

FARMING MATTERS

Formerly known as LEISA Magazine



Agroecology: a path towards the Sustainable Development Goals

A new issue of Farming Matters

Dear readers,

It is our pleasure to present to you this **Special Edition** of Farming Matters! This issue offers a selection of time tested and cutting edge experiences of agro-ecological approaches for achieving the SDGs. Some of the articles are *best picks* selected from earlier editions of our magazines, others are new.

This special issue of Farming Matters is published on the occasion of FAO's II International Symposium on Agroecology, in April 2018. It builds on the magazine that many of you are familiar with. In June 2017 the ILEIA team published its final issue of Farming Matters. Since then ILEIA handed over the Farming Matters legacy to its colleagues in the AgriCultures Network.

During the past six months the AgriCultures Network started a renewal process of Farming Matters and her sister magazines in Brazil (Agriculturas, in Portuguese), Latin America (LEISA, in Spanish),

India (LEISA India, in English), Ethiopia (Wegel, in Amharic), and West Africa (AGRIDAPE, in French). This issue is the result of a collaboration of all the partners, produced together with IFOAM - Organics International.

We would like to use this opportunity to welcome you to our renewed digital magazine platform where you can read and download the latest versions of Farming Matters (www.farmingmatters.org) and all our regional magazines (www.agriculturesnetwork.org).

Happy reading!

Sincerely,

The AgriCultures Network: Bara Gueye (Senegal), Paulo Petersen (Brazil), KVS Prasad (India), Teobaldo Pinzas (Peru), Solomon Kebede (Ethiopia), Edith van Walsum (the Netherlands).

In Memoriam: Sue Edwards

We were deeply saddened to learn about the passing of Sue Edwards in February 2018. We knew her as one of the most open, generous, loyal, creative, hardworking and loving advocates of agroecology.

Sue experimented with agroecological methods and worked with thousands of farmers to spread them in Ethiopia, proving that agroecology works better than high input agriculture. She brought the push and pull technology and also the System of Rice Intensification to Ethiopia, both of which are groundbreaking agroecological practices as highlighted in this issue of Farming Matters. Sue started an agroecology learning institution in her library which has become famous all over Africa. Sue was an important bridge builder and a fierce fighter for the rights of women and youth. She is one of five persons that received the Organic One World Lifetime Achievement Award. Sue continues to inspire us and others in the movement for agroecology.

Million Belay, on behalf of the AgriCultures Network
Markus Arbenz, on behalf of IFOAM Organics International



Photo: Gaia Foundation



Reviving our valuable heritage

My name is Nereida Sánchez. My father grows organic vegetables for the local markets around Guadalajara, Mexico. My family had always saved seeds from some varieties that they could not find on the market, but they used to buy most of their seeds because it is much cheaper than to produce them. It takes a lot of time and care to select, produce and store good quality seed.

The problem is that there are only a couple of varieties of each crop available for purchase. This has led to the loss of so much generic diversity on our farms over the last 50 years. For example, while my grandfather clearly remembers a local variety of white carrots, my father sort of does, but I had never seen them. With the loss of these varieties, we are also losing culinary traditions. In Jalisco there used to be a traditional dish called *coaxala* made from very small cherry tomatoes called *jaltomate*. But *jaltomate* has been lost, and so has the traditional dish.

In an effort not to lose our valuable heritage, in 2010, we started collecting and producing seed on our family farm. Our mission is to recover these traditional varieties and bring them back into

The Sánchez family (Nereida sitting in the front).

the farming system in Mexico. We have become one of the few producers of seeds of traditional horticulture varieties in the country.

Now, eight years later we have a vast collection of seeds, including more than 60 varieties of lettuce, as well as flowers and aromatic plants. Each year we hold a seeds festival where people from all over the country gather together to share varieties, and knowledge about the importance of biodiversity. This festival has had far reaching impacts, including forging collaboration with school gardens so that children start to know and grow local, traditional varieties again, including white carrots. We are also involved in a participatory guarantee system that goes above and beyond the criteria for organic production and includes political and social factors.

Now that we are recovering our traditional varieties, the next step is to recover the associated traditional knowledge about breeding, because we know it will make our cropping systems even stronger.

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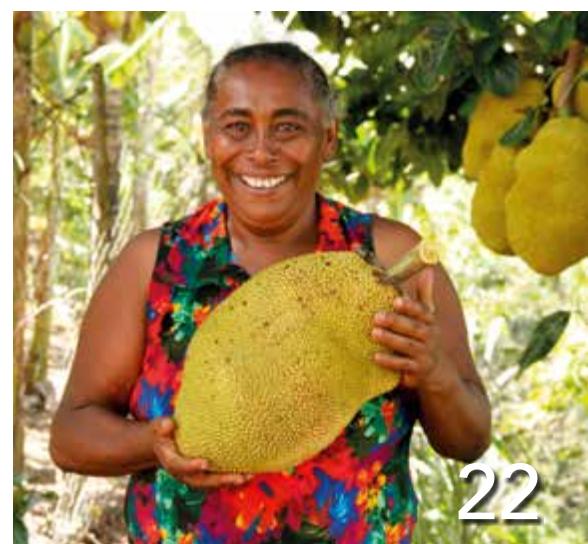
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Scaling up agroecology to achieve the SDGs: A political matter

Agroecology-based food systems have an enormous potential to contribute to the achievement of the Sustainable Development Goals. The crucial question is: if agroecology already proved it can address social and environmental challenges, why do successful initiatives often remain confined to the local level? With enabling political-institutional conditions, agroecology can scale up and scale out, and guide us on promising pathways towards achieving the SDGs.

Paulo Petersen and Markus Arbenz

Thousands of isolated experiences in agroecology and organic agriculture around the world demonstrate that it can produce enough healthy food, safeguard soil, water and biodiversity, reduce greenhouse gas emissions, and build resilient, just communities and economies. These same experiences behold important clues about key institutional and technical principles for spreading agroecology from the bottom up, and about obstacles that impede their social and geographical spread. Drawing from emblematic experiences from all continents, this issue of *Farming Matters* makes the case for new governance mechanisms and public policies that can enable agroecology to fulfil its potential of addressing today's multifaceted crises.

The formalisation by the United Nations in 2015 of the *2030 Agenda for Sustainable Development – Transforming Our World* placed on the agenda of the international community a comprehensive set of *Sustainable Development Goals* (SDGs). The SDGs can be a

useful benchmark for guiding strategies to address today's global systemic crisis. Agroecology offers a promising pathway towards achieving the SDGs, but only if we face the world's crisis at its roots.

Agriculture and the environment

Since 2008, there has been a notable increase in global instability, characterised by intensified economic, political, social, environmental and climate upheaval. As we are witnessing a convergence of environmental and social crises, there is no longer any doubt that we are experiencing a unique crisis, structural in kind. Structural crises demand structural solutions. Transformations of great magnitude and complexity are therefore needed.

It is becoming increasingly clear that agriculture and food production have emerged as the main driving force behind the planet's environmental degradation, while at the same time, it is the economic sector that is most affected by these biophysical transformations. Adequate ecological conditions for agri-



Young farmers learning how to make compost. Photo: AFSA

culture (fertile soils, biodiversity, clean water, a stable climate) are seriously deteriorating due to the form in which foods are currently produced, processed, distributed and consumed. Resolving this paradox is urgent.

The agroecological pathway

The 2008 International Assessment of Agricultural Knowledge, Science and Technology for Development (IAASTD) concluded that in order for agriculture to turn from a problem into a solution, it is necessary to shift from the current, prevailing productivist mindset towards an approach that considers the complexity of farming systems within their socio-environmental contexts. In 2010, Olivier De Schutter, then United Nations Special Rapporteur on the Right to Food, pointed to agroecology as the appropriate approach to guide the transformations needed in agri-food systems. Other academic and 'grey' studies followed, drawing similar conclusions (a selection can be found on pages 44-45).

According to the International Panel of Experts on Sustainable Food Systems (IPES-Food), instead of the uniformity imposed by globalised markets, agroecology promotes diversity (from cultivated plot to plate, from the local to the global), which enables citizens to regain autonomy over the flows that link production to consumption at local or territorial levels. Nonetheless, recent global institutional arrangements facilitate the dominance of transnational corporations,

The SDGs and international trade

Possibly the biggest challenge to achieving all 17 SDGs is to overcome the major contradictions between international treaties relating to the environment on the one hand, and to economic and trade-related issues on the other.

These contradictions will not be overcome through the same responses to economic crises of the past, that is, by deepening the exploitation of people and nature through the promotion of new technologies, and new forms of organising power and commodity production. Market-driven development mechanisms merely serve to strengthen an economic system that functions as though nature were an endless source of resources and an infinite waste sink. This reality is particularly notable in the agri-food sector, the economic sector that most closely connects society to nature. Today, an ever-shrinking number of transnational corporations imposes, in the name of economic freedom, the increasing standardisation of production and consumption, eroding the sovereignty of local peoples and communities over their livelihoods and ways of life. New international arrangements are needed in which ecological and economic objectives are reconciled.



Women like Nereida Sánchez are often at the centre of new initiatives in agroecology, mobilising their knowledge, skills and agency. Photo: Sanchez family, Mexico

homogenisation of the global food system, and systemic institutional obstacles to the scaling up of agroecology, such as land grabbing (page 26). There is also a scientific and political push towards reiterating and deepening the scientific-technological legacy of the Green Revolution (see box), now presented in new rhetