once again puts farmers in the driver's seat, opts for local solutions and is a key factor in achieving food democracy.

By Olivier de Schutter

As a contribution to the science of agronomics, agroecology aims to reduce the use of external fossil-based inputs, to recycle waste, and to combine different elements of nature in the process of production in order to maximise synergies between them. But agroecology is more than a range of agronomic techniques that present some of these characteristics. It is both a certain way of thinking of our relationship to Nature and a social movement that is growing.

A RENEWED UNDERSTANDING OF NATURE

Agroecology invites us to embrace the complexity of Nature: it sees such complexity not as a liability, but as an asset. The farmer, in this view, is a discoverer: he or she proceeds experimentally, by trial and error, observing what consequences follow from which combinations, and learning from what works best – even though the ultimate “scientific” explanation may remain elusive. This is empowering: the farmer is put in the driver's seat, she constructs the knowledge that works best in the local context in which she operates. In contrast, so-called “modern” agriculture, which is in fact twentieth-century agriculture, did the exact opposite: it sought to simplify Nature. What to do in the field was defined by whatever was prescribed by “science” developed in laboratories. The path from research to practice was unidirectional, and it was seen as unproblematic: since solutions were based on science, they were considered universally applicable. The experiential knowledge of the farmer was irrelevant at best; at worst, it was treated as “prejudice”, and as an obstacle to the top-down implementation of sound scientific prescriptions from “experts”. In this view from twentieth-century science, the complexity of

AGROECOLOGICAL REVOLUTION

Nature is a problem: simplify it if you can – never mind if this means robbing the farmer of developing her art – and transforming that art into the literacy of reading instructions for use on the spray bottles and on the seed bags.

If agroecology stems from a renewed understanding of Nature and of our relationship to Nature, it naturally follows that it is also a social movement. This movement encourages peer-to-peer exchanges of information between farmers. It prioritises local solutions relying on local resources. And it transforms the relationship between the farmer and the “expert” from the department of agriculture or from the international agency, not in order to reverse it and to replace one hierarchy with another, but in order to move towards the co-construction of knowledge, as most clearly illustrated by participatory plant breeding.

MORE THAN A SET OF AGRONOMIC TECHNIQUES

It is only if we see agroecology as something else than a particular set of agronomic techniques that we can understand the opposition that it faces. Indeed, as a branch of agronomics that borrows from ecology to replace the act of farming within the ecosystems in which that acts takes place, agroecology is particularly well-suited to meet the challenges of the day. In our still dominant industrial farming system, it takes about ten calories of fossil energy to produce one calorie of food, a clearly unsustainable approach as we reach peak gas and peak oil. This system is a huge emitter of greenhouse gases: at least 13.5 per cent of total anthropogenic greenhouse gas emissions comes from agriculture, and this rises to up to one third once we factor into that calculation the deforestation to create pastures and expand cultivated areas, as well as the various stages of food processing, packaging, transport and retail. Small production units are systematically put at a disadvantage, since they are less well equipped to mechanise and to achieve economies of scale, and since they are less competitive in a world in which farmers are asked to become suppliers of raw commodities – of large volumes of uniform stuff – for the food processing industry. The impacts on rural development are considerable, as small family farms are disappearing en masse. Moreover, as they have been shaped in the past, industrial food systems have encouraged the shift to highly processed foods, including ready-

to-eat “convenience” foods and ultra-processed “junk” foods. The consequences of such modern consumption patterns are well known. World-wide, the prevalence of obesity doubled between 1980 and 2008. More than one billion adults are now overweight, and 400 million others are obese. Combined with more sedentary lifestyles and tobacco and alcohol consumption, inadequate diets are resulting in the rise of non-communicable diseases: type 2 diabetes, heart disease, or gastro-intestinal cancers, all directly related to diets, are now growing rapidly in all regions, and not only in rich countries, as was the case in the past.

Agroecology provides a number of answers. It favours a gradual transition away from the fossil-energy-based farming of the earlier generation, and it seeks to preserve soil health and to reduce soil erosion. In fact, it is mostly because of its environmental benefits that agroecology is now considered with interest by governments and international agencies. Although it can be practised on a large scale, its insistence on intercropping techniques, and on various combinations between plants, trees and animals – in order to re-establish the agro-sylvo-pastoral complementarities that “modern” agriculture has negated – makes it especially suitable when practised on relatively smaller farms. As such, increased support to agroecology shall contribute to re-balancing competition between large, industrial-size farms and smaller farms, which at the moment is significantly skewed in favour of the former.

GREATER DIVERSITY, BETTER HEALTH

And agroecology promotes better nutrition, both because greater diversity on the farm results in greater diversity in the plates for the communities who produce their own food, and because of the proven benefits to health. Organic crops, recent studies show, have up to 60 per cent higher numbers of key antioxidants than conventionally-grown ones, and of course show much lower levels of pesticide residues and of toxic heavy metals, such as cadmium, than industrially grown crops. Most importantly, agroecology represents a shift away from the quasi exclusive focus on growing large cereals in monocultures, which over the past 30 years has in fact reduced the diversity of the plants on which our diets are based, and has favoured an ever-increasing reliance on heavily processed foods that are richer in saturated fats and in

added sugars and salt. The health benefits of an agroecological revolution would be significant.

OVERCOMING THE POLITICAL ECONOMY OBSTACLES

Why is it, then, that despite all these benefits it may provide, agroecology remains marginalised? Four major lock-ins still form considerable obstacles to the agroecological revolution. First, technologies and infrastructures are biased in favour of achieving economies of scale through reliance on large monocultures that can be more easily mechanised. Second, dominant agribusiness actors – the large commodity buyers and food processing companies – are better positioned to supply markets with low-priced foodstuffs, against which other actors, using other, more sustainable modes of production, are unable to compete: until industrial farming methods will be obliged to fully internalise the social and environmental costs they impose on the collective, this is not going to change. Third, our lifestyles have evolved with the industrial way of producing food that we have been encouraging: people today have less time to cook, they have relegated food to a secondary position in their lives, and many families have lost even basic culinary skills that are required to reduce the dependency on heavily processed foods, including the convenience foods that we have become so accustomed to. Fourth and finally, political obstacles remain. Large agribusiness actors veto any significant change that would threaten their position in the system, and that would question, in particular, the relegation of the farmer to the position of a captive buyer of inputs, and a provider of raw materials to the food processing industry.

These obstacles are formidable. This is why food democracy – the ability for people to make real choices about how to produce food, what to produce, and how to eat – is key to unlocking the system. The agroecological revolution is much needed. It will however only succeed if we overcome the political economy obstacles to change. I welcome this edition of Rural 21 as an important contribution to such an ambitious and urgent undertaking.

Olivier De Schutter is Member of the UN Committee on Economic, Social and Cultural Rights and was the United Nations Special Rapporteur on the right to food from 2008 to 2014.
Contact: olivier.deschutter@uclouvain.be



“Diversity instead of uniformity” plays a key role in the concept of agroecology. It includes bidding farewell to large-scale mono-cropping and ...

Photo: Martin Leissl/laif

AGROECOLOGY – THE MOST CONVINCING PROPOSAL FOR TRANSFORMING UNSUSTAINABLE AGRO-FOOD SYSTEMS

“Agroecology” is becoming increasingly important in the debate on the future of agriculture and the food industry. Is it just a new buzzword, one of so many on the long list of sustainable agriculture terms, or is it really a novel approach that calls for changing tack? Our authors explain.

By Angelika Hilbeck and Bernadette Oehen

The current industrial agro-food system, including the many aspects of production and distribution, is highly unsustainable, both for environmental and for human health reasons. Furthermore, it fails to feed the world as was promised decades ago. This was concluded in the 2008 International Assessment of Agricultural Knowledge, Science and Technology for Development (IAASTD) Report and captured in the statement that “business as usual is not an option anymore” (see also article on pages 11–13). The situation was described even more dramatically in the 2013 Review by the United Nations Conference on Trade and Development (UNCTAD), titled “Wake up before it is too late to make agriculture truly sustainable for food security in a changing climate”. But hunger and starvation continue to rise despite the fact that more than enough foodstuff is available and global productivity of most staple crops is still increasing.

Moreover, for many years, scientists have been sounding the alarm that the global ecosystem is in a precarious state and possibly on the verge of an abrupt shift because of anthropogenic pressures. For example, Johan Rockström and

his colleagues write: “Further pressure on the earth system could destabilize critical biophysical systems and trigger abrupt or irreversible environmental changes that would be deleterious or even catastrophic for human well-being”, which may leave planet Earth in a “much less hospitable state” for human populations, as Will Steffen and colleagues maintain. Together with other scientists, they have identified nine key global ecosystem processes that regulate the stability and resilience of the global ecosystem. For each process, they have defined the boundaries of the safe operation space for humans. They show that for four of these nine processes, the planetary boundaries have been exceeded as a result of human activity: climate change, loss of biosphere integrity (i.e. biodiversity), land-system change, and altered biogeochemical cycles (phosphorus and nitrogen).

CALLING INDUSTRIALISED AGRICULTURE TO ACCOUNT

One of the main drivers behind the anthropogenic pressures on these planetary processes is industrialised agriculture. This form of agri-

culture has been modelled after the extractive industries, reducing agriculture to one function only: the production of raw materials (commodities) for long industrial extraction and production chains for feed, fibre, energy and foodstuff. In this model, maize or soybeans, for example, are no different from oil or minerals mined from beneath the soil. Also in so-called less developed countries with as yet little industrialised agriculture, powerful forces are at work pressuring national governments into converting land to such industrial monocultures, at the expense of small-scale farmers, human health and the environment. The products of these long, open and linear industrial processing chains may be edible foods, although this is not what these commodity crops are mainly meant for. Many of them serve as raw materials for feed, fibre and, increasingly, fuel. Emily Cassidy and colleagues calculated that, globally, only about 59 per cent of the total produced calories are delivered to the world’s food system. However, the more than 80 per cent of crop produced calories going into human food in development countries contrasts sharply with the 34 per cent in the USA. The rest ‘feeds’ engines, industries and



... a greater variety of seeds for farmers to choose from.

Photo: Jörg Böhling

waste disposal sites. Cassidy and colleagues found that if the current mix of crops were grown exclusively for direct human consumption, in principle, it could feed an additional four billion people today – instead, more than 800 million are starving.

Just like all commodities, these commodity crops are globally traded and transported. In basically all industrial countries (as well as those striving to become such countries), policies and subsidiary systems have been installed that reward those farmers who consolidate their farms as larger units and firms to produce the highest quantities possible of primary raw materials from a handful of crops, like soy beans, maize, oilseed rape, wheat or cotton. These industrial agro-food systems rely on external inputs such as fossil fuel, synthetic pesticides and fertilisers to support the large-scale production of these few commodity crops bred primarily, if not exclusively, for yields. In the breeding programmes of the high yield varieties used in these industrial systems, little consideration was given to adaptation to local conditions and resistance against pests and diseases.

THE CONCEPT OF AGROECOLOGY

Agroecology is inspiring more and more people as a concept for the transformation of current unsustainable agro-food systems into sustainable ones. In 1983, Miguel Altieri defined it as the application of ecological principles to agriculture, and it fundamentally includes farmers and builds on farmers' knowledge. He proposed that agroecological systems should be based on five ecological principles: 1) re-

cycling biomass and balancing nutrient flows and availability; 2) securing favourable soil conditions for plant growth by enhancing the organic matter; 3) minimising losses of solar radiation, water and nutrients by managing the microclimate and soil cover, and practising water harvesting; 4) enhancing biological and genetic diversification on cropland; and 5) enhancing beneficial biological interactions and minimising the use of pesticides.

For others, agroecology is not only a system of producing food or a scientific discipline, but also a social movement that links producers to consumers and criticises the effects of industrialisation and the economic framework of the globalised food market. Michel Pimbert states that agroecology is based on autonomy, prudent use of resources and co-operation along the entire agro-food chain. Agroecology is, thus, neither a defined production system nor a production technique. It is rather a set of principles and practices intended to enhance the sustainability of a farming system tailored to the local conditions, and as a movement, it seeks new ways of connecting food producers with consumers – an approach which is vital for food security.

Among the many different forms of agroecological production systems, only the products of organic farming are subject to world-wide regulation, with laws and private label guidelines. However, the various forms, whether codified organic or agroecological, all differ substantially from conventional, industrialised agriculture, as described in the Table.

PROPOSED COMPETING PATHWAYS TO SUSTAINABLE AGRICULTURE – REAL ALTERNATIVES OR WINDOW DRESSING?





Competing concepts of making industrial agriculture more sustainable are also proposed, again purporting technology-oriented narratives. Proprietary techno-science packages are envisioned to be the primary key drivers of change and productivity increase, with yields of monoculture crops per area remaining the chief target and guarantee for food security. The Standing Committee on Agricultural Research to the European Commission (SCAR) contrasted two main types of proposals for change in their 3rd SCAR Foresight Exercise, published in 2011, and coined them 'productivity narrative' and 'sufficiency narrative'. Sufficiency is one element of sustainability. It stands for moderation or temperance, i.e. for production and consumption adapted to the resources available.

Under the 'productivity narrative', scientific advances should deliver high-yielding varieties (preferably patent-protected, e.g. by using genetic engineering techniques) that are amendable to automated precision technologies, taking into account resource scarcities and environmental problems. The focus of these strategies is the more efficient use of external inputs, leading perhaps to less of them being used, but certainly not to their expendability. The increase in efficiency is to come about through high-tech solutions offering the required inputs packaged with the necessary

Differences between industrial and agroecological food production

Conventional agri-food systems	Agroecologically based agri-food systems
Domestic and export-oriented production of raw materials (feed, fibres, commodities)	Local, regional and national food production and consumption
Long supply chains	Short supply chains
Feeding the agri-food industries with cheap raw materials	Nourishing households with healthy food
Few crop and livestock species	Different varieties of crops and livestock species
Large-scale mono-cropping or short crop rotation	Small-scale diversified food systems with long crop rotations and temporary grasslands/fallow lands
High dependency on external inputs (hybrid seeds, fertiliser, energy)	Lower dependency on external inputs (farm-saved seeds and own breeding, manure and composts to feed the soil)
Top-down extension schemes	Farmer field schools, stable schools, innovation platforms
Industries lead innovations, proprietary technology packages (main act) drive change	Farmers lead innovations, technologies (support act) help them in achieving their agroecological production goals
Segregation of the producers from their social background	Integration of the social relationships (farmer to farmer, farmer to consumer)
Segregation of agriculture from landscape, biodiversity, single function	Integration of landscape and biodiversity into agriculture, multifunctional
Narrow, single-field perspective, one-size-fits-all blueprint approach	System view, holistic approach including methods and technologies based on farmers' knowledge, traditional and indigenous people's perspectives

Conceptual comparison of a range of proposed changes (paradigms and narratives) towards sustainable agricultural systems

Productivity paradigm / narrative		Agroecology paradigm / narrative	
			
			
Exit systems: Conventional, high-input, chemical intensive, high yields		Traditional, low-input, low yields	
Conversion – maximise efficiency through precision technologies: <ul style="list-style-type: none"> - Large industrial operations - Linear, open extraction chains - Integration with high-tech robotics, remote control, IT, software - Biotechnologies - Conventional production – less chemical inputs, more efficient low-volume chemicals 	Conversion – maximise efficiency through precision technologies: <ul style="list-style-type: none"> - Large industrial operations - Conform with current economic paradigm - Perhaps shorter extraction chains? - Appropriation of organic-inspired production methods and supporting technologies - Biotechnologies plus GE* - No/little chemical inputs? 	Transformation to agroecological systems: <ul style="list-style-type: none"> - Family farm, small to mid size - Transform current economic paradigm, local-global agency - Short chains, closed cycles - Organic production methods and supporting technologies - Biotechnologies except GE* - No chemical inputs 	Conversion to more productive systems: <ul style="list-style-type: none"> - Family farm, small to mid size - Transform and create local economies - Short chains, closed cycles - Organic or other agroecological production methods and supporting technologies - Biotechnologies except GE* - No chemical inputs
Modified conventional	Ecologically inspired conventional	Agroecological	Agroecological
Business-as-usual LIGHT Little to medium change – still towards ruin		Transformation Much change – away from ruin	

* GE = genetic engineering

Source: Hilbeck, A. and B. Oehen (eds & authors) 2015.

Feeding the People: Agroecology for Nourishing the World and transforming the Agri-Food System.

technical (ideally autonomous) machinery, e.g. GPS-directed robots or drones, and, most importantly, the quintessential knowhow in the form of proprietary software (big data). In this vision, a farmer becomes either an investor, a ‘virtual farmer’ who runs the farm remotely from his/her home or office via a computer, or a farmer-technician executing the proprietary protocols and instructions developed by industry – for fees. Such technology-driven concepts are coined as ‘climate-smart agriculture’ or ‘precision agriculture/farming’. Moderation of production tailored to local conditions or reduction in consumptions are no-go areas in this narrative.

Climate-smart agriculture or CSA is mostly embedded in a development context and emerged from the debate in international UN circles around the interlinked challenges of climate change, agriculture and food security. Significant support stems from major institutional UN actors: the UN Food and Agriculture Organization (FAO), the International Fund for Agriculture and Development (IFAD), most importantly its international agricultural research centres of the Consultative Group for International Agricultural Research (CGIAR).

‘Precision agriculture/farming’ are terms that were coined in the USA and find their biggest supporters and developers among those global agriculture input, processing and trading industries who are the primary drivers behind the current destructive industrial agro-food systems. They are supported by governments in North America and the European Union who also help promoting these ‘CSA’ or ‘pre-

cision’ agro-food systems in those parts of the world where the most industrialised agro-food systems are already established, e.g. South America or eastern European countries.

SEEMINGLY THE SAME, BUT IN FACT DIFFERENT

Much of the rhetoric of CSA, but also ‘precision agriculture/farming’, is reminiscent of the wording used in agroecology, and builds on similar analyses. Ben Lilliston claims that such rhetoric creates ambiguity regarding the meaning of these terms and co-opts agroecology’s recent popularity while it simultaneously aims to “drown out the rising support for agroecology coming from both scientists and social movements”. Similar strategies were identified by Nicolas Lampkin and colleagues when comparing the different conceptual approaches to ‘sustainable intensification’ to genuine agroecological approaches. For instance, descriptions like “CSA is not a set of practices that can be universally applied, but rather an approach that involves different elements embedded in local contexts” borrows heavily from the language developed around agroecology. It also makes it sound like accommodating similar objectives as agroecology, such as food security, resilience, sustainable use of natural resources, reduced emissions and less deforestation. However, the main difference lies in what is not mentioned but is key to agroecology: small-scale farmers, food sovereignty, local supply, and circular and short production chains. Indigenous and traditional knowledge certainly has little to no value or role in the vision of CSA or precision agriculture.

In agroecological systems, scientific advances and technologies are also critical but assume a support role in helping to achieve the goal of developing highly productive agro-food systems that are respectful of ecosystems and resource saving through behavioural change and agroecological practices that are tailored to the local conditions. In contrast to the competing visions outlined above, agroecological approaches put food production and people at the centre, and farmers are key actors. Ideally, supporting technologies are offered at the capacity level of the farmers to master and own them. Education and training that increases the knowledge and skills of the farmers is crucial. This approach will require a fundamental change in the political, economic and institutional support structures. True agroecological transformation means ‘no business as usual’ anymore and requires a ‘system re-design’ aiming away from ruin, while all competing proposals try in one way or another to ‘conform’ to and, thus, rescue the current socio-economic and trading framework and, with it, the associated power and profit structures (see Figure). Consequently, they can at best offer approaches that we call ‘business-as-usual-light’ but that are still headed towards ruin – just a little later.

Angelika Hilbeck is a Senior Scientist at the Institute of Integrative Biology of the Swiss Federal Institute of Technology (ETHZ) Zurich in Switzerland.

Bernadette Oehen is a Senior Scientist at the Department of Socio-Economic Sciences at the Research Institute of Organic Agriculture (FiBL) in Frick, Switzerland.

Contact: angelicka.hilbeck@env.ethz.ch

IAASTD: FROM WORDS TO ACTIONS

The International Assessment of Agricultural Knowledge, Science and Technology for Development (IAASTD) may well be the most controversial agriculture and food system assessment so far. It was the controversy around it that gave it the attention that some of its key initiators, governments, multilateral development partners and the private sector tried to drown. The IAASTD has strongly influenced the Sustainable Development Goals thanks to the unrelenting efforts by civil society groups, NGOs and a few of the report's sponsoring UN Agencies. Where are we heading for today, ten years after the report was published?

By Hans R. Herren

The International Assessment of Agricultural Knowledge, Science and Technology for Development (IAASTD) series of reports (one global and five regional) were given the title of “Agriculture at a Crossroads”. This title describes in a very clear language the lead finding that business as usual is not an option when it comes to agriculture, food and nutrition security in the medium and long term. Its 400 authors, vetted by the Report's Bureau of 30 governments and 30 civil society organisations, development partners and private sector representatives worked over a period of four years to produce this report, regarded by many as the International Panel on Climate Change report on agriculture. The reports, global and regional, provided options for action (several country and private sector representatives objected to the term “recommendations”) for the radical transformation of the present chemical-based industrial and conventional food and agricultural production systems towards agroecology, institutions, practices and policies with a strong justification based on the assessment of the present food system and its impact in the three sustainable development dimensions (environment, society and economy – see Figure on page 12). It is noteworthy to mention that the report's findings were approved by 58 countries (not counting the UK, who did sign on after the final plenary meeting).

FROM JOHANNESBURG TO RIO+20

In 2008, when the final report was presented to the stakeholders, we were about midway of the Millennium Development Goals (MDGs), basically too late to influence them in a meaningful manner, not least because they were only applicable to developing countries, while the main issues with agriculture were global in nature. Also, given the cold shoulder the report received at the UN Food and Agriculture Organization (it was never officially presented to the member countries), the World Bank (who released its 2008 Annual Report on the agriculture topic just ahead of the IAASTD,



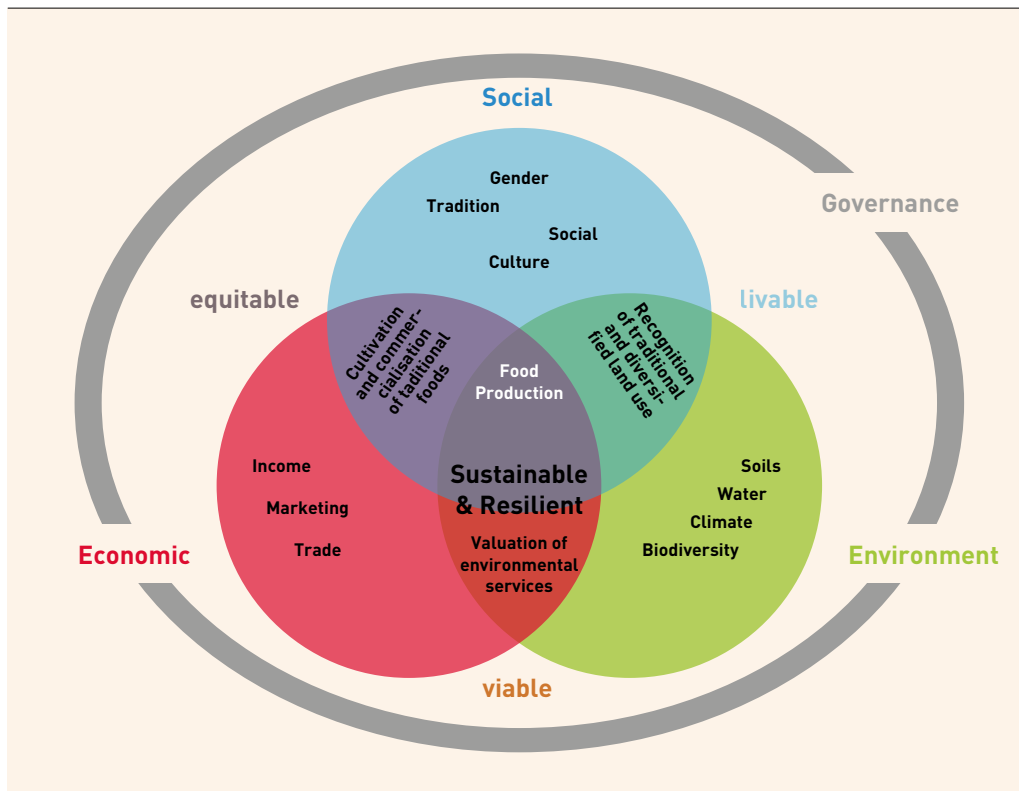
At the Rio+20 Conference on Sustainable Development in Brazil in June 2012. Then UN Secretary-General Ban-Ki-moon at an event belonging to the campaign “The Future We Want”.

Photo: UN Photo/Eskinder Debebe

thus undermining it), the Foundations that were instrumental in the development and promotion of the green revolution, and CGIAR, the NGO community took the initiative to keep the IAASTD report alive and bring it to the attention of decision-makers at every possible opportunity. The best occasion was being readied as the Agenda 2030, which had its debut at the Rio+20 Sustainable Development Summit (SDS) in 2012, ten years after the IAASTD was commissioned at the Johannesburg SDS. The NGOs went to Rio+20 as a strong group, with a document entitled “Time to Act”. It outlined a number of key issues that the NGOs wanted to see in the final Rio+20 declaration “The Future We Want”. After much negotiating and drama, the drafting committee did take into account many of the suggestions enshrined in the Time to Act document, and so these found their way into the SDGs.

The SDGs are not perfect, but given the obstacles thrown across agriculture and the food system transformation's way, the world as a whole now has a framework universally agreed upon and actionable. Whichever way we do look at the SDGs, we need to regard them as a glass half full, and we can go beyond the set targets, or at least prepare the trajectory we need to be on post-2030. The road from “The Future We Want”, in particular paragraphs 111 and 115 and the many targets that are linked in a direct or indirect way to a reformed agriculture and food system to achieve them, was strewn with difficulties and a battle of the words, i.e. should it be “transition” or “transformation”? That the IAASTD options for action have been included, even if in a mild form, in the SDGs and give the framework needed for transformational policies to be implemented is probably the most important achievement.

The 3+1 dimensions of sustainable development



Source: Biovision

AGROECOLOGY ON THE MOVE

The repeated push by the NGO community and the United Nations Environment Programme (UNEP) to see the agriculture and food system transformation suggested by IAASTD become a global reality is being challenged by the push in the opposite direction by the vested interests represented by the agro-industrial and conventional agriculture lobby. Agroecology (AE) is making progress despite these challenges. The best signs are seen at FAO, which has by now organised two international Symposia on AE as well as several regional ones (see also article on pages 14–16). Missing still is a North America Symposia, and perhaps a west European one. In the words of José Graziano da Silva, Director General of FAO, the cathedral of agriculture (FAO) has opened a window to AE ... let's hope that the doors will open soon, too. The last AE symposium held in early April 2018, may be symptomatic of what is happening regarding the transformation process. Out of over 700 participants, some 600 were from civil society groups, a remarkable success and a sign that AE has picked up momentum, a momentum that will continue given the need to achieve the SDGs, for which AE is unavoidable. Goal 2 is intimately linked to all other goals, and the synergies that can be created across the SDG matrix with AE practices are a necessity should

one be able to meet the targets on time and within budget (see Figure on page 13). AE will also allow for huge savings, as it minimises the negative feedbacks, such as impact on climate change, health, biodiversity loss and water conservation, to name just a few.

When considering the seven key findings of the IAASTD report, multi-functionality, focus on small-scale farmers, damage caused by industrial agriculture, ecological resilience through agroecology, food security, fair trade and food democracy, one realises that these are now very much part of the transformation conversation – which is not surprising, as they are also within the main tenets of AE.

The discussion now held on what may well be a key leverage point in support of the transformation is true costing. The industrial/conventional agriculture and food system model relies for its success on the externalisation of environmental health and social costs, thus making its products appear relatively cheap, compared for example to organically produced foods. The exponentially growing health and environmental costs and the social hardship and inequity left in the wake of the industrial and conventional agriculture model are standing in the way of achieving the SDGs and are thus becoming points of interest for policy-makers and development experts.

WHERE TO FROM HERE?

The domino piece that represents the industrial and conventional agriculture and food system model is shaking seriously, and it's now up to the AE supporters to make sure it has a knock-on effect on the long line of global destruction domino pieces. Agro-industry is now rapidly co-opting AE terms while cloaking the old practices in new slogans such as climate smart agriculture, sustainable intensification, green revolution 2.0 or double green revolution. These terms cover the same old practices that make farmers dependent on chemical and genetically manipulated inputs, negate or destroy ecosystem services, eliminate much-needed biodiversity and still contribute to climate change instead of being part of the solution (see also article on pages 8–10).

It is therefore important that the options for action outlined in the IAASTD report be taken seriously and implemented in the SDG framework, from AE in the field to institutional changes. The knowledge, science and technology for such a transformation is available now, and while more R&D is needed (see article on pages 31–33), AE can easily produce sufficient, good quality and culturally appropriate food for all. To further support the transformation, it would be important to better understand the political economy of the food systems, as well as the money flows that are shaping it. A recent report from the International Panel of Experts on Food Systems entitled “From Uniformity to Diversity” highlighted eight key blockages that keep the industrial and conventional agriculture and food system in the status quo. From path dependency, i.e. the green revolution model to cheap food and export orientation, the report makes the case, in the footsteps of the IAASTD, for a systemic transformation. The present efforts regarding true costing are an example of a move in the right direction, which also can be traced back to the IAASTD report, as many of the conversation topics that are or will be shaping the discourse and actions around the implementation of AE on a global scale.

After ten years of efforts by many organisations and individuals, the main options for action outlined in the IAASTD report are seeing the light of day. It is certainly rewarding for the IAASTD report authors and supporters to see that, even if with a delay and a lack of speed, transformation is taking place, both in the field and at the ministries, and also in the UN Agencies and among multilateral and bilateral development partners. As we look ahead, we need to ensure that the transforma-

The SDG matrix



Source: United Nations; Biovision

tion process adheres to the AE principles and keep an eye on co-option of terms without the intent for comprehensive, holistic and systemic implementation, so our work for the next decades is well cut out. There is also an ongoing discussion regarding the establishment of a permanent panel or convention like the IPCC for agriculture ... nothing new, since we had proposed this at the final plenary of the IAASTD, but it was killed before seeing the light of day with the excuse that we did not

need yet another UN organisation in addition to the FAO and the Committee on World Food Security, among others.

The difference is that what we had proposed back then would have produced updated IAASTD reports, say every five years, fully integrated reports rather than a flow of disconnected High Level Panel of Expert reports that do not address the systemic nature of agriculture and the food system in its widest sense.

They are the subject of negotiation with member states, instead of being scientific.

Hans R. Herren is President of the Millennium Institute Washington, Founder and President of the Biovision Foundation for Ecological Development, Zurich, Switzerland and co-chair of the IAASTD report.

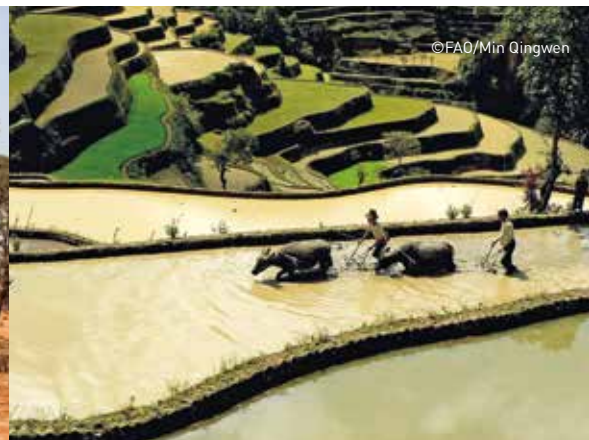
Contact: d.fritz@biovision.ch



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AGROECOLOGY – A PATHWAY TO ACHIEVING THE SDGs

As an approach based on sustainability that is people-centred and knowledge-intensive, agroecology matches the transformative approach that the 2030 Agenda calls for. Our author explains how agroecology and the Sustainable Development Goals relate to one another and presents the FAO initiative on fostering agroecology.

By Beate Scherf

Although not a new concept, agroecology is a key part of the global response to deforestation, water scarcities, biodiversity loss, soil depletion and greenhouse gas emissions and has the potential to alleviate poverty, reduce hunger and malnutrition and decrease inequalities. Agroecology contributes directly to multiple Sustainable Development Goals (SDGs): the eradication of poverty (Goal 1) and hunger (Goal 2); ensuring quality education (4); achieving gender equality (5); increasing water-use efficiency (6); promoting decent jobs (8); ensuring sustainable consumption and production (12); building climate resilience (13); securing sustainable use of marine resources (14); and halting the loss of biodiversity (15) while significantly increasing the resilience of both people and the environment, mitigating climate change, and sustainably using and conserving natural resources and biodiversity. Moreover, agroecology can contribute to achieving the aims of the Paris Climate Agreement, the Convention on Biological Diversity and the United Nations Convention to Combat Desertification.

Rooted in sustainability, agroecology is a people-centred and knowledge-intensive approach that matches the transformative approach called for by the 2030 Agenda. It has the potential to meeting the needs of future generations while ensuring that no one is left behind. Agroecology focuses on smallholder and family farmers, fisherfolk and pastoralists. It seeks to transform food and agriculture systems by addressing the root causes of problems

and providing holistic and long-term solutions based on co-creation of knowledge, sharing and innovation, including the combination of local, traditional, indigenous and practical knowledge with multi-disciplinary science.

“ *The future of agriculture is not input-intensive, but knowledge-intensive. We need the integrated approach that agroecology can offer.* ”

FAO Director-General José Graziano da Silva, April 2018

STRENGTHENING THE GLOBAL DIALOGUE

With the organisation of the 1st International Symposium on Agroecology for Food Security and Nutrition in September 2014, the Food and Agriculture Organization of the United Nations (FAO) commenced strengthening the global dialogue and laying the groundwork for enhanced co-operation. This was followed by regional seminars held from 2015 to 2017 in five regions (sub-Saharan Africa, Latin America and the Caribbean, Asia and the Pacific, Europe and Central Asia, and the Near East and North Africa), involving 1,400 participants – representatives of governments, researchers, civil society, the private sector and the UN sys-

tem – from 170 countries. Not only did these regional seminars reveal a diversity of perspectives, experiences and approaches, but they also identified commonalities between regions and across different approaches to agroecology – including shared challenges, opportunities and objectives, as well as common characteristics of agroecological systems, practices and approaches. In April 2018, a 2nd International Symposium titled “Scaling-up Agroecology to contribute to the SDGs” was held which brought together 700 participants, including representatives from 72 governments, 350 civil society organisations and representatives from six UN organisations. Participants analysed experiences, evidence and public policies to respond to the challenges faced by our agriculture and food systems (see Recommendations in Box on page 16) and confirmed the notion that it is time to upscale agroecology.

WHERE DO WE STAND?

In preparation for the 2nd International Symposium, FAO’s work plan for 2018–2019 was analysed to present an overview of the organisation’s engagement in the field of agroecology and to expose gaps and opportunities for upscaling. The analysis revealed that eight per cent of FAO’s results planned for 2018–2019 support transitions to sustainable food and agriculture through agroecology. Two-thirds (64 %) of these results are to be delivered in 78 countries across all five geographic regions addressing food security, nutrition and health,

A ROADMAP TOWARDS AGROECOLOGY-BASED SUSTAINABLE FOOD AND AGRICULTURE SYSTEMS

Based on Stephen Gliessman's five levels of food system change converting conventional agricultural production and food systems to agroecological food systems, the FAO defined four levels that can serve as a roadmap outlining a transformation process simultaneously achieving economic, environmental, social, nutritional, health and cultural objectives. Each level requires mechanisms in place to strengthen capacities, institutions, legal frameworks, policies and programmes that support transitional processes. The four levels describe a progressive path towards greater environmental, social and economic sustainability and can be implemented in any combination.

The first two levels are at producer level. Levels 3 and 4 go beyond the producer level involving the broader food system and societal level. They require co-operation among producers within the same territory, which may require public support.

4 BUILDING AN ENABLING ENVIRONMENT FOR MORE SUSTAINABLE FOOD SYSTEMS

Integrated legal frameworks, policies and governance systems provide an enabling environment supporting the transition towards more resilient and sustainable food systems. The uptake of agroecological practices requires systems of education and extension to support agricultural producers in changing their practices. Policies and legal frameworks that contribute to farmers' land tenure and natural resources security are directly correlated with investment in agricultural production systems and the implementation of good practices. Agroecology requires cooperation through an enabling environment at territorial scale.

3 STRENGTHENING MARKETS THAT SUPPORT AGROECOLOGY

Transitioning to agroecology can only be sustainable if markets are adapted, or new markets established, to incentivise agricultural producers to produce biodiverse, local food and to invest in improving their agricultural production systems. Market arrangements that support agroecology include: public procurement, participatory guarantee systems, geographical indications, farmers' markets and consumer-supported agriculture schemes. Consumers can help drive these changes.

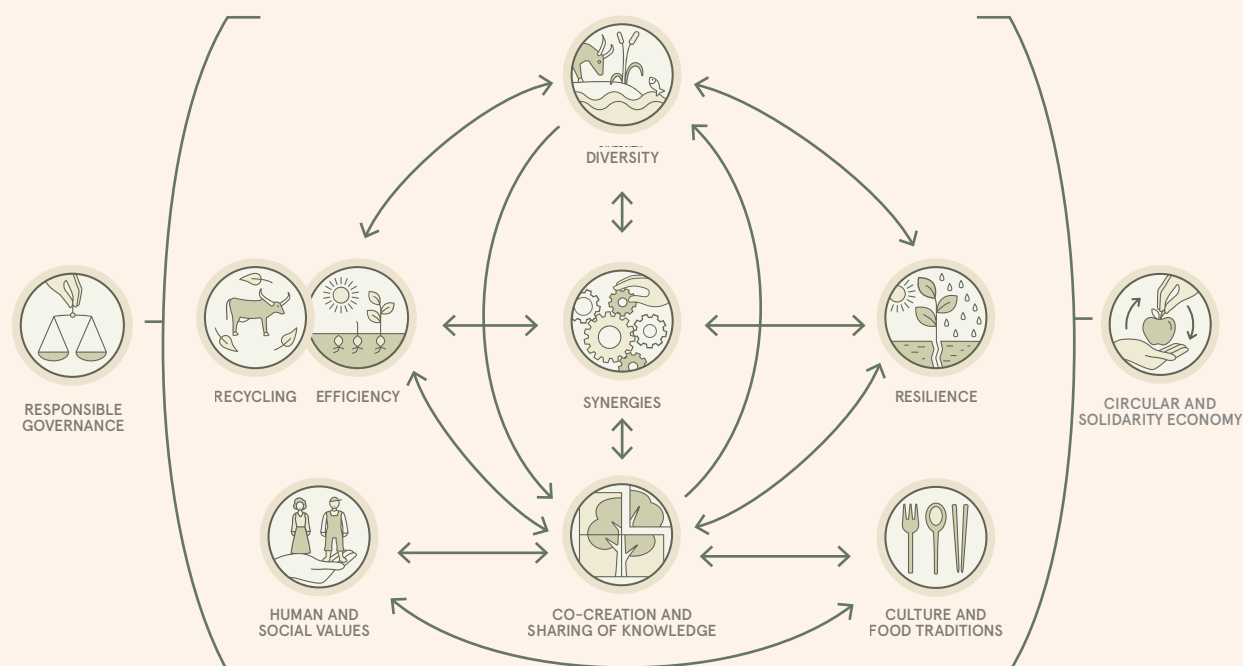
2 TRANSFORMING AGRICULTURAL PRODUCTION SYSTEMS TO BE MORE RESILIENT AND SUSTAINABLE

Redesigning agricultural production systems is necessary to address the root causes of problems, such as degradation of land, loss of biodiversity and ecosystem services and water scarcity. The new systems increase biodiversity, recycle by-products and diversify landscapes.

1 INCREASING THE EFFICIENCY OF PRACTICES AND RESOURCES AND SUBSTITUTING EXTERNAL INPUTS

Optimising biological processes is the starting point as it reduces the need for external inputs that negatively impact human and environmental health. Products and practices are replaced with those that are more environmentally sound. Though they may lead to creating sustainable agriculture and food systems, activities at this level are not in themselves considered agroecology.

In addition, deriving from a comprehensive consultation process, ten elements were defined that may be used by national policy-makers and stakeholders in planning, managing and evaluating agroecological transitions (see Figure): diversity; synergies; efficiency; resilience; recycling; co-creation and sharing of knowledge (describing common characteristics of agroecological systems, foundational practices and innovation approaches); human and social values; culture and food traditions (context features) and responsible governance; circular and solidarity economy (enabling environment). These elements are interlinked and interdependent.



access to markets for local production, family- and small-scale production, climate-resilient approaches, sustainable natural resource management and sustainable food systems and livelihoods. In addition, 22 per cent of the work is being planned at regional level and 23 per cent at global level. Of the eight per cent of FAO's results, almost 80 per cent of the activities contribute to building enabling environments for more sustainable food systems. Most of the planned work feeds into more than one of the four transition levels defined by FAO in 2018 (see Box on page 15), with a focus on level 1 in combination with level 4. Single-level interventions contribute only to level 4.

Opportunities exist for further incorporating and upscaling agroecology through better integration of the agricultural sectors (crop and livestock production, forestry, aquaculture and fisheries) and transition towards sustainable food systems approaches in collaboration with partners particularly at country and regional levels. In addition to the work already contributing to agroecology, a significant part of FAO's work over 2018–2019 could be shaped to upscale the area.

THE SCALING UP AGROECOLOGY INITIATIVE

In order to join forces and engage partners, the “Scaling up Agroecology Initiative” was launched together with UN agencies and other partner organisations during the 2nd International Symposium in April 2018.

COMMON RECOMMENDATIONS ON AGROECOLOGICAL TRANSITIONS

1. Strengthening the central role of producers and their organisations in safeguarding, utilising and accessing natural resources.
2. Fostering experience and knowledge sharing, collaborative research and innovation.
3. Promoting markets for agroecology-based products and services.
4. Reviewing institutional policy, legal and financial frameworks to promote agroecological transition for sustainable food systems.

“ *In the transformative spirit of the 2030 Agenda, we will work with food producers, governments and other stakeholders to strengthen agroecology – as a promising approach –, harnessing a range of sustainable practices and policies, knowledge and alliances to achieve equitable and sustainable food systems in support of the SDGs.* ”

Mission of the Scaling up Agroecology Initiative

The initiative is to focus on the following challenges, which were identified in the consultations:

- There is a lack of awareness of agroecology among policy-makers.
- Agroecological transitions require an enabling environment providing positive incentives and buffers for food producers while they transform their systems, which takes time to realise the full benefit.
- Political and economic support needs to prioritise sustainable approaches, including research priorities taking into consideration externalities of food systems.
- Research, education and extension systems do not sufficiently respond to the needs of agroecology as an approach to effectively transform food and agricultural systems (see also article on pages 31–33).
- Current market systems are not responding to agroecological approaches and the needs of diversified agroecological production systems or the needs of consumers for diversified and healthy diets, particularly those of small-scale food producers and poor urban consumers. Successful models which re-connect producers and consumers, rural and urban areas (such as community-supported agriculture schemes, public procurement programmes, e-commerce and participatory guarantee schemes) need to be strengthened, and agroecological producers require improved access to these market opportunities.
- There is a lack of co-ordinated action and collaboration in policy and governance. Policies need to be integrated across scales (local, national and international) and sectors (from agriculture, fisheries and forestry to economic, social and environmental sectors) to achieve coherence through a territorial approach.

THE WAY FORWARD

The Scaling up Agroecology Initiative aims to accompany and support national agroecology transition processes through policy and tech-

nical capacity. To this end, it will build alliances among different stakeholders, strengthen networks and allow co-creation of knowledge and knowledge sharing. The Initiative is to focus its efforts on three areas of work:

1. knowledge and innovation improving the evidence base on agroecology and ecosystem-based approaches;
2. policy processes assisting countries in the development of policies for agroecology with the participation of non-state actors by harnessing existing international instruments and decisions of inter-governmental bodies, including the 2030 Agenda;
3. building connections for transformative change by working with governments, producers' organisations, consumers, civil society, research and the private sector, supporting networks and platforms for knowledge exchange and dialogue for these stakeholders at national, regional and international levels.

We are convinced that co-operation among partners and a wide range of actors and institutions is necessary to scale up agroecology in order to achieve the SDGs and invite interested stakeholders to engage in the Scaling up Agroecology Initiative. As a first step, FAO will develop with partners a detailed ten-year action plan to operationalise the Initiative.

Beate Scherf is Programme Officer for FAO's Strategic Programme 2 (Making agriculture, forestry and fisheries more productive and sustainable). She previously worked on issues related to sustainable livestock development and the management of animal genetic resources, particularly assisting countries in the implementation of the Global Plan of Action, and, with a team, Scherf developed the second global assessment on the state of animal genetic resources.

Contact: Beate.Scherf@fao.org; agroecology@fao.org

The views expressed in this article are those of the author and do not necessarily reflect the views of the Food and Agriculture Organization of the United Nations (FAO).

For links and further information on FAO's work on agroecology, see online version of this article at: www.rural21.com



Photo: Timbaktu Collective

PUTTING PEOPLE AT THE CENTRE OF DEVELOPMENT

Over the last five decades, India's Ananthapuramu district has been transformed from a mixed cropped area with great agro-biodiversity into the largest groundnut mono-cropped area in the country – with negative impacts on the food and income situation of the local population. The Timbaktu Collective has set itself the goal of reversing the negative effects of this development and, with the aid of a community-owned approach, making small-scale farming a viable alternative for income and livelihood security.

By C. K. Ganguly (Bablu)

The geographical position of the Indian Peninsula renders Ananthapuramu district, with a population of four million, one of India's driest areas and the country's second most drought-affected district. Once well-known for its dry deciduous forests, grasslands and rainwater harvesting tanks, its lands now are deforested and degraded, its underground water resources are depleted, and its famed tanks are in disrepair, while its rural population remains poor and in severe debt, with 45 per cent rural indebtedness against a state-wide 18 per cent. High rural debt, high seasonal migration, low literacy levels, rapid depletion of underground water resources, a high number of suicides among farmers and trafficking of women and children in certain areas of the district are direct pointers to the economic, social and political backwardness of Ananthapuramu district and its people.

Over the past 45 years, a model of agriculture development promoting monoculture and cash cropping has had serious repercussions on land, water, human resources and ecosystem health. The district has departed from being a mixed cropped area with great agro-biodiversity to becoming the largest groundnut mono-cropped area in the country. Cash cropping has reduced the role of women in agriculture and pushed them to being mere sources of labour both in the field and at home. The district has seen a shift from locally produced

food grain to grain imports. With non-food expenditure on health, education and social events increasing rapidly without an equivalent increase in household incomes, spending on food is neglected. This has resulted in poor calorie and nutritional intake, which in turn has adversely affected the health of rural families.

Participatory Guarantee Systems are locally focused quality assurance systems. They certify producers based on active participation of stakeholders and are built on a foundation of trust, social networks and knowledge exchange.

IFOAM – Organics International

This situation has necessitated an integrated and community-owned response dealing with the existing disparities and inequalities. In 2006, the Timbaktu Collective (see Box on page 18) initiated the Organic Agriculture Program (OAP), with emphasis on agroecological methods, to reverse the negative effects of the above-mentioned problems and in turn make small-scale farming a viable and profitable alternative.

THE BUILDING BLOCKS

A conscious attempt has been made to shift the focus of the farmers to agroecological practices that look into soil health, food crops, land, biomass and seed management, along with the elimination of external inputs. The strategy used was to form strong farmer groups in the villages as the foundation of the programme, with women and men as equal members. In 2008, these farmer groups were federated to form the Dharani Farming and Marketing Co-operative, which procures, processes and sells the produce of its members under the brand name "Timbaktu Organic". Participatory Guarantee Systems are used for organic certification to assure the integrity of the agroecological system of production. The directors of the Cooperative are elected from among the leaders of the farmer groups. While the day-to-day management of the Cooperative is looked after by professionals hired by the directors, they themselves handle all policy-related issues.

The Cooperative helps its members engage directly with the market and has awakened in them the power of collective bargaining. Dharani has become an excellent model of forward linkages in the organic agri-value chain. For millets and pulses the pre-fixed prices are usually 20-50 per cent higher than the market value. Based on volumes produced, Dharani



Farmers acquire practical agroecological knowledge at Farmer Field Schools.

Photo: Timbaktu Collective

arranges to pick the produce of farmers from the farm gate thereby reducing transaction costs for farmers. Dharani also provides member farmers a patronage bonus incentive at the end of the financial year, with a portion of the profit earned being redistributed to the producers on the basis of the crop and the quantity they have supplied to the Cooperative in that year. While the local market accounts for much of the revenue, organic produce is also sold to South Indian cities such as Bangalore or Hyderabad, where demand is growing.

WHAT HAS BEEN ACHIEVED SO FAR

The Organic Agriculture Program was initiated in 2006 after almost ten years of internal practice and experimentation in agroecological farming. By the end of March 2018, Dharani's annual revenues stood at 35 million rupees, and OAP had reached out to a total of 2,105 farming families, from 60 villages covering an area of almost 12,000 acres. Sixty-seven per cent of the population in the Collective's areas of operation are marginal dry land farmers

exploiting a fragile resource base. The Collective has successfully re-introduced organic and millet-based mixed cropping in these areas. The participating farmers have increased their incomes by reducing input costs, good prices and incentives received from Dharani. The input costs arise mainly from the use of chemical fertilisers and pesticides, which ceases in organic practice since fertilisers and pesticides are produced locally and with locally available materials. Yield loss in the initial years of conversion is compensated by the premium prices the Cooperative offers as well as by seed and cattle provided by the TC at subsidised rates. By March 2019, all the 2,105 members will be eligible to supply their produce to Dharani as they will all have been recognised as certified organic under PGS of Organic Certification.

The programme has been able to provide the right incentives to retain educated youth in agriculture, as periodic surveys by external consultants show, change the cropping patterns and move towards mixed cropping systems where a diversity of crops are grown ensuring not only food and nutritional security but also income and livelihood security of rural households. TC has invested in agricultural marketing infrastructure (warehouse, processing and value-addition facilities, brand creation), training stakeholders in entrepreneurial and marketing skills and enabling back-end and front-end integration to strengthen the cooperative and develop a viable business enterprise.

However, there are shortcomings. The decisions relating to transitioning to agroecological approaches are disproportionately and unjustifiably vested only on the farmers. Training and capacity building based on agroecological approaches to farming and transitioning are not given due priority by the public extension services, although the Timbaktu Collective's programmatic coverage foresees a focused team of trainers to build capacities of farmers. Gender inequities in rural areas pose a threat, where agroecological practices are mostly dependent on an empowered women workforce. Mainstream research on agroecological approaches and systems is inadequate. The notion that agroecological systems are suitable only to certain specific contexts and lack of policy support are greater impediments in making it a common practice.

WHERE ARE WE HEADING?

The work of Timbaktu Collective shows that agroecological approaches have a positive impact on the lives of smallholder farmers. The

THE TIMBAKTU COLLECTIVE

In February 1990, after a decade of working in rural Andhra Pradesh, a small group of social activists purchased 32 acres of barren land in chronically drought-prone Ananthapuramu district of Andhra Pradesh, India. They named the land "Timbaktu". Today, it is an agroforest habitat and a community featuring a high degree of social cohesion and co-operation and prioritising the "Good Life". In November 1990, the same group registered the Timbaktu Collective (TC), a community-centric, not for profit, voluntary organisation, to "help rural communities in ecologically challenged Ananthapuramu district of Andhra Pradesh take control of their own lives, govern themselves and live in social and gender harmony while maintaining a sustainable lifestyle".

Inspired to create a holistic outreach, the Collective launched several programmes on themes of rural self-governance, livelihood enhancements, community conservation, revival of local economy and empowerment with marginalised groups such as women, dalits, people with disabilities, children, youth, smallholder farmers, artisans and agricultural labourers. Each programme saw people coming together as co-operatives as this strengthened their shared capacity to engage with and overcome their common challenges. Over the past 27 years, the Collective has successfully stamped its presence in a clear operational area of 175 villages in four administrative divisions of the district, amongst 22,500 marginalised families. It has so far promoted 13 cooperatives with various stakeholders and their federations all of which indicate viability.

process of transformation started with mobilising and organising farmers into farmer groups. Through a continuous process of training/hand-holding and capacity building, farmers have learnt agroecological approaches to farming and acquired management skills and leadership qualities. This focus on developing human capabilities and placing people at the centre of development efforts has positively impacted the lives of member farmers, their practice of farming and their interactions with the market.

A natural resource management approach is more relevant, compatible and applicable in supporting smallholder farmers. It helps to reduce poverty, ensure food security, promote self-reliance, back ecological management of productive resources and empower rural communities. While farmers will continue to be supported in the shift to agroecological farming practices, the focus will increasingly be on taking the results of TC's work to policy-makers, getting involved in participatory research and dissemination of knowledge, further strengthening the skills of its farmers' groups in directly negotiating with authorities for their rights, working towards involving more women in the decision-making process and collaborating with consumers and citizen groups for a shift in policies favouring smallholder farmers. It thus wants to:

- get involved in farmer-led participatory research and extension services to develop and disseminate agroecological knowledge;
- build capacities of farmer groups and strengthen their skills to actively participate and engage with local and regional authorities and negotiate for their rights;
- actively involve women farmers in all decision-making processes relating to scaling up of agroecological systems to address discrimination and gender inequity issues;
- collaborate with citizen groups and consumers who support/promote small-scale producer groups, and promote negotiating with policy-makers on the need for a radical shift in all policies directly or indirectly supporting industrial food regimes.

C. K. Ganguly (Bablu) is one of the founders of the Timbaktu Collective (www.timbaktu.org). He is currently functioning as its Secretary cum Chief Functionary. He is also a World Board Member of IFOAM – Organics International.
Contact: timbaktu.collective@gmail.com

THE FUTURE OF AGROECOLOGY IN INDIA

Small farmers in India face a double risk – in producing and in marketing. Despite a lack of specific focus in their schemes, the earlier United Progressive Alliance (UPA) government did, in a sense, set the stage for the development of organic farming in India on a large scale. Since the launch of the Organic Farming Policy of 2005, some news reports suggest that there has been an increase in the area under organic farming by about 70 per cent. Sikkim, for example, is now a fully organic state.

The current National Democratic Alliance (NDA) government has come up with Paramparagat Krishi Vikas Yojana (Traditional Farming Development Scheme – PKVY), which is actually a repackaging of previously existing schemes. Before the NDA government came to power in 2014, the UPA government had initiated a number of schemes and programmes aimed at developing agricultural activity in the country and improving the lot of the rural people – albeit without a focus on promoting organic farming. While the PKVY definitely addresses this aspect as well as the issue of local markets more strongly, it concentrates more on the north eastern states of India.

A major thrust towards organic cultivation, however, will require a number of other initiatives and infrastructural support. Active involvement in studying crops and their diseases, development of organic manure, natural pesticides, training of farmers and provision of storage and connectivity are all important areas to look into. But as more and more states of India are turning towards promotion of organic farming, what is seen is a growing influence and lobbying from organic fertiliser and pesticide companies to use this as a medium to expand their business. That the government is supporting such a trend reflects its insufficient understanding of agroecological practices.

As Ms Arpita Mukherjee, a professor at the Indian Council for Research on International Economic Relations (ICRIER), pointed out in a recent article, some of the policy initiatives to promote organic farming and exports include the development of an organic regulation for exports by the Agricultural and Processed Food Products Export Development Authority (APEDA), removal of quantitative restrictions on organic food exports, providing subsidies to farmers under the Paramparagat Krishi Vikas Yojana (PKVY) in partnership with the state governments, and other schemes such as the Mission Organic Value Chain Development for North Eastern Region. Mukherjee also points out the following issues faced by organic farmers that are affecting their livelihood and income:

- First, the supply chain is underdeveloped, and small and mid-sized farmers located in hilly regions and tribal belts find it extremely difficult to access the market. In a number of cases, the middlemen take away most of the profits, and farmers are not able to earn a premium price.
- Second, while the government is subsidising farmers under the Participatory Guarantee System (PGS) for India, which is a self-certification process supported through the PKVY scheme, these farmers are not allowed to export.
- Third, as a farmer converts his/her land from conventional chemical-based farming to organic farming, there is a risk of loss in yield, while no subsidy is provided to compensate this loss. Further, a majority of the government budget and subsidies are targeted towards chemical-based inputs.
- Fourth, there is a serious shortage of good-quality organic inputs, which increases the risk of loss of yield. Available quantities of organic fertilisers are way below what is required, and there are a number of spurious players in the market, too. More crop-specific and region-specific research and development (R&D) on organic inputs is needed.
- The fifth and the biggest challenge faced by organic farmers is the lack of an organic policy for the domestic market and imports. With the right policy measures, organic farming is expected to grow by 20 per cent in the next five years, and the farmers will see a rise in their income.

HEALTHY FOOD FOR HEALTHY PEOPLE ON A HEALTHY PLANET

Sufficient and healthy food for everyone that is produced by people who can earn a good living without looting the planet – we won't achieve this goal without transforming agriculture, be it industrial or smallholder-based. Our author outlines Germany's food policy approach in development co-operation.

By Stefan Schmitz

The achievements of agriculture, especially over the last half-century, cannot be denied. Never before has it been capable of feeding so many people. Despite a rapidly growing world population, the share of undernourished people has never been as low as it is today. But these developments also have their flip sides. And these flip sides can no longer be ignored. Otherwise we will be heading straight for disaster.

Climate change and species loss, the loss of fertile soil, the destruction of forests and the over-exploitation of water resources are among the greatest threats to the survival of humankind. The current global agricultural and food system is making a considerable contribution to these threats. The way in which the world is feeding itself and agricultural goods are produced is anything but sustainable. Agriculture has a roughly 25 per cent share in climate change, half of which is due to the fact that agriculture is reaching out more and more into natural landscapes with its areas un-

der cultivation, releasing enormous amounts of carbon that has so far been bound in the soil and in forests. Agriculture is responsible for around 80 per cent of global deforestation. Seventy per cent of the world-wide consumption of freshwater goes into agriculture. Moreover, within a mere 25 years, the fertility levels of a quarter of all soils under cultivation have declined significantly owing to too intensive or improper cultivation. Deforestation, over-grazing, excessive use of water resources and similar inappropriate practices have resulted to an inconceivable extent in the devastation of entire regions.

Many aberrations have to be attributed to the industrialised form of agriculture, with its intensive livestock farming, its monocultures and its frequently far too careless handling of fertilisers, herbicides and antibiotics. But in its present form, smallholder agriculture in the Global South, which is often referred to as backward, is not sustainable either. Degraded soils as a result of land use which is not adapt-

ed to local conditions reflect this unsustainable use. High population pressure and low area productivity not only exacerbate the lack of food but also raise pressure on farmland. Many smallholder families in the South in particular are still not in a position to earn enough to secure their livelihoods. They are the population group in which absolute poverty and hunger are most widespread.

Despite all the progress made in agriculture, more than 800 million people are suffering hunger, while two billion people lack vital micronutrients and almost two billion people are said to be overweight or obese. Thus, for a wide variety of reasons, around half of the world population do not enjoy healthy food. Partly, this is due to a lack of food, but partly also to its overabundance and an inadequate knowledge about a healthy diet. While the mass distribution of cheap, industrially processed food is critical, a growing global middle class is developing an ever greater taste for protein-rich animal source foods. Not only

SOIL PROTECTION AND REHABILITATION

The Global Programme Soil Protection and Rehabilitation for Food Security started in 2014 with the aim to support six partner countries in Africa and Asia in their efforts to conserve and restore soils. Technical approaches adapted to the local environment and livelihoods of rural populations are promoted through trainings of smallholder farmers and agricultural service providers. The Programme also assists in creating conducive policy frameworks that provide incentive mechanisms for sustainable land use. A variety of farming systems with integrated nutrient cycles allow for a substantial reduction of external inputs.

In Benin, crop rotation with nitrogen-fixing legumes and the construction of rock berms have significantly improved productivity and reduced erosion by wind and water. In Kenya, a combination of minimum-tillage, integration of cover crops and application of compost (see picture) have increased soil health, resulting in increased drought tolerance and crop yields. The Programme succeeded in protecting and rehabilitating more than 100,000 ha of agricultural land. It aims to achieve a total of 280,000 ha of rehabilitated land by 2022.



An innovative smallholder inspecting compost production in Gongo, Western Kenya.

Photo: GIZ/Jörg Böhling

does this often exceed a healthy measure for the individual, but in sum, it also represents an enormous consumption of natural resources.

Sufficient and healthy food for everyone that is produced by people who can earn a good living without looting the planet – this is the goal! This goal is clearly stipulated in Sustainable Development Goal (SDG) 2 (Zero Hunger), but also in the SDGs 12 (Responsible Consumption and Production), 13 (Climate Action) and 15 (Life on Land) of the global goals for sustainable development.

CRUCIAL IMPULSES HAVE TO COME FROM AGRICULTURE

Achieving this goal requires coherent collaboration between different policy areas. In addition to agricultural policy, these areas comprise e.g. trade, education, health, research, infrastructure and environmental policies. The most important entry point is agriculture, because it is agriculture via which the most effective and far-reaching changes can be reached, and this is where the crucial impulses have to come from.

The SDGs equally address the industrialised countries and the developing countries and emerging economies. According to the logic and philosophy of the SDGs, all countries are “developing countries” that have to head

for a common goal which has so far not been reached anywhere. Nowhere else does this become clearer than in the goal of healthy food for healthy people on a healthy planet.

The agriculture of the Global South, particularly in Africa, where it is still based largely on a subsistence economy, has to develop. However, it is essential for it to avoid the mistakes that today’s industrialised agriculture has made on its development path over the last decades. At the same time, this industrial agriculture needs to substantially correct the mistakes it has made in the past. The common goal is an agriculture based on agroecological principles. The chief characteristics of such a form of agriculture are: temporal and spatial diversification of agricultural production (crop rotation farming, intermediate cropping, integrated farming systems linking livestock keeping to area); varietal diversity; optimised production with low external input, farm-level and regional cycle economy; short value chains with minimum distances between fields, markets and plates.

Food and nutrition security, agriculture and rural development are among the top priorities of German development policy, which, provided that this has not already happened, will boost its investment in agricultural programmes in the partner countries according to the agroecological principles of agricultural production outlined above and the corresponding provisions in SDG 2 and SDG 15.

Important impulses have already been given, such as the projects focusing on the development of Green Innovation Centres, which are now being extended step by step to centres for the establishment of a knowledge-intensive rural economy, or the projects on soil rehabilitation and the conservation of soil fertility (see Boxes).

SUPPORT IS NEEDED AT ALL LEVELS

The emphasis here is not on an agroecological optimisation of individual, isolated projects. Rather, the goal is to participate in an agroecological transformation in developing countries via support measures at all levels, ranging from the implementation of a project at local level through agricultural policy advice at national level to engagement in achieving the right global framework conditions. This is an important contribution towards fending off a collapse of the global agriculture and food system and achieving the ambitious but urgently needed Sustainable Development Goals by 2030.

Stefan Schmitz is Deputy Director-General for Food, rural development and natural resources, and Commissioner for the special initiative “One World – No Hunger” at the German Federal Ministry for Economic Cooperation and Development (BMZ).

Contact: stefan.schmitz@bmz.bund.de

GREEN INNOVATION CENTRES

Generating a sustainable food supply for an increasing world population requires agricultural innovation. The Federal Government has therefore set up 15 Green Innovation Centres for the agriculture and food sector: 14 in African countries and one in India. The project promotes sustainable, climate-adapted production and processing methods that protect natural resources.

In Cameroon, for instance, the Green Innovation Centre supports a Farmer Field School for the reduction of pesticides and has trained 3,000 smallholders in the use of ecological practices. Therefore, last year, 80 farmer companies were able to produce seven tons of certified organic cocoa beans. In Zambia, smallholders receive a ten per cent bonus from a local partner company if they can prove that they are growing their peanuts and soy products using resource-conserving methods – such as planting *Gliricidia* trees on their fields, which improves soil quality and water balance. The initiative has reached out to more than 100,000 smallholders.



Organic cocoa generates higher income for smallholders in Cameroon.

Photo: GIZ/Kaus Wohlmann

AGROECOLOGY HAS TO BECOME ECONOMICAL

Today, consumers are charged more for organic food than for conventionally produced food. But given the latter's ecological footprint, this ought to be the other way round, our author of the Swiss Agency for Development and Cooperation maintains. To make this happen, he calls for public policies to be reformulated so that they include social and environmental costs and benefits in their food and agriculture legal frameworks.

By Manuel Flury

Despite the fact that as many as 72 out of 129 developing countries have reached the hunger target of the Millennium Development Goals and the proportion of undernourished people in the developing regions has fallen by almost half since 1990, more than 800 million people still suffer from hunger, and two million from micronutrient deficiencies. A further 1.9 billion are overweight, increasingly also in the Global South. The pollution and degradation of air, soil and water as well as the loss of genetic heritage, together with the changing and increasingly unpredictable climate, threaten the foundation of food production and the livelihood of the world's population. The present-day food system cannot provide enough healthy food for all while preserving the environment.

With an expected two thirds of the world population living in cities by 2050, food habits are going to change, and a growing number of people with low purchasing power will not be able to feed themselves decently. Also, food production will continuously shift to peri-urban and urban regions, where the pressure on available resources is growing drastically. Access to land is highly contested, and water resources are scarce and often polluted.

As José Graziano da Silva, Director General of the United Nations Food and Agriculture Organization (FAO), stated at the opening of the recent 2nd Agroecology Symposium in Rome, Italy, there is urgency “to get out of the trap of conventional, high-resource input systems with increasing productivity at any social and ecological costs, still not leading out of hunger for over 800 million people”.

Intensive use of external inputs such as chemical fertilisers and pesticides in crop production or feed concentrates for animals lead to increased yields and production. However, reduced soil fertility, water quality and (agro-) biodiversity, and in some instances, even air pollution are environmental costs often ignored. Chemical residues in food that is often highly refined and, thus, poor in nutrients, cause health costs that citizens and society have to bear. Furthermore, a food system that depends on transporting food thousands of kilometres around the globe is “not fit for the future”.

The Sustainable Development Goals towards ending hunger – without leaving anybody behind and tackling climate change and environmental protection – and the International Assessment of Agricultural Knowledge, Science

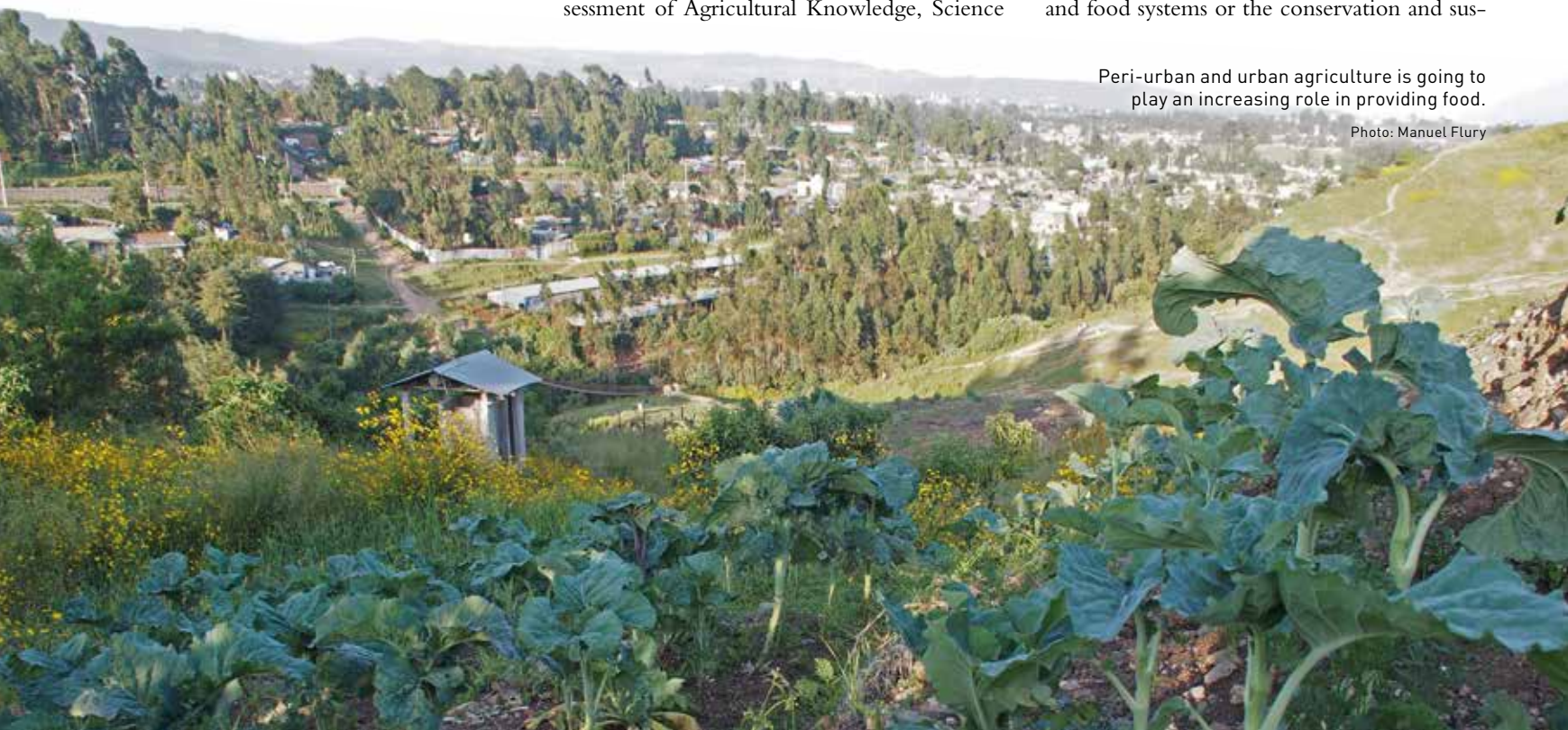
and Technology for Development (IAASTD) set the frame for Swiss Development Cooperation (SDC) in its aim to support sustainable food and nutrition systems. As this report clearly states, “Business as usual is not an option!” It does not offer so-called “silver bullet” solutions but outlines in a comprehensive way the areas for action, including change in science, technology, policies, institutions, capacity development and investment.

HOW SDC PROMOTES AGROECOLOGY

Referring to the SDGs, the Swiss Government outlines its mandate “to help reduce global risks in the field of sustainable agriculture, food security and nutrition”. This has to include inter alia: improving access to healthy food, supporting seed systems, increasing agrobiodiversity and combating land degradation. Following the FAO, thus understanding agroecology as “the use of ecological principles for the design of agricultural systems” (see also article on pages 14–16), SDC promotes initiatives of agro-ecological agriculture and influences institutions that work towards reducing the environmental impact, such as initiatives to reduce the ecological footprint of agriculture and food systems or the conservation and sus-

Peri-urban and urban agriculture is going to play an increasing role in providing food.

Photo: Manuel Flury



tainable use of agrobiodiversity, in particular smallholder farmers' access to local and quality seeds. Some examples are given below.

Water governance

A consortium of private and public sector partners and value chain actors for rice and cotton are promoting reduced water consumption in food production in the four countries of India, Kirgizstan, Pakistan and Tajikistan (Water Project WAPRO). Where previously the retailer would only have invested in the availability of water at field level, through public funds made available by SDC, water governance at the village level has become a main concern of the consortium. Through technical advice, made possible by the project, the farmers now apply cropping techniques that use less water in producing organic rice, which qualifies them to be paid a premium price. WAPRO also contributes to the revision of the global standards on rice production. Sharing responsibilities of different public, private and civil society actors constitutes a core concern of Agenda 2030. Through such partnerships, SDC envisions to influence transformation in how a global public good such as water is being governed.

Seed diversity

With support from SDC, Bioversity International is promoting enhanced use of crop diversity through community managed seed banks. In Uganda, the project builds on the diversity that was available on farm to reduce the pressure of pests and diseases, and on farmers' knowledge to develop new low-cost methods to increase common bean diversity. Common beans are primarily managed by women, therefore this project benefited not only local farmers but also women in terms of availing them with the much-needed diversity and equipping them with the capacities to grow better seeds for better yields, food and seed security. The lessons from these pilot community seed bank projects have guided the inclusion of community seed-banking in draft policies on seed and plant genetic resources of the Ugandan Government.

Organic farming

Responding to the Decision of the African Union (AU, 2011) on organic farming, the Ecological Organic Agriculture (EOA) Initiative has been established under the leadership of the AU Commission. Under the Initiative, which SDC and the Swedish Society for Nature Conservation are supporting, EOA is to

ORGANIC FROM CONVICTION

Alice Muriuki lives as a farmer in the highly fertile Muranga Hills, in Kenya, some two hours' drive from Nairobi. Muriuki recently switched to growing tea organically. When asked about her reasons, she mentioned the health problems that originated from the pesticides she applied. She has no marketing channels of her own and sells her tea to the local tea collection co-operative, where it is put on sale alongside conventional products. She participates in field research demonstrating the advantages of her farming practice and shares her experiences with neighbours.

Photo: Manuel Flury



be mainstreamed into national agricultural production systems, in public policies and investment plans, in technical standards and certification procedures, in research agendas and training curricula, in advisory and information practices and in the organisation of markets and value chains.

A transformation towards healthy food systems requires changes in the research and innovation systems in order to respond to agroecological approaches. SDC promotes scientific research on the potential of organic agriculture. The Swiss Research Institute of Organic Agriculture (FiBL), with partners in India, Bolivia, Kenya, Ghana and many other countries, and supported by SDC, has shown that organic production can be both economic and ecological if markets reflect true costs and if by-products of field and tree crops are brought into the calculations.

PRICES HAVE TO REFLECT HEALTH AND ENVIRONMENTAL COSTS

The majority of key decision-makers and investors still opt for short-term productivity gains and do not consider the health and environmental costs that society has to bear. Agroecology implies particular technologies and management practices. However, it goes beyond developing a single higher-yielding crop variety or running monocultural production systems. Agroecology follows natural cycles, includes multiple cropping patterns and asks for shorter-distance marketing channels, including diversified dietary patterns that follow seasons. Agroecologically sound food systems therefore imply multiple transformations, including rules and regulations that allow real

cost calculation, putting prices on negative environmental and social externalities.

Smallholders will also feed a large proportion of the people world-wide in a future, highly urbanised world. Peri-urban and urban agriculture – in the proximity of the consumers – is going to play an increasing role in providing food. Therefore, improving productivity and quality of the products based on agroecological principles is crucial. However, agroecology is not solely a smallholder agriculture affair. On the contrary. Large-scale agriculture, broadly characterised by non-sustainable production methods, is challenged with the need for transformation. Upcoming digital agriculture technologies may assist in water saving production and reduced and optimally targeted application of pesticides and fertilisers. Investments – also in research – and public policies need to be reoriented. Market prices will have to reflect the health and environmental costs. On the markets today, consumers pay higher prices for healthier food. The change would mean that conventionally produced food needs to be more expensive as it damages the environment and health. To make this happen, public policies need to be reformulated in order to include social and environmental aspects (and benefits) in their food and agriculture legal frameworks.

Manuel Flury is Co-Head of the Global Programme Food Security (GPFS) at the Swiss Agency for Development and Cooperation (SDC) in Bern, Switzerland.

Contact: manuel.flury@eda.admin.ch

For links to the projects, see online version of this article at: www.rural21.com

A SELF-CORRECTION FORCE: THE 10 THESES OF THE GERMAN AGRICULTURAL SOCIETY

Early in 2017, the German Agricultural Society (DLG) publicly announced ten theses on agriculture in 2030. Experts from various professions in agriculture and stakeholders in other areas thus defined a position in enabling them to develop a future strategy for German and European agriculture. One central aspect in this context is the sustainability of production.

By Carl-Albrecht Bartmer

Every ten years, in the framework of a convention, the German Agricultural Society develops a future scenario for German and European agriculture for the next 20 years. In addition to the forecast market developments, the cornerstones of the conference in autumn 2016 above all concerned the sustainability of agricultural systems.

With a sustainability assessment of the individual farm and a survey of the sector in the context of a sustainability report for German agriculture (2014 and 2016), the DLG has already been pursuing an approach for ten years in which sustainability is not appraised qualitatively but quantitatively, on the basis of indicators. For example, the organisation has already been pointing out for several years that the task ahead is not only that of mastering the challenge of a growing demand for agricultural products, which is also a significant challenge that the European agricultural sector faces, but that we have to be self-critical in addressing the issue of whether the current agricultural production systems really meet the demands of sustainability.

THE GLOBAL SCENARIO REGARDING AGENDA 2030

In brief, we were able to establish the following in our analysis in the context of the convention:

In 2030, global agriculture will be facing the challenge of providing food for 8.5 billion people. According to calculations performed by the United Nations Food and Agriculture Organization (FAO), by 2030, global demand for grain will have risen by around 8 per cent, for pork by 19 per cent, for poultry meat by 17 per cent, and for milk and dairy products by 10 per cent compared to 2015 figures. Over the same period, global available farmland per capita will have declined from around 2,200 square metres in 2015 to roughly 2,000 square metres in 2030. The reasons for these devel-



Cost-effectiveness and animal welfare are equally important in livestock husbandry.

Photo: DLG

opments are population growth, urbanisation, desertification and salinisation.

By 2030, the Sustainable Development Goals (SDGs) of the United Nations are to be achieved as well. A catalogue with 17 goals for sustainable development forms the core of this Agenda 2030. All 17 goals are of equal importance in this set, and they are closely linked to one another. For example, productivity and the conservation of important environmental goods such as climate, water and species diversity form a unit together with the other goals. Goal 2, “End hunger, achieve food security and improved nutrition and promote sustainable agriculture”, describes a topic that is of outstanding importance to agriculture.

Further gains in productivity, attained in a sustainable manner in the sense of the Brundtland Report “Our Common Future”, assume a key role. The DLG Position Paper “Landwirtschaft 2030” (agriculture in 2030) takes a determinedly critical look at agricultural sys-

tems in fields and stables. Neither the aspects of nutrient surpluses, species decline and climate change nor animal welfare point to systems that are sustainable in every respect.

CHALLENGES FACING THE ACHIEVEMENT OF SUSTAINABLE AGRICULTURE BY 2030

Restricted crop rotation, increasing resistance regarding chemical pesticides or diseases among animals kept in stables resulting from how they are looked after cannot be explained solely by referring to cost management aimed at more competitiveness. Rather, they challenge the creativeness of farmers regarding production technology and, in particular, their innovativeness. There are many options to simultaneously enhance productivity and sustainability, ranging from intelligently bred plant varieties or animal races through agricultural and animal housing engineering to the new opportunities that digitalisation offers.

This also requires a social environment that is open to such innovations. We have to garner understanding in society for our licence to operate. We have powerful arguments, both professional and emotional (“What is fascinating about agriculture”), and as farmers, we have a duty to deliver in terms of communication. This applies in particular, but not only, to developed, industrial societies.

Forward-looking agricultural policy also has to take up the challenge of sustainability and productivity. Here, modern processes are just as important as indicator-based measuring of sustainability. It can serve as a measure in a transparent analysis of the status quo, in measuring the success of political programmes and also for the benefits offered by innovations.

International agricultural trade provides the opportunity to balance local or temporary supply deficits among agricultural products. Especially given unevenly distributed availability of resources, natural precipitation, temperatures and soil quality, this has a considerable impact on productivity and sustainability. However, international agricultural trade ought to be in accord with development co-operation goals.

Farmers only rarely provide regional, national and, in particular international markets with primary products. Rather, the latter are further processed in an increasingly complex manner and are sold as quality products by food retailers virtually throughout the world. This is why integration in efficient quality chains that internally optimise processes and are able to organise cross-regional distribution is indispensable. In the long run, value chains can only be as strong as their individual segments. This would argue in favour of a fair distribution of value chain shares within the chain, which unfortunately is not always the case.

Today, one year after the DLG presented its ten theses on agriculture in 2030, one can observe a discussion process covering agriculture as a whole and focusing on a very concrete, more sustainable development of the branch in the future. That a branch should have the strength to engage in self-criticism and self-correction is increasingly proving to be a sign of strength and optimism about the future.

Carl-Albrecht Bartmer is Chairman of the German Agricultural Society's Supervisory Board and is himself a farmer.

Contact: HGF@dlg.org

THE TEN DLG THESES ON AGRICULTURE

- 1 Harmonise knowledge, skills and will.**
Farmers need well-grounded and comprehensive training, and as honest entrepreneurs, must be guided by their professional ethics.
- 2 Get to grips with nutrient surpluses, loss of biodiversity, climate change and animal welfare.**
This requires innovations, which make the production systems sustainable.
- 3 Enable innovations.**
Willingness to innovate, inventive spirit, freedom of research and appropriate risk management are essential prerequisites in society to achieve sustainable agriculture.
- 4 Making animal husbandry fit for the future.**
Cost-effectiveness and animal welfare are equally important in livestock husbandry. Conflicting goals can be minimised by precise observation of livestock, attentive animal care, good genetics and innovative livestock husbandry systems.
- 5 Harmonise crop production with environmental protection and nature conservation.**
Loss of biodiversity, nutrient surpluses and resistance to crop protection treatments can be reduced. Raising awareness among stakeholders, innovative technology, efficient varieties, precision fertilisers, and effective and environmentally compatible crop protection products all help here.
- 6 Use the revolutionary potential of digitisation constructively.**
Structural change is continuing to gain in momentum through digitisation. Structures and relationships in the food value chain are changing fundamentally. Digitisation should be used to sustainably increase efficiency and productivity.
- 7 Build engagement between society and agriculture.**
Farmers should face up to the debate with society and open a dialogue that should be conducted fairly and respectfully by all involved. This includes listening, realistic self-assessment, factual reasoning and a readiness to act courageously.
- 8 Further develop the EU's agricultural policy.**
Sustainable production methods should be supported with public funds. Key indicators and benchmarking should be used so that the practices attracting support can be verified and the efficiency of the policy programmes be quantified and documented transparently.
- 9 Harmonise international agricultural trade with the goals of development policy.**
Trade needs binding standards on sustainability, good governance and combating corruption in order to compensate for production deficits and create prosperity for all partners.
- 10 Strengthen the food value chain and rural areas.**
The agricultural and food sector is a strong segment of the overall economy. Without competitive agriculture that is integrated into thriving rural areas and ensures locally produced raw materials, the food sector will migrate away from Germany.



Photo: Author

“ WHY AGROECOLOGY DOESN'T SCALE UP ”

Given the well-documented advantages of agro-ecological systems both for human beings and for the environment, they should really have found much swifter and more comprehensive application than has been the case. Our author does not accept the usual attempts to explain this phenomenon and argues instead that small farmers need a Green Revolution if they are to escape their heavy labour burden, a stagnant crop yield and deep rural poverty.

By Robert Paarlberg

Farming in ways that imitate nature sounds like a good idea, until you remember that nature is hardly a place of food abundance. The wilderness produces plenty of biomass, but very little of it is digestible in the human stomach, which is why we invented agriculture in the first place. Agroecological farming methods that imitate nature can of course produce healthy and tasty food, but these methods require far too much human labour to remain attractive to farmers, once they have gained access to powered machinery, chemical fertilisers, and irrigation pumps.

Agroecology has been heavily promoted by advocates and activists since the 1980s, as an alternative to Green Revolution farming, and it has won wide endorsement from philanthropic foundations, donor organisations and the United Nations system. Yet most actual farmers, private investors and ministries of agriculture pay little attention. They continue to favour powered machinery over hand labour, monocultures over polycultures or intercropping, modern knowledge over traditional knowledge and fertiliser use over the recycling of animal waste. In 2016, one review in the journal *Horticulturae* summed it up nicely: “Despite the call for alternative methods of production over the years, the paradigm of industrial or conventional agriculture still dominates and permeates most mainstream academic and policy discussions about the future of agriculture.”

Agroecology has been most heavily promoted in Latin America, and if it were on the rise in this region we would expect a slowdown or even a decline in the use of modern chemical inputs like fertilisers. Yet between 1980 and 2002 the use of urea fertiliser in South America increased by 60 per cent and the use of nitrogenous fertilisers by 139 per cent. In Central America, between those same dates the respective rates of increase were 139 per cent and 32 per cent. More recently, in Latin America and the Caribbean overall, between 2002 and 2014, total fertiliser consumption in kilograms per hectare of arable land rose by another 43 per cent.

In the face of this continued spread of Green Revolution farming, advocates for agroecology try to claim success at the level of individual demonstration projects. One early example is a report on NGO-led projects in nine different Latin American countries originally prepared in 1999 by Miguel Altieri. This report claimed “yield increases” between 20 per cent and 200 per cent. But on closer inspection, only one of the nine projects employed the signature agroecology technique of intercropping, and several were based on techniques widely employed by conventional farms, such as crop rotations and cover crops. More importantly, high yields are not a good measure of success if they depend on burdensome labour requirements. Peasant farmers are glad to provide this labour as long as NGO project leaders are paying them to do so, but when the external support drops off the labour effort drops off as well.

Agroecologists in Latin America have tried to recreate the supposed abundance of pre-Columbian raised bed farming systems, but they learn once again that the labour costs are too high. The waru-waru system used by the Inca required hand planting, hand weeding, hand harvest, and laborious maintenance annually, plus a rebuilding of the beds every ten years. Two decades ago, a report by the Organization of American States (OAS) on waru-waru farming in Peru showed that the production costs in this system worked out at 480 US dollars for each 11.2 kg of potatoes.

Most recently, agroecology advocates have claimed the island nation of Cuba as a success story. Cuban farmers lost their access to highly subsidised imports of fuel and agricultural chemicals when the Soviet Union collapsed in 1989, so many retreated from modern methods to pre-industrial techniques. They replaced tractors with oxen and hand hoes and fertilisers with animal manure, and they controlled pests not with chemicals but with biological methods and intercropping. Activist researchers like Peter Rosset claimed in the *Journal of Peasant Studies* that this was a “rapid and successful” spread of

agroecology. A case study of Cuba conducted by an NGO named La Via Campesina claimed that agroecology had “achieved what the conventional model has never accomplished in Cuba or any other country: more production from less”.

Data from the United Nations Food and Agriculture Organization tell a less positive story. Nearly a quarter century into its forced experiment with agroecology, Cuba has yet to produce as much food on a per capita basis as it produced in 1990. In fact, Cuba’s official net per capita food production index in 2014 was still 37 per cent lower than it had been in 1990. On a dollar basis, the value of per capita food production in 2011–13 was still 34 per cent lower than it had been in 1990–1992 in constant dollar terms.

In response to its ongoing food production problems, the Cuban government has not, in fact, been betting on agroecology. Instead it has been relying on food imports and hoping to revive its conventional farming sector. With support from Brazil and also Venezuela (before that nation’s economy collapsed), Cuba has tried to boost its use of synthetic chemical inputs and its inventory of large scale machinery and more centre-pivot irrigation equipment. Instead of going organic, Cuba increased its consumption of mineral fertilisers by 32 per cent between 2002 and 2012. It has even pursued research on genetically engineered crops.

Agroecology supporters who know their methods are not replacing Green Revolution techniques have fallen back on a number of excuses. In 1991, Vandana Shiva explained that Green Revolution farmers in India had been lured by foreign advisors into adopting modern practices as “a shortcut to obtain greater profits at the expense of sustainability”. Nearly three decades have now passed since this warning of unsustainability, and the “shortcut” continues to deliver production gains. Others say scaling up agroecology is difficult because it is management-intensive and knowledge-intensive at the beginning. One 2014 paper from a UK environmental organisation put it this way: “Poorer and more marginal farmers, in particular, may decide not to adopt these practices if they do not have enough time and resources to invest in learning and experimentation.” Learning agroecology practices may indeed be laborious, but the bigger problem is that the practices themselves are laborious.

One example was the system of mixing trees with crops known as “alley farming”, designed in the 1970s by researchers at the International Institute for Tropical Agriculture (IITA) in Nigeria. The goal was to plant rows of crops in

the “alley” between strips of leguminous trees, hoping that the roots of the trees would fix nitrogen in the soil to fertilise the crops. Alley farming worked fine on research stations, but actual farmers in Africa either refused to adopt the practice or abandoned it soon after adopting. A 1995 review by the UK’s Overseas Development Institute revealed that farmers resisted the system because the trees required too much time-consuming pruning, and because crop growth suffered due to shading and root competition from the trees.

Yet another excuse for the weak scale-up of agroecology is that choices are constrained because “policies and market signals are stacked against agroecology”. Many developing countries have indeed made fertilisers and pesticides artificially cheap for farmers to speed the transition to Green Revolution farming. But sub-Saharan Africa has not done this, and agroecology has still failed to take off.

In sub-Saharan Africa, average fertiliser use remains at only 16 kg per hectare, or just one eighth as much as in Latin America and only one tenth as much as in South Asia. This should create plenty of space for farmers to adopt agroecology, but instead they remain stuck with unimproved methods, stagnant crop yields and deep rural poverty. What they need is a Green Revolution.

Robert Paarlberg is Adjunct Professor of Public Policy at Harvard Kennedy School in Cambridge, Massachusetts, USA.

Contact: robert_paarlberg@hks.harvard.edu

GMOs IN NIGERIA – DO THE MASSES HAVE A CHOICE?

Civil society organisations throughout Africa are campaigning for agroecological and indigenous approaches to maintain food sovereignty. But their umbrella organisation, the Alliance for Food Sovereignty in Africa (AFSA), warns that a corporate industrialisation of African agriculture could destroy the biodiversity and ecosystems that these approaches are based on. Taking the introduction of genetically modified organisms in Nigeria, our author looks at how such industrialisation processes can come about.

By Nnimmo Bassey

Nigeria is the most populous country in Africa. It is estimated to have about 170 million inhabitants, accounting for close to 50 per cent of the West African population. With this numerical strength, the biotech giants no doubt imagine that Nigeria is the market to grab for their genetically modified products. More so, as Nigeria remains a major influence in Africa, it is clear that the entry of genetically modified organisms (GMOs) into the country will facilitate the acceptance of their risky technology in other African countries. Nigeria is currently faced with intense pressure to adopt modern biotechnology as a solution to food challenges.

It took many years for Nigeria to develop a National Biosafety law. The country had the benefit of an existing Biosafety Model Law developed by the African Union (AU) in 2003, which was meant to serve as guide to African countries as they drafted domestic biosafety frameworks and legislation at country level in order to robustly regulate the production of GMOs or their entry into their territories. Due to corporate and global political pressures, the reality has been the production of biosafety laws that fall below the bar set by the AU's model law.

The Nigerian National Biosafety Management Agency Act was signed into law in April 2015 in the last days of the administration of the country's former president Goodluck Jonathan. This law established the National Biosafety Management Agency (NBMA), which was saddled with the responsibility to provide a regulatory framework and to safeguard human health and the environment from potential adverse effects of modern biotechnology.

Within a year of the setting up of the NBMA, the tides changed dramatically in the wrong direction for the country. The NBMA is-

sued three permits on Sunday, 1st May 2016 to Monsanto Agriculture Nigeria Ltd. for the commercial release and placement in the market of genetically modified cotton (MON 15985) and for field trials of genetically modified maize (NK603 and MON89034X NK 603). The maize varieties were permitted to be field tested jointly by Monsanto and the National Biotechnology Development Agency (NABDA) – a government agency set up for the development and promotion of biotechnology.

In a frenzy of permit issuance, the NBMA allowed trials of GM cassava and the importation of a cocktail of genetically modified maize varieties, ostensibly on the basis that these varieties are permitted in European Union countries.

In September 2017, the permit for a novel variety of cassava was issued to the International Institute of Tropical Agriculture (IITA) and ETH laboratory in Zurich for field trials. This genetically modified cassava (AMY3 RNAi Transgenic lines) has not been tested anywhere else in the world. Although the Health of Mother Earth Foundation (HOMEF) and 87 other groups sent a scientifically prepared objection to this application, and although the objection was acknowledged, it was nevertheless not taken into consideration in reaching the decision to issue the permit. The pattern was recognisable in the processing of earlier objections to Monsanto's applications by the GMO approval agency in 2016. In that case, the agency had acknowledged receipt of the objections on a Thursday, promised to consider them, but went ahead to issue permits three days later, on Sunday, the 1st May.

In December 2017, the agency gave approval to WACOT Ltd. to freely import genetically modified maize into the country for a three-

year period – after the same company had tried to smuggle in the said seeds without prior approval. Permits were granted just a few weeks after the illegal goods were impounded and their repatriation was ordered. This was against the law, which requires that 270 days' notice must be given before the import of any genetically modified crop.

In March 2018, the agency advertised an application by the National Biotechnology Development Agency (NABDA) to carry out field trials of GM soybeans. It is worth mentioning here that NABDA sits on the board of the NBMA and this board is populated with GMO promoters with no representation of farmers or consumers, who are directly at the receiving end of this technology. NBMA and NABDA have announced that genetically modified cowpea and cotton will be released into the Nigerian market this year, 2018. Other GM crops which are in the pipeline are sorghum and rice.

In its present form, the Nigerian Biosafety Management Agency Act 2015 has several loopholes that are being manipulated to allow the influx of GMOs into the country. There are no strict provisions for liability and redress, public participation or risk assessments. The Act gives NBMA wide discretionary powers which literally let the agency out of control and allow it to behave as though it were above the law. The agency, which is supposed to be an unbiased regulatory umpire, has instead taken up the role of a promoter of GMOs without due consideration of Nigeria's socio-cultural peculiarities. In February 2018, the director of the agency organised a tweeter chat on GMOs. One of the issues that were raised during this chat was on how the masses would be able to identify genetically modified products in the market. The director stated that GMOs would be labelled and that then,



Photo: Author

Nigerians would have a choice of whether or not they wanted to consume them. In Nigeria, labelling is a false promise. Many of the crops targeted for genetic modification are sold in forms which make it an impossible option. For example cowpea which is processed to make what is called akara (bean cake) or moi-moi and sold by the road sides cannot be labelled.

Besides objections by farmers and civil society groups urging the Nigerian government to pull the brakes on GMOs, in 2016, the high-

ly respected National Inter-Religious Council (NIREC) advised the government to halt dealings with GMOs as the nation at present does not have the capacity to handle them in terms of infrastructure or human resources.

Will they listen?

Nnimmo Bassey is Director of the Health of Mother Earth Foundation (HOMEF), a Nigeria-based environmental think tank and advocacy

organisation that is a member of the Alliance for Food Sovereignty in Africa (AFSA). Bassey chaired Friends of the Earth International from 2008 to 2012 and was Executive Director of Environmental Rights Action for two decades. In 2010, he was named co-winner of the Right Livelihood Award. Contact: nnimmo@homef.org

For more information on HOMEF's work, see: www.homef.org

OPTING FOR THE MIDDLE GROUND – BLENDED SUSTAINABILITY AS THE WAY FORWARD

In both developed and developing countries, policy stakeholders are tussling with the question of whether to promote agroecological intensification or sustainable agricultural intensification to deal with the multiple burden of a growing population, a changing climate, environmental degradation, and a precarious food and nutrition security situation. This has nurtured intense debates and created an impasse among policy actors. Blended sustainability could be a way out.

By Jonathan Mokshell

Differences in opinions are inherent in all debates. Exchanging differing views can be healthy as it may give birth to new knowledge and even inspire ideas to solve real-world problems. But it can also be unhealthy. This happens when ideologies get in the way of a resolution to an important issue.

DEFINING AGROECOLOGICAL AND SUSTAINABLE AGRICULTURE INTENSIFICATION

The debate between the two sustainable agriculture approaches, i.e. agroecological intensification (AEI) and sustainable agricultural intensification (SAI), has by all accounts reached an impasse. Proponents from both sides avow that their respective approaches offer the most appropriate, socially acceptable, economically viable and environmentally friendly solution to nourishing the 8.5 billion people that the world is expected to have by 2030 – the deadline of the United Nations Sustainable Development Goals. Existing literature has viewed AEI and SAI as two pathways to agricultural sustainability that are polar opposites.

AEI refers to the application of ecological science to the study, design, and management of sustainable agriculture. Farmers' knowledge and experimentation provide the bases for agroecological approaches. AEI, which has strong support from non-governmental organisations, is all about letting nature take its course by harnessing the potential of agriculture and ecological processes to improve agricultural yields. So fertilisers or genetically improved crop varieties are a no-no.

SAI, meanwhile, is essentially the opposite, although its main proposition is to use inputs without waste. SAI entails "intensification using natural, social and human capital assets, combined with the use of best available technologies and inputs that minimize or eliminate harm to the environment". Private agrochemical organisations largely support this approach.

POINTS OF DEBATE

There are several points of debate around AEI and SAI. Tolerance for genetic engineering in SAI and its unacceptability in AEI is one,

and is at the centre of public and scientific discourses, a trend that will continue for the foreseeable future.

Another is the issue of land sharing versus land sparing. The former focuses on less intensive production techniques to maintain biodiversity throughout the production process, while the latter involves setting aside some land for intensive production and some for biodiversity preservation and conservation. SAI proponents believe land sharing will lead to extensification, which can have a potential negative impact on biodiversity and contribute to climate change. AEI proponents, meanwhile, think that land sparing, which favours the use of agrochemical and modern technology to increase production, will cause damage to the environment and affect soil biota.

Proponents of SAI criticise the concept of AEI as being synonymous with a "do-nothing approach", low external input use and "anti-science", as well as for bringing potentially negative consequences on efforts to end hunger and achieve food security. Opponents dub the SAI approach as business as usual, high external input use and an "oxymoron".



Photo: Author

Apart from the literature documentation of the intense debates between advocates of the two sustainable agriculture methods, I've also personally witnessed this in agricultural policy processes, in both formal and informal settings. It's not surprising. Humans, by nature, tend to put themselves in certain camps. And when we subscribe to a particular camp, we stick to our coalitions, and we do the best we can to justify our positions with narratives.

WHAT MAKES AEI AND SAI CONTROVERSIAL?

Both AEI and SAI have trade-offs and potential synergies on the economic, social and ecological dimensions of sustainability; not recognising these is what makes these sustainable agriculture approaches a highly controversial topic in both scientific and policy arenas.

For instance, increasing productivity through land sparing might have economic (e.g. increased income), food security and social benefits (e.g. improved livelihood), but it might also have some environmental consequences (e.g. excessive use of inorganic chemicals). Similarly, increasing production through land sharing might have some social (e.g. improved livelihood) and environmental benefits (e.g. improved land management and biodiversity protection), but it could have environmental (e.g. land extensification) and economic implications (e.g. reduction in income in the initial phase). These examples suggest some trade-offs among the different dimensions of agricultural sustainability and have a potential

impact on a farmer's decision to adopt an AEI pathway (e.g. organic agriculture practices), an SAI pathway (e.g. climate-smart agriculture practices), or a blend of the two (e.g. a system of rice intensification and conservation agriculture practices).

Profitability and ideological beliefs have also influenced the difference in opinions. Standards, labour, price, geo-politics and biophysical characteristics likewise increase the complexity of the debate, making it practically impossible to agree on a single set of sustainable agricultural practices. Further, there are political-economic issues that could explain the support for SAI by private sector actors with an interest in upholding input-dependent agriculture. Compared to AEI, SAI concepts can be recast into language that seeks to optimise (rather than reject) the use of fertiliser and agrochemicals.

HOW BLENDED SUSTAINABILITY CAN END THE IMPASSE

Considering these difference, we need a way forward if we want to achieve the Sustainable Development Goals by their deadline. The standoff needs to end – now. If the opposing sides of the sustainable agriculture debate open their minds and engage, they will find that they actually have some things in common. There are practices that suit both realms, and some practices are location-specific. These include mechanisation (e.g. tillage and mechanical seeding), drip irrigation, micro-dosing and application of compost at the time of sowing.

So there's a middle ground. Blended sustainability is how I term it. The blended sustainability concept carries the idea of examining the dimensions of the different farming pathways and practices, and aligning the strengths and weaknesses of AEI and SAI pathways to harness synergies and reduce tradeoffs. It involves employing farming practices based on the social, economic, and ecological conditions of a particular area, and on the perception of the two approaches in that location.

For example, modern technologies in the SAI pathway can be promoted to benefit small farms economically, while the ecological intensification practices in AEI can be adopted to make farming systems more ecologically sustainable. With current technological advancements, one cannot ignore the interaction between modern technology (e.g. precision farming, seeding with drones) and indigenous knowledge (e.g. onion leaves for controlling striga weed) and their role in promoting sustainable agriculture. Such interaction and blending of farming practices is already taking place in both the developed and developing countries.

How people in certain parts of the world define organic farming may also provide a common ground. In some parts of the Western world, use of tractors is fine because labour is scarce. It's the reverse in others where labour is in abundance.

Blended sustainability, in other words, takes the ideology out of sustainable agriculture. The concept of blending approaches is nothing new and has, in fact, become mainstream in the international development community. Many see blended finance – the combination of public, philanthropic, and commercial funding – for instance, as critical to reaching the targets under the Sustainable Development Goals.

A dozen years can come fast, so this is not the time to bicker over which sustainable agriculture approach is the best. Truth be told, the best could be somewhere in the middle.

A farmer practising drip irrigation in the Tana River Basin, Kenya.

Photo: Georgina Smith/CIAT



Jonathan Mokshell is a postdoctoral agri-food economist at the International Center for Tropical Agriculture (CIAT) in Cali, Colombia and an associate research fellow at the German Development Institute (DIE) in Bonn, Germany. His work focuses on the policies, institutions, markets, and disruptive innovation dimensions of the global food system.

Contact: J.Mockshell@cgiar.org



Holistic approaches in agroecology require the incorporation of farmers' knowledge and experience.

Photo: Jan Börner

MORE INTER- AND TRANSDISCIPLINARY RESEARCH NEEDED IN AGROECOLOGY

Agroecology embraces a collection of different disciplinary fields, ranging from agriculture and ecology to political theory. A stronger recognition of agroecology in agricultural research, which often has a strong production focus, could help to achieve sustainable development if more holistic and transdisciplinary research approaches are adopted.

By Lisa Biber-Freudenberger, Manfred Denich and Corey Whitney

According to UN projections, the current population of around 7.6 billion people is expected to reach nearly ten billion by 2050. The latest assessment on land degradation by the Intergovernmental Platform for Biodiversity and Ecosystem Services (IPBES) forecasts a reduction of global crop yields by up to 50 per cent in different regions in Central and South America, sub-Saharan Africa and Asia by that time, mostly due to land degradation and climate change. Agroecology will play a major role in meeting the challenge to nourish the human population, taking into consideration the need for healthy functional ecosystems as a prerequisite for sustainable livelihoods. This is reflected by the increasing relevance of agroecological issues in current political initiatives such as IPBES and the SDGs (Sustainable Development Goals). Many of the SDGs can only

be achieved if food and feed are produced sustainably for the world's growing population. This however requires research to expand the often narrow concepts of agricultural systems. It calls for a more holistic view of the overall socio-ecological systems, the interconnectedness of their components, and the relevance of nature's contribution to people for sustainable development.

In this context, agroecological research provides a framework to assess concepts and strategies such as the water-energy-food nexus, the sustainability of national and international bioeconomies and the potential of alternative agricultural practices (such as organic farming) to nourish the world's growing population. Moreover, the field helps to identify favourable development pathways by analysing and

identifying trade-offs between food production and biodiversity conservation, between local livelihoods and global consumer interests and between short-term economic gain and long-term natural risk management. Assessments on pollination and land degradation offer examples of the need for such research capacity. In particular, the social, economic, and ecological changes in developing countries require research that considers problems from different scientific and cultural perspectives. Therefore, collaboration among diverse disciplines and actors is crucial to bringing together multi-faceted knowledge, approaches, and methods in agroecology for i) reliable estimations of developmental changes, ii) realistic assessments of the adoptability of research-based innovations, and iii) practice-oriented recommendations for rural development.

UNDERSTANDING AGROECOLOGICAL SYSTEMS

Despite recent advances, research gaps are still looming that hinder our understanding of agroecological systems and functions. The complexity and diversity of agroecological systems, together with the uncertainty of determining the benefits of ecosystem functioning and services for human development, are major challenges in agroecology research. For example, the suitability of many agroecological interventions for small farmers in Africa is not fully understood. The applicability of ecological management strategies for the control of invasive species, diseases and pests such as the fall armyworm, or complementary irrigation to adapt to changing climatic conditions, such as dry spells and shifts in the duration and timing of the rainy season, are just two examples of pressing research topics. Furthermore, a heated discussion is currently taking place on the overall sustainability benefits of different agricultural production systems such as organic, low external input supply, mixed or intercropped, conservation or conventional farming practices. Better methods to evaluate total farm productivity, integrate external effects and evaluate the non-commercial ecosystems services in agriculture are desperately needed. Diverse inter- and transdisciplinary approaches are required for understanding the trade-offs between agricultural productivity and biodiversity conservation in extensively and intensively managed agroecological systems and for consideration in land use decision-making. These can be applied in the processes of identifying research agendas, developing applications of research outputs and implementation strategies. Such approaches offer a more holistic understanding of system functions and processes, and may help to develop pathways to implement sustainable solutions. The One

INTERDISCIPLINARY AND TRANSDISCIPLINARY APPROACHES

Interdisciplinary research integrates conceptual and theoretical approaches and methods from different disciplines. It moves beyond discipline-specific approaches to address immediate and relevant issues.

Transdisciplinary research goes a step further in that it seeks to involve all stakeholder and target groups in both the planning and research phases. The multi-faceted dimensions of agroecology provide an ideal basis for applying inter- and transdisciplinary research approaches for agricultural development.



Implementation research aims to develop solutions for putting research findings into practice. It should be gender-sensitive and include the rural youth.

Photo: Detlef Overmann

Health concept, for instance, integrates environmental with animal and human wellbeing to address complex health issues in agroecosystems. The control of zoonoses (diseases that can be transmitted between animals and humans) or the mitigation of mycotoxins (toxic substances produced by fungi colonising crops) with agroecological interventions are examples of the potential benefits of inter- and transdisciplinary One Health approaches.

INTEGRATION OF TRADITIONAL KNOWLEDGE IS KEY

Holistic approaches in agroecology require the incorporation of farmers' knowledge and experience. Their knowledge often reflects the time-tested experience of rural communities. Incorporating this knowledge into the research process sustains scientific efforts by providing a locally embedded broader view on agroecology. From the perspective of agroecological research and practice, the engagement with rural communities in the research process helps all actors to define their role in working together to achieve practical solutions. It facilitates trust between scientists, policy-makers and practitioners. Farmers are considered partners in research rather than merely sources of information, objects to be researched, or adopters of technologies. Their knowledge can be used to identify and address challenges in agroecological systems so that outputs are relevant and adoptable. They also guide future research directions by determining appropriate research agendas and offering critical feedback on scientific solutions.

IMPLEMENTATION RESEARCH TO ACCOMPANY PRACTICAL APPLICATION

Much research-based agroecological knowledge has already been generated. This includes innovations such as best practices for soil management or internalising the economic value of pollination services. Yet in most cases, these innovations find their way into agricultural practice either very slowly or not at all. This is because research-based innovations and related interventions often fail to consider the traditional knowledge and practices of farmers. As a consequence, adoption of agricultural innovations can take several years (e.g. new varieties, transport facilities) or even decades (e.g. irrigation facilities). Implementation research is transdisciplinary in nature and can be applied to ensure the uptake of relevant research outputs. It aims to understand barriers and develop respective solutions for putting research findings into practice and should be done together with the stakeholders that will make use of the innovations. Considering the importance of women as well as demographic trends in many rural areas of developing regions, implementation research must be gender-sensitive and include the rural youth. It should involve researchers from a diversity of fields such as agronomists, social scientists, economists, psychologists, education researchers, social anthropologists and communication experts, among others. Besides researchers, stakeholders to be included are farmers, extension workers, local and national authorities, agricultural and trading companies, banks, wholesalers, retailers and consumers. Implementation research practices

have broad applications in agroecology. For example, the practices are indispensable for connecting the discovery and proof-of-concept phases, on the one hand, and the piloting and up-scaling phases, on the other, within the “Research-for-Development Continuum” of the CGIAR system.

NORTH-SOUTH CO-OPERATION

Agroecological problems are complex and require the engagement of all stakeholders to define meaningful research questions for local socio-economic and ecological contexts. Determining who defines and prioritises agroecological research questions is highly

relevant for North-South cooperation and for achieving development aims. Research that is demand-driven ensures the commitment of all partners and puts collaborators on equal footing. Intercultural competence is required to facilitate joint problem identification and priority setting so that realistic and applied research agendas are developed. In practical terms, this requires appropriate funding and longer timelines so that exploratory field visits and stakeholder meetings can be conducted to define meaningful research questions and to align them with farmers’ priorities. Furthermore, research findings should be shared in venues beyond scientific publications so that they are accessible to policy-makers and practitioners. At the end of the research project,

additional time, funding and continued commitment from all partners is necessary to facilitate the implementation of research outputs through science-policy, science-practice and policy-practice processes.

Lisa Biber-Freudenberger and **Manfred Denich** are scientists at the Center for Development Research (ZEF), and **Cory Whitney** is a scientist at INRES – Horticultural Sciences. The two institutes belong to the University of Bonn, Germany. Contact: m.denich@uni-bonn.de

* With inputs from Tina Beuchelt, Hannah Jaenicke, Girma Kelboro, Christine B. Schmitt and Jan Henning Sommer.

PRACTICAL EXAMPLES FROM RESEARCH AT ZEF

Research at the Center for Development Research (ZEF) covers a number of different aspects of agroecology with a focus on sustainable land use. It employs both interdisciplinary and transdisciplinary approaches (see Box on page 32) through exchanges between its three different departments on social and cultural change, economics and technological change, and ecology and natural resources management. Through this work, ZEF intends to address some of the most urgent topics regarding the implementation of the Sustainable Development Goals, and with reference to agroecological systems and challenges. ZEF researchers seek new and innovative approaches based on stakeholder demands, developed and implemented in a participatory manner. Most ZEF research projects are jointly developed with local partners from academia as well as practitioners including NGOs, the public and the private sector. Wherever possible, the implementation process is actively facilitated, monitored and researched. Doctoral students from the international doctoral programme of ZEF benefit from this inter- and transdisciplinary research environment and serve as knowledge multipliers in their home countries long after their time at ZEF.

ZEF and its partner institutions created **WASCAL**, an international organisation

that addresses various aspects of land use, especially the potential to mitigate and adapt to the impacts of climate change. It provides science-based advice generated by African and German interdisciplinary research clusters and contributes to educating the next generation of African scientists and policy-makers.

The **STRIVE** project investigates bioeconomic transition pathways and their sustainability implications on the global scale with a particular focus on trade and innovation transfer. The interdisciplinary approach integrates economics with natural and political scientific methods and qualitative as well as quantitative case studies.

The **FSS I** project uses a multi-stakeholder approach to create hands-on implementation tools to increase the potential for sustainability certification of agricultural commodities to contribute to food security while ensuring more sustainable, resilient and biodiverse production systems.

The **NutriHaf** project is a research and capacity building project that looks at the potential of farming vegetables and fruits in agroforestry systems to contribute to food security and biodiversity conservation. It employs a gender-sensitive participatory approach to ensure that the needs and

preferences of all smallholder farmers are considered to increase the adoption potential of the project outputs.

The **BiomassWeb** project aims at enhancing food and nutrition security in Africa by evaluating the food and non-food biomass contributions in complex value webs. It exemplifies different ways of implementing transdisciplinary research through joint activities with farmers on the ground, demand-driven research and development projects led by the African research community, science-policy workshops and the online platform BiomassNet targeting experts from science, policy and practice.

The **WABES** project facilitates networking and capacity-building across West Africa. It brings together interdisciplinary expertise in a science-based context and builds expert networks. It interfaces, develops and disseminates tools and approaches to support the Intergovernmental Platform for Biodiversity and Ecosystem Services by identifying sustainable approaches in agriculture. It bridges the gap between basic and applied research and the science-policy interface through the use of interdisciplinary knowledge.

For links to the projects, see online version of this article at: www.rural21.com

FINANCIAL LITERACY IS KEY TO SOUND REMITTANCES MANAGEMENT

In Sri Lanka and Nepal, many migrant families struggle to make ends meet instead of being able to save part of their received remittances for an investment that would allow them to build the basis of their livelihoods at home. Based on empirical data from labour migration projects implemented by Helvetas Swiss Intercooperation in Sri Lanka and Nepal, this article demonstrates that financial literacy is indispensable for a more sustainable use of remittances.

By Katrin Rosenberg, Basanta K. Karki and Ranjan Kurian

Across the globe people move within and between countries in search for a better future. Various factors contribute to the decision to migrate for work. Many others are forced to migrate because of difficulties to sustain livelihoods, natural disasters, violent conflict, persecution or the need to escape unhealthy family situations. According to the United Nations Department of Economic and Social Affairs (UNDESA), 244 million people world-wide have moved to another country. This figure includes migrant workers and refugees. Consequently, remittances are an important source of income for millions of families in developing countries across the world. In the past three decades, the flow of remittances to developing countries has constantly been growing. The World Bank's latest figures confirm that 429 billion US dollars (USD) in remittances were sent to developing countries through official channels in 2016, an amount substantially higher than Official Development Assistance and more stable than Foreign Direct Investment.

Similar trends are observed in the contexts relevant to Sri Lanka and Nepal. The continuously growing economies of West and East Asian countries such as those in the Gulf, but also Malaysia, attract millions of workers not only from South and South-East Asia but beyond as well. Sri Lanka, for example, has witnessed a continued increase in foreign employment since the 1980s. While at that time a mere 15,000 people migrated for employment, they today amount to 260,000. In 2015, remittances reached 6.9 billion USD. Overseas employment is the largest foreign exchange earning source for both the Nepalese and the Sri Lankan economy. Since formal labour migration commenced, it has generated substantial and continuously growing inflows of remittances, while at the same time relieving pressure on unemployment. In Nepal, barely 2,000 people registered as migrant workers 20 years ago, but in re-

cent years, on average, around 500,000 Nepalese have been leaving the country for foreign employment annually. Remittances have continuously increased and reached 6.3 billion USD in the Nepalese fiscal year 2015/2016, which equals 30 per cent of the GDP.

WHAT IS THE MONEY USED FOR?

Whether migration indeed has beneficial impacts on long-term sustainable development of the migrant families depends on a wide range of variables, such as the local context, type and extent of migration and the size of remittances. More concretely, the main impacts depend directly on patterns of expenditure, investment and labour allocation in migration households, or in other words whether the income is used on production or only consumption. Similar to the discussions on the magnitude of the positive impact of migration on development, literature has debated the productive versus the consumptive use of remittances, as summarised

by Bhandari and Chaudhary (2016). One line of research suggests that migration and remittances contribute positively to the migrant families and their communities through initiating development dynamics by lessening production and investment constraints in the economy, creating an environment for risk diversification, helping migrants to establish businesses, poverty reduction, and through investment in human capital development. Other scholars argue that remittances are primarily used to cover consumption expenses.

Research from Sri Lanka and Nepal supports both lines of argumentation. The International Labour Organization (ILO) sheds light on the use of remittances in Sri Lanka and finds that the major areas include housing, children's education, personal assets and consumption. Migrant families' expenditures on a range of unproductive and consumable assets have increased after migration. In addition, such equipment oftentimes leads to a subsequent increase in recurrent expenditure as most of the devices consume energy or fuel and require costly maintenance. In the surveyed area, less than five per cent of the returnee migrant workers have invested in productive assets, such as land, housing, three wheelers, and, to a smaller extent, small businesses.

For Nepal, a recent study by the Nepal Rastra Bank suggests that 80 per cent of the sample households have no other significant means than remittances to manage their regular expenses. In relation to use of remittance, the sample households reported that 25 per cent is used for loan repayment, 24 per cent for daily consumption, 10 per cent for education and health, 4 per cent for social work, 3 per cent for household assets and 1 per cent for productive work. Interestingly, the study demonstrates that the families are saving around 28 per cent of the remittances they receive. Nevertheless, it also reflects that families tend to become



A Nepali woman demonstrating her saving till.

Photo: HELVETAS Nepal

remittances-dependent and stop engaging in other income-generating activities.

These findings from Nepal and Sri Lanka are not surprising when taking into account that many migrate due to the lack of economic opportunities close to home and out of the need to provide food, shelter and clothing to their families. Furthermore, knowledge of financial literacy, including financial planning and budgeting, financial services and concepts of savings are often lacking. Financial literacy incorporates knowledge, skills and attitudes “to make informed judgements and to take effective actions regarding the current and future use and management of money. It includes the ability to understand financial choices, plan for the future, spend wisely, and manage the challenges associated with life events such as a job loss, saving for retirement, or paying for a child’s education, as a US Government Accountability Office report describes. The importance of financial literacy for sound remittances management has been confirmed by field experiences gathered in the context of implementing a Helvetas project.

A STEPPING STONE FOR SUSTAINABLE ECONOMIC DEVELOPMENT

When designing measures to support migrants and their families interested in establishing small businesses as a productive investment of their remittances, it became evident that most families in the targeted areas in Sri Lanka and Nepal were not able to save remittances and establish alternative income sources. On the contrary, many families remained indebted, did not manage to pay back loans and became dependant to different degrees on income from labour migration. In order to address these issues, financial literacy interventions were designed to empower migrant workers and their families to set explicit and realistic financial goals and work towards achieving them. A sound understanding of the financial options, money management and available services (savings, credit and loans linked to remittances) is a stepping stone to long-term and sustainable economic development.

Participants start to reflect on their expenditure patterns, optimise them and thereby increase savings. Anecdotal evidence confirms that participants have most benefited from reflecting on their expenditure patterns and optimising them by establishing and comparing budgets. For example, families decided to



Women taking part in a role play on business planning.

Photo: Katrin Rosenberg

sell not needed electricity-consuming equipment, consequently reducing recurrent expenses. Bulk purchasing of food products is another successful strategy adopted by many participants. Keeping records of income and expenditure and practising participatory family decision-making and goal setting also contributes to enhance trust and build better relationships among the migrant and his/her family, as well as among the (extended) family members who benefit from remittances. Additionally, participants are sensitised on remittances as hard-earned money and sacrifice not only by the family left behind, but also by the migrant living and working under what are often harsh conditions. One broader goal is thus to reduce family tensions associated with control over and (mis-)use of remittances. Furthermore, beneficiaries were less susceptible to loan sharks providing easily accessible loans at high interest rates for migration-related expenses. Those who had already obtained loans were supported in establishing repayment schedules and transforming the informal loans into formal ones with banks. Most importantly, in both countries, around 50 per cent of the participants started engaging in income-generating activities, and in Sri Lanka, these were specifically trained on a number of trades such as tailoring or sweets production. In both countries, Sri Lanka and Nepal, many of those who had started their own income generating activities expressed that they did not consider a re-migration necessary. However, they would continue with the business as a family, and expand where possible. In addition to the financial benefits, most families reported that family conflicts had decreased. The reasons for this are seen not only in reduced financial problems, but also in increased and better communication within the family. Financial questions have been taken as entry points to foster an open communication which subsequently also

allowed to address further issues. Whether better financial management results in fewer conflicts or joint family financial planning leads to a more open communication and better relations is difficult to determine conclusively.

TOWARDS A POLICY FRAMEWORK FOR SUCCESSFUL REINTEGRATION

Return and reintegration of migrant workers into their home communities gains importance for both governments in Nepal and Sri Lanka and requires concrete programmes. Achieving this is only possible when return and reintegration is considered from the beginning of the migration cycle. The basis for successful economic reintegration is sound remittances management – right from the start. In the context of Sri Lanka and Nepal, this can only be achieved by low-skilled labour migrants and their families if they have the relevant knowledge, skills and attitudes of financial literacy. It is key to include financial literacy for migrant workers and families left behind as a stepping block in any policy targeting return and reintegration. This must be followed by adequate financial products provided by banks and micro-finance institutions and ultimately by a favourable framework for small-scale investments. The recently passed Sri Lankan Sub Policy and Action Plan on Return and Reintegration of Migrant Workers recognises the importance of financial literacy and sets an indicator accordingly.

The Helvetas project experience in Nepal and Sri Lanka has demonstrated the importance of financial literacy in the frame of safer migration. It is a key aspect contributing to maximise the benefits of labour migration and reducing its risks and negative impacts. It furthermore lowers dependency on remittances and makes (re-)migration more often a choice than a mere necessity for survival.

Katrin Rosenberg is a development professional and currently works as Senior Advisor Migration and Development in HELVETAS, based in Switzerland.

Basanta Kumar Karki is a development practitioner engaged in the field of migration & development, human rights and labour rights and was associated with HELVETAS in Nepal until May 2018.

Ranjan Kurian is a development professional and currently works as Project Manager of the Labour Migration Project in HELVETAS Sri Lanka. Contact: katrin.rosenberg@helvetas.org

BREAKING THE MODE OF DEMOLITION AND RECONSTRUCTION

Taoyuan Village belongs to the “Happiness Green Village” scheme of the Western Hubei Eco-culture Tourism Circle, in Western Hubei Province, China. It is an example of how an attractive living environment can be created for rural inhabitants by repairing and promoting ancient villages, also with view to stemming the rural exodus.

By Xuesong Zhang, Ju He and Hailin Zhang

As China’s urbanisation process accelerates, the urban-rural gap is becoming more and more obvious. The cities are developing and expanding rapidly, while rural communities are gradually languishing and waning. Some villages have already disappeared, while others are set to suffer the same fate, leaving many peasant workers unable to return but also without prospects of staying in the cities.

Taoyuan Village was also in gradual decline. Just like so many others Chinese villages, it had become very shabby and impoverished, and the young peasants went out to work, while the children and the elders stayed in the rural environment. Nearly ten years ago, Taoyuan looked like a completely “empty village”. Lacking protection, the ancient buildings and old trees suffered great damage, and the village landscape was withered and tattered. The riverway was in a state of disrepair, natural ecology was on the slide, and traditional cultures were in decline.

Taoyuan Village is located in Wushengguan Town, part of Guangshui City in Hubei Province. It is at the foot of the great Wushengguan Pass, a strategic link between North and South China located in the hub of the Togbai and Dabie Mountains. Long ago, Taoyuan Village was an important commercial port with a prosperous economy. It boasts a more than 500-year-old persimmon forest as well as many historic stone buildings that are well preserved and an inscription tablet, built by the decree of Emperor Xianfeng of Qing Dynasty, to praise local filial culture.

A “GREEN HAPPINESS VILLAGE”

In October 2012, Taoyuan Village joined the first batches of “Green Happiness Village” pilots of Western Hubei Province (see Box on page 37). The construction plan, designed by the Beijing Green Cross Ecological Culture Communication Center, a non-government organisation, followed the concept of “making the countryside more like countryside”. The local government adheres to the concepts of “natural character, modern function, green in-



Retaining the original building fabric is an integral element of the green Happiness Village project.

Photo: Xuesong Zhang

dustries, civilisation & simplicity”, and actively endeavours to protect excellent Chinese rural historical and cultural elements, promote rural ecological civilisation, and build a new Chinese authentic village. Taoyuan Village was also included in the Land Remediation Project of Hubei Province in 2013. The local government seized the opportunity, encouraged public participation and completely renovated the village. It organised its functional departments in batches, to carry out field visits and learn from successful cases around Guangshui City.

Local planning and design departments co-operated with teams of experts in constantly improving project planning and gradually forming Taoyuan’s features. The Land and Resources Department of Guangshui City undertook civil engineering measures such as creating an ecological embankment of the Taoyuan River, maintaining bridges and constructing tour trails. At the same time, ancient stone houses were repaired, the village’s environment was revitalised, and the ecology was restored.

The Green Happiness Village construction of Taoyuan Village breaks with the conventional mode of demolition and reconstruction, adhering to the construction concepts of respecting the original site and original appearance,

restoring old as the old and preserving the original state of the village.

Based on respect for and complying with nature, the landscape of Taoyuan Village was remediated, with the project insisting on the priority of ecological suitability and recovery and promotion of the natural environment. Landscape elements such as topography, paths, ancient trees and stone buildings were integrated into the overall environment design.

The historical traces and cultural deposits of Taoyuan Village are borne in aspects such as buildings, folk customs and daily life. The idyllic scenery around dwellings, bright-coloured flowers and orderly croplands are unique to Taoyuan Village. In the remediation process, the elements of historical and culture traces were extracted, summarised, and integrated into the design and construction technology in order to fit in with the original ecology as well as the natural landscape.

Regarding landscape spatial allocation and construction, land remediation focused on the local culture (agriculture, dietetic culture and tourism culture), and combines farm work, festivals, folk customs, tourism, health maintenance and outward-bound training in the

landscape system. This aims to develop natural landscape and local traditional facilities as rural tourism resources.

CONSIDERING THE HUMAN ENVIRONMENT AND KEEPING VILLAGERS ON BOARD

The project is not only devoted to improving the living conditions and dwelling environment of the villagers. It also enforces village construction and development. Furthermore, it is committed to satisfying the services of living and leisure as well as management and consumption requirements of participants. And it emphasises their sensorial and mental satisfaction.

Some new elements based on materials, colours, plant species, environmental protection and ecosystem are added carefully to the design. This aims to allow the landscape environment to directly reflect the original ecology and peasant lifestyle while also addressing contemporary people's behaviour and ways of thinking. The project provides a participatory landscape space, including a footpath for walks, a theme campsite, an educated youth inn and a grand quality homestay.

A careful combination of public participation and government-directed efforts was applied. The villagers were informed of the chief aspects of the planned land remediation well in advance and were encouraged to engage in decision-making and supervising. The main planning departments considered the opinions, ideas and suggestions of all parties involved in order to take full account of manoeuvrability and practicability, and also to ensure quality e.g. in road or sanitary installation construction.

The total investment budget of Taoyuan Village construction is about 30–50 million renminbi (RMB), the equivalent of 3.4–7.8 million US dollars. By June 2016, more than 37.8 million RMB had already been spent via the diversification of investment and financing channels. Part of investing was guided by the government, although the principal share of finance was provided via the land remediation fund and market enterprises.

DEVELOPING NEW INCOME OPPORTUNITIES

In order to promote rural industrial upgrading and income increase of peasants, already estab-

lished Taoyuan Villager Cooperatives are actively invited to engage in the implementation of land remediation. On the basis of voluntary participation, the villagers are establishing an industrialisation commonwealth, a “community of interests”, vigorously developing stock breeding, crop farming, rural tourism and agrotechnology and becoming shareholders, mountain-contracting rights, real estate, etc. The industrial restructuring was combined with land remediation, and the villagers were encouraged to develop a green industry. The village's “532” industrial structure means that the percentage of newly developed industry such as tourism industry is 50 per cent, that of traditional industry including environmentally sustainable stock breeding, organic rice and vegetable farming accounts for 30 per cent and industry supporting for new developed industry constitutes 20 per cent.

SAFEGUARDING THE INTERESTS OF ALL PARTIES IS KEY

Land remediation requires the support of enterprises and industry. The project has attracted a lot of enterprises seeking to develop ecological tourism – e.g. sightseeing, local family food, a family inn – and ecological agriculture.

THE GREEN HAPPINESS VILLAGE PROJECT

The construction of “Green Happiness Villages” is a new model of socialist rural development advocated by Hubei Provincial Development Strategic Planning Office in 2012. The model is aimed at avoiding irreversible destruction of the original ecological village inherited from the western Hubei region over thousands of years and sharing responsibility for the preservation of China's long history of farming civilisation. Villagers and other citizens are encouraged to experience and enjoy the village.

Villagers are guided in developing their own ecological environment and local style, establishing self-organisation and self-management and grafting modern civilisation organically on the original village. City people can come to the village to discover what ancient pastoral and farming times were like and experience and enjoy a style of production and life in general that is completely different from that of an urban environment.



Taoyuan Village before the project was launched.

Photo: Xuesong Zhang

They have actively participated in the land remediation, make related assumptions and suggestions, and develop and create brands whose characteristics optimally reflect the potential value of Taoyuan Happiness Green Village. These brands represent different products and industries of the Village, such as tea, vegetables and country tours. On the basis of earlier demonstrations, projects such as cultivating native protospecies of rice, Beijing Termite Mushroom, Shaanxi Rose, functional vegetables, etc. are now being started in batches.

Public participation is an important aspect of land remediation. However, it is hard to avoid conflicts of interest in the process that may lower expectations. An appropriate legal framework for measures is therefore essential. Stable multi-participation mechanisms must be set up to reach multilateral consensus. Safeguarding the interests of all parties involved is a vital prerequisite for land remediation.

The case of Taoyuan Village shows that carrying out an integrated remediation of ancient villages not only has to improve agricultural production conditions and optimise the dwelling environment and living conditions of the villagers. Sufficient attention also has to be given to renovating and promoting an ecological landscape as well as to the inheritance of traditional cultures. Based on the above principles, the villagers have the opportunity to “see the mountains, watch the waters, and retain the nostalgia”, and to fully realise the concepts of “green development”, promote the construction of a new countryside and a beautiful China and achieve a unification of ecological environment protection and rural comprehensive and balanced development.

Xuesong Zhang, a Professor, **Ju He**, a Postgraduate and **Hailin Zhang**, an Associate Professor, are all at the College of Urban and Environmental Sciences at Central China Normal University in Wuhan, China. Contact: hailzhang@mail.ccnu.edu.cn

PRESERVING BIODIVERSITY IN A CROSS-BORDER CONTEXT

Côte d'Ivoire and Liberia are co-operating on preserving the remaining Guinean contiguous subtropical humid forest areas. Local support is essential in such a venture, and a number of measures have been designed to raise acceptance of the project among the communities concerned.

By Karim Ouattara, Blandine Schaffner and Elisée Napari Yeo

The Taï-Grebo-Sapo cross-border forest complex covers over 13,000 square kilometres of virtually intact tropical forest. It comprises the Taï National Park in Côte d'Ivoire, the two national parks at Grebo-Krahn and Sapo in Liberia, and several classified forests and/or forest concessions (see Map).

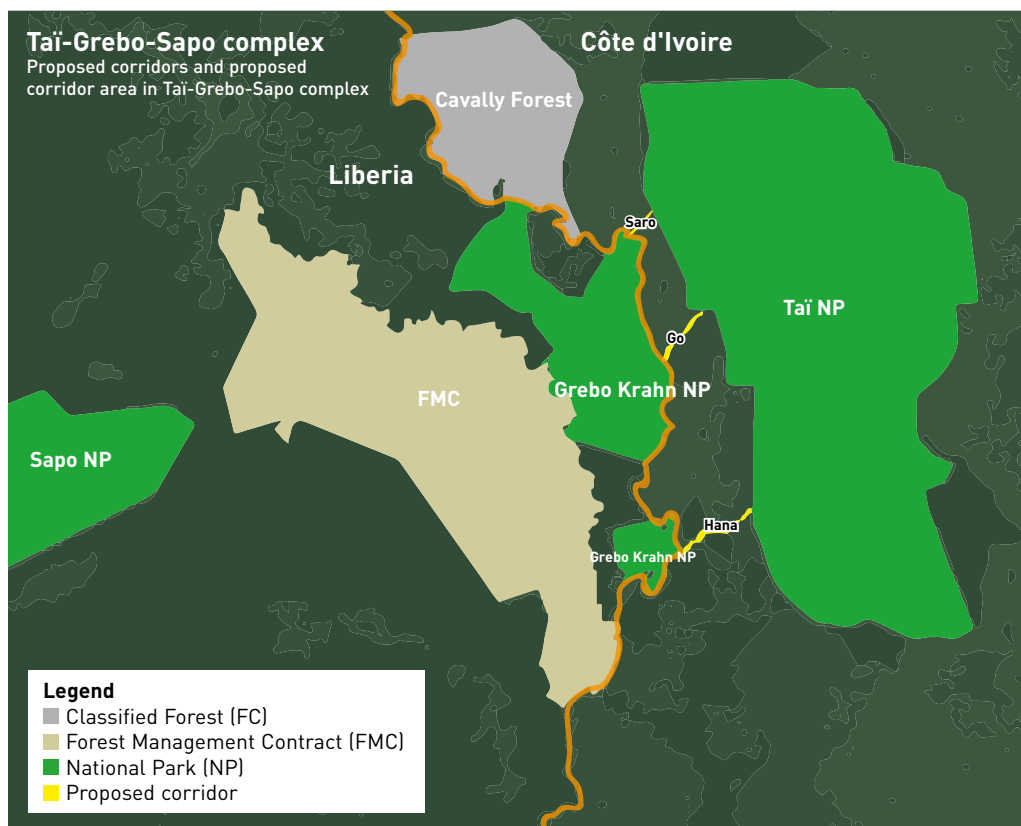
All around it are rural areas principally dedicated to agriculture and mining. The population of Côte d'Ivoire doubles on average every 20 years, and this has resulted in destruction of natural environments around areas reserved for the development of cash crop farming of cocoa, coffee and rubber. The Taï National Park has accordingly become more and more isolated, with increasingly aggressive land use around its periphery. Compared with Côte d'Ivoire, nature is still relatively well preserved in Liberia, although mining, the boom in cash crop farming and poaching all pose a threat to biodiversity.

The forest blocks described above are very valuable for conserving biodiversity as they host over 1,200 plant species, 300 of which are endemic, and hundreds of animal species, such as the West African chimpanzee or the pygmy hippopotamus. The fragmentation of the territory is a real threat and even a matter of survival for some of these species, which has led to the idea of an ecological corridor between Taï National Park in Côte d'Ivoire and the Grebo-Krahn park in Liberia. The "Biodiversity Conservation Project" was created in the two countries as one of several projects to implement the corridor (see Box on page 39).

THE FIRST STEP: GAINING THE POPULATIONS' SUPPORT IN CÔTE D'IVOIRE

In Côte d'Ivoire, the populations in the areas concerned recognise the park's contribution to their agricultural production in terms of rainfall and soil fertility (see Box on page 40), and they do not oppose such a project in principle, as long as it does not affect them directly. However, they are generally wary of the idea of a corridor in this area, which they argue

Project area and selected study regions in Côte d'Ivoire



Given the particularly high level of fragmentation, estimated at over 90 per cent, in the area between the Taï National Park and the Grebo-Krahn Park, three target areas covering twelve villages have been selected for the study. These are clustered around the three rivers Saro, Go and Hana originating in the Taï National Park and flowing into the Cavally River on the border. Based on a literature search and other examples of corridors in the world, it seems that a minimum width of 450 metres would be sufficient to guarantee the corridor's survival and effectiveness. The corridor targets both endangered, endemic and so-called "umbrella" species. According to the "umbrella species" concept, preserving and managing habitat for a single high-profile species indirectly protects the many other species that share its habitat. Ultimately, the forest elephant *Loxodonta africana cyclotis*, the Diana monkey *Cercopithecus Diana* and the pygmy hippopotamus *Choeropsis liberiens* were selected as the main target species.

would reduce their income from farming and mean that all sides would attach greater weight to the animals at the expense of people and its development.

The project is accordingly starting with a two-year preparatory period (February 2017 to January 2019). The main objective of this preparatory phase is to confirm the ecological and socio-economic feasibility of the corridor and ensure its social acceptance. Indeed, natural resources cannot be conserved in the face of opposition by the people, particularly in a

context of latent social conflict and local economic challenges.

After an intense consciousness-raising campaign, popular reservations about the project were still strong. In order to better understand these reservations, the local team had discussions with key individuals and with communities on the history of the area and the conflicts which the corridor could potentially ignite. This study was a major asset, as it highlighted certain aspects of the painful history of the communities in the region. As a result of more

or less recent political events (war in Liberia in the 90s, post-election crisis in 2011 in Côte d'Ivoire) and frequently misunderstood decisions in connection with the management of Taï National Park, they felt fobbed off in this strip of land, which is just four kilometres wide in parts and at the same time marginalised in an area with little economic development.

Through a participatory search for solutions identified on the basis of negotiations, this phase is leading in a series of steps to the definition of conceivable types of activities which could appeal to the local communities in the corridor and possibly bring them to accept the project. The negotiations are taking place at the level of individuals, growers and landowners and at village level, and aim at formulating and achieving acceptance of a concept for approval by a National Steering Committee and submission to the Council of Ministers.

THE ALTERNATIVES PROPOSED TO THE COMMUNITIES

The participatory diagnostics in each of the twelve villages enabled a prioritisation of the villages' problems by sector of activity and to identify solutions which they could agree on. Support in the fields of health (healthcare centre, maternity centre), education (school construction, assistance with educational material) and food security should be considered as compensation for acceptance by local populations of the project to implement the corridor. In agriculture, which is the leading activity in the region, in order to improve the standard of living of the populations, support for communities in managing low-lying land scheduled for rice growing, or support to improve productivity of subsistence crops would seem to be an essential and inevitable part of assistance to local populations.

In addition, there is job creation for young people, for example as corridor rangers or through development of tourism, training and support for women in activities connected with tourism (e.g. catering) and income-generating activities (e.g. value chains for non-wood forest products). For those people directly impacted by the ecological corridor, it is planned to propose a range of solutions defined in co-operation with the growers and their stakeholders. Some ideas have already been advanced, for example reallocation of their land for the corridor. The landowners could be rewarded with payments for environmental services if they commit to afforesting or reforesting their land where it is integrated into the corridor.



Photo: Blandine Schaffner

WHY CREATE AN ECOLOGICAL CORRIDOR IN THE TAÏ-GREBO-SAPO COMPLEX?

For social and/or environmental reasons, individual groups of animals (young sub-adults or adults) leave their native habitat to find new territory for food and, often, reproductive partners. This phenomenon ensures the survival of these animals. Isolation of protected areas affects not only the distribution of animals for access to habitat and food, but increases inbreeding in groups isolated in a given area. To avoid a situation which could result in the disappearance of species and negative changes to the ecosystem, it appeared essential to create an ecological corridor that would join the Taï National Park in Côte d'Ivoire and the extensive Grebo-Krahn-Sapo forest in Liberia. Another benefit of strengthening forest continuity in this complex is the conservation of dense forests with their biodiversity and services, particularly for cash crop agriculture in Côte d'Ivoire, where most cocoa production comes from the region around the Taï National Park.

THE BIODIVERSITY CONSERVATION PROJECT – ITS HISTORIC NATURE AND THE ACTORS INVOLVED

Although the idea of conserving this forest complex goes back several decades, the origins of the Biodiversity Conservation Project date from 2009, when a bilateral workshop was organised by UNEP-GRASP (United Nations Environment Programme Great Apes Survival Partnership) and the Wild Chimpanzees Foundation (WCF) with the principal authorities in charge of managing the forests, parks and reserves of Liberia and Côte d'Ivoire to discuss the creation of an ecological corridor in this area. The meeting marked the creation of a cross-border committee to manage the Taï-Grebo-Sapo complex, comprising various national entities (Ministry of the Interior, FDA, OIPR, FPRCI, etc.), international organisations (Mano River Union, for example) and NGOs involved on one side or the other of the frontier, showing the commitment of the two countries to biodiversity conservation.

This appeal led to the launch of three projects to strengthen ecological connectivity in 2017. They have the same objective, namely to connect the three large forest blocks Taï, Grebo and Sapo in order to permanently conserve the biodiversity of this area. Specifically, this translates into (i) the creation of a unique ecological corridor between the Sapo, Grebo-Krahn and Taï parks, (ii) the creation/restoration of intermediary areas (community/residual forests) and the recognition of Grebo forest as a national park at the end of 2017, (iii) capacity development of the local and national authorities and (iv) the development of support measures for the bordering populations affected by the corridor. Primarily funded by the German Federal Ministry for Economic Cooperation and Development (BMZ) and the US Agency for International Development (USAID), these projects are being implemented in a complementary way by various entities, the Côte d'Ivoire Ministry of the Environment and Liberian Forest Development Authority (with funding by Germany's Kreditanstalt für Wiederaufbau – KfW), Deutsche Gesellschaft für Internationale Zusammenarbeit (GIZ) and WCF. The Biodiversity Conservation Project is one of the three projects.

Key steps in the preparatory process

MAJOR STEPS	ACTIVITIES		RESULTS
Planning	<ul style="list-style-type: none"> • Analysis of institutional context • Selection of study areas • Identification of risks and opportunities of project 	→	Validation of work plan at national level and agreement on principle with populations for implementing the preparatory process
			↓
Information	<ul style="list-style-type: none"> • Stakeholder awareness raising • Socio-historical study • Dialogue on risks and opportunities • Identification of key criteria for implementing the ecological corridor 	→	Creation of two local coordination groups and agreement on principle with populations for implementing the preparatory process Validation at local and national levels of ecological, socio-economic, institutional criteria
			↓
Implementation	<ul style="list-style-type: none"> • Environmental studies <ul style="list-style-type: none"> • Environmental diagnosis • Selection of target species • Analysis of land use • Socio-economic studies <ul style="list-style-type: none"> • Identification of affected individuals • Land tenure analysis 	→	Validation at local and national levels of the options for the corridor and selection of status of corridor
			↓
Identification of solution and development of concept	<ul style="list-style-type: none"> • At village level: <ul style="list-style-type: none"> • participatory village diagnostics • At individual level: <ul style="list-style-type: none"> • options for compensating individuals • Complementary studies on human-fauna conflict resolution, financing, need for capacity development etc. 	→	Village consultations and validation at local and national levels of a range of solutions adapted to different situations
			↓
Final validation	<ul style="list-style-type: none"> • Environmental and social impact study • Village consultations 	→	Signature of agreements in principle at local level and approval by the National Steering Committee

This commitment can take the form of an individual or collective contract, depending on the status of land ownership. In addition, those on the periphery of the corridor who agree to follow agroforestry practices (for example a living hedge) and improve the forest cover could also benefit from these payments.

PROJECT STEERING

Several levels of participation have been jointly defined with the stakeholders. First, the Côte d'Ivoire Government has issued a ministerial decree establishing a National Steering Committee (NSC) which aims to be inclusive by virtue of the active participation of all the stakeholders in project decision-making. The NSC has representatives from the ministry departments, the Côte d'Ivoire Parks and Reserves Foundation and the Côte d'Ivoire Office of Parks and Reserves, regional and local government, national MPs, civil society representatives (NGOs and traditional local authorities) and technical and financial partners as observers.

Subsequently, two local co-ordination groups were established, one for each sub-prefecture involved, with effective involvement of the village heads and prefectorial authority to appoint members from all the communities (indigenous people, outsiders, youth, women). The rules of procedure are similar to those of the NSC but have a local basis. Entities which can assist with clarification and the orientation of the study have been admitted to these co-ordination groups as observers. This is the case for the project team providing the secretariat and the Côte d'Ivoire Office of Parks and Reserves, the local representation of the ministry of agriculture and the local representation of the ministry of forests. Besides the meetings organised by the project team, these village members relay information to their communities, and in the interests of transparency participate systematically in every stage of the process (activities, studies etc). In conflict resolution, it is also important to note the unconditional support of local authorities and of the NSC members, who can explain the current process and calm communities or individuals who are still reluctant.

THE ECOSYSTEM SERVICES OF THE TAÏ NATIONAL PARK

An assessment of the value of the Taï National Park in 2015 by the Côte d'Ivoire Parks and Reserves Foundation and the Côte d'Ivoire Office of Parks and Reserves showed that the Taï forest makes a positive contribution to the local climate, which, thanks to good rainfall, supports sufficient cash crop production for over 180,000 farmers, and whose bordering area alone contributes 40 per cent of national cocoa production, not to mention rubber or palm oil production.

FACTORS FOR SUCCESS AND IMPACT

Whatever the outcome of this preparatory process, communities have been able to share their concerns, and have highlighted: (i) the need to preserve the current social balance between communities and between growers and landowners, (ii) the need to be heard and respected in keeping agreements, and (iii) the need to be assisted with good management of compensation, or, to put it briefly, turning this biodiversity conservation project into a venture that takes human beings into account.

At the local level, people's participation in the decision-making process is a guarantee of success and an experience which is virtually unknown to these communities. At the end of this preparatory process, planned for the start of 2019, a project concept will be proposed for validation by the communities that is to take the form of a written statement of their support for the project, before validation at national level. According to the project team, respecting all the actors and ensuring transparent communication is the right way to enable the implementation and sustainable management of an ecological corridor.

Karim Ouattara is a researcher at Centre Suisse de Recherches Scientifiques (Swiss Scientific Research Centre) in Abidjan, Côte d'Ivoire and an expert assigned to the project.

Blandine Schaffner is an expert in charge of the preparatory process for AHT GROUP AG, based in Abidjan, Côte d'Ivoire.

Elisée Napari Yeo is the project's Focal Point at the Ministère de l'Environnement, de la Salubrité et du Développement Durable (Ministry of the Environment, Health and Sustainable Development) in Côte d'Ivoire.

Contact: schaffner@ah-group.com



Widow Achala Gora is worried about the future. Will she be able to keep her small patch of land, or is she going to lose it to investors? If she can't keep the field, she will have to go to one of the refugee camps and get her rations from the international community.

Photo: Jörg Böhling

VILLAGISATION – BETTER LIVING CONDITIONS FOR THE POPULATION OR A PRETEXT FOR LAND EVICTIONS?

With its extensive resettlement programme, the Ethiopian government is promising people improved access to government services. In reality, however, its policy is resulting in forced displacement, conflicts over scarce resources and ethnic tension. And ultimately to hunger, as the example of the west Ethiopian region of Gambela shows.

By Klaus Sieg

When smallholder Mark Ojulu wants to work in his field of maize, he faces nearly an hour's walk to get there. Just like his village neighbours. Since they were resettled by the Ethiopian government six years ago, they have had to cover long distances to get to their fields. And they are not the only ones in this situation in the Ethiopian region of Gambela. According to estimates by human rights organisations, between 50,000 and 70,000 smallholders living in widely scattered communities in the swampy bushland bordering on South Sudan had to abandon their ancestral holdings in order to live in compact villages in future.

ONLY FEW PROMISES KEPT

Villagisation is the name of the programme. It is meant to provide people with more education and healthcare, roads, granaries and better

protection. That's what the government says in the capital. Critics maintain that the programme is being used to clear the land for international investors. "The promises they gave us haven't been kept," says Mark Ojulu, passing the first clay huts of his village on the way back from the field. People still lack a granary that would spare them the tedious task of grinding grain by hand. And they can only visit a doctor in the next small town that they are separated from by several miles of dusty dirt track.

At least Mark Ojulu is still managing the family's cropland. But for how long? Officially, all the land belongs to the government. There are no tenancy agreements or other securities for the smallholders. "We would be screwed without the land," says Ojulu. Around twelve people live on the yield of the little maize field, which is hardly more than half the size of a football pitch. Apart from his small son,

his wife and her mother, several relatives and some needy neighbours depend on the field.

Ojulu's fears appear to be justified. In the course of villagisation, many smallholders in Gambela have already lost their cropland and pastures. The international organisation Human Rights Watch speaks of eviction and even forced displacement – despite all protestations to the contrary by the government in Addis Ababa.

"Nearly all the resettled village inhabitants come from areas in which the land was allocated to investors," says a staff member of a local non-governmental organisation that is involved in rural development programmes in the region. The organisation wishes to remain anonymous – just like smallholder Mark Ojulu and the other actors in this article. Critics quickly end up in prison in Ethiopia.

TAX REVENUE FOR THE GOVERNMENT

But what makes this region so attractive for agricultural investors? Gambela's lowlands are crossed by several tributaries of the Blue Nile. These rivers wash up fertile sediments. However, the agricultural corporations are not only lured by the good soils. Since international corporations, business people and finance funds discovered farmland as a means of investment, the Ethiopian government has been allocating it with revenue that makes the coffers ring, with investors paying just a handful of dollars per hectare and year. So far, this has attracted around 50 of them to the East African country, from Turkey, China, India or Pakistan. According to a report published by the UK's Financial Times, the Central Government has leased an area almost the size of Belgium so far. Over the next few years, it seeks to allocate a similar amount of land, much of which lies in Gambela.

According to the proponents, this is the only way to modernise agriculture and the infrastructure. "The elite is getting rich with land allocation at the expense of the little people and is robbing them of their livelihoods," the NGO staff member complains. "Some of these investors don't even cultivate the land. They just cut down the trees, make charcoal and disappear."

Engaging in industrial agriculture in this very remote region is a challenge. There are hardly any asphalt roads for heavy plant or lorries to carry the harvest. Also, it is difficult for investors to find qualified staff for their farms. Moreover, Gambela has extreme weather patterns, and heat and drought alternate with torrential rains and floods. For instance, large portions of the land owned by Indian investors Karuturi Global have been literally submerged. The world's largest producer of cut flowers and self-proclaimed King of Roses intended to grow rice and grain in Gambela. Now many thousand hectares lie fallow. The government wants to withdraw the concession it awarded to this corporation.

But the smallholders have lost their land. They have had to retreat to areas lying far away, with poor soil, little water and scant pasture grass. Quite a few of them now depend on the United Nations World Food Programme.

THE WFP AS A LIFELINE

For years, the United Nations has been supporting war and civil war refugees from South

Poor roads in the remote region of Gambela are a challenge for heavy harvesting machinery or lorries carrying the harvest.

Photo: Jörg Böhling



Sudan. First, these people fled from Sudan to get away from the wars of independence against the North. Since 2013, they have been seeking refuge from the murderous civil war that is raging in what is now an independent South Sudan. Nearly 300,000 South Sudanese are living in Gambela, most of them in camps. Almost daily, there are new arrivals of people who have crossed the hardly secured frontier.

While state-of-the-art machinery is at work in the surrounding fields harvesting rice for exports, the refugees from South Sudan have to rely on the UN World Food Programme supplies. And so do other people. The same ethnic groups, the Annuak and the Nuer, live on both sides of the border. Locals also succeed in being registered as refugees. Empty grain sacks bearing the World Food Programme logo or USAID tins containing edible oil made out of peanuts are a frequent sight in the villages. Thus the United Nations is also sparing those people from hunger who were driven out in the course of land allocation to the large-scale investors.

THE SAUDI STAR 0.5 MILLION HECTARE PROJECT

Mark Ojulu is not yet one of them, despite the activities of Saudi Star, one of the really big investors, close to his village. This corporation, which belongs to Saudi magnate Mo-

ammed al-Amoudi, has just acquired a 4,000 hectare farm that goes back to the period of military dictatorship. In the 1980s, supported by the Soviet Union, the Derg regime started a number of large-scale farms. To Saudi Star, this farm stemming from socialist days is just an extension of its venture. As early as 2009, the corporation was cultivating rice in an area of around 10,000 hectares in the region. In the long term, the cultivated area is to grow to a size of half a million hectares. Already, the fields seem to stretch to the horizon. The Financial Times report says that the harvests of the past seasons were way below what had been reckoned with, the reason for this being too little rain.

In the future, Saudi Star wants to trim its cropland and artificially irrigate it to raise yields. In addition, construction is in progress of a 21-kilometre-long irrigation canal that is to be fed by a reservoir built in the Derg days. The 100-million-dollar project is to be completed already this year. It is hoped that this venture will ensure rich harvests. The prices will ultimately decide whether crops are for exports or for the national market.

However, it is smallholders like Mark Ojulu who supply the Ethiopian population with food. The major share of them work to feed their own families. A mere five per cent of the food consumed in Ethiopia comes from the large-scale farms.



Around twelve people live on the yield that farmer Mark Ojulu harvests from his little maize field.

Photo: Jörg Böhling

REFUGEE CRISIS CREATING TENSION

Mark Ojulu's neighbour Achala Gora fled from South Sudan with her four children four years ago. "We ran off head-over-heels as the skirmishes between the army and the rebels got closer and closer," the 35-year-old woman explains, leaning against the wall of her house and looking across the small yard. For days, the family fled on foot across the war-torn land until they finally reached Ethiopia. Achala Gora did not want to go to a refugee camp. Conditions are cramped there. People live in tents or huts made of tarpaulins. They are stressed and lack any prospects. Rows, violence, vandalism and theft are the order of the day. "And there are no possibilities to keep livestock or chickens, grow crops or create a livelihood," Achala Gora says.

Here in the village, she has relatives who have provided her with a small house, and she recently received a small patch of land from the village community to grow maize, sorghum and vegetables. The locals and the refugees in the village are members of the Annuak. Family ties across the frontier are frequent, and a culture of sharing is maintained. Nevertheless, the tens of thousands of people who have fled across the border with little more than the clothes they were wearing are a considerable strain, and tension and disputes often develop

over cropland or pastures and waterholes for the livestock. Young men in particular have brushes with each other.

NO SECURITY

Suddenly, one of the village elders appears in the dusk. Armed men were sighted, he reports. They could again be Murle, from South Sudan. Only forest and bushland is left between the village and the border with South Sudan. Two years ago, gangs probably belonging to this ethnic group came across the border and stole both livestock and a large group of children. They killed more than 180 people. In this village, too, some families are mourning the deaths of their children. "Nobody protects us from the violence of these gangs," says one of the orphaned fathers, shouldering his rifle. He shows us the scar of a gunshot wound he got in the raid last year. Together with two other armed villagers, he sets off to comb the surrounding district for intruders. More security was promised for the people when the village was centralised. But a small troop of soldiers only get there after several hours.

Klaus Sieg is a freelance journalist based in Hamburg, Germany.
Contact: klaus@siegtext.de

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Editorial staff:
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Ines Lechner, i.lechner@dlg.org
Angelika Wilcke, a.wilcke@dlg.org

Editorial assistance:
Michael Gardner

Translated by:
Christopher Hay
Tazir International Services

Cover photo:
Jörg Böhling

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Andrea Trapani, DLG-Verlag

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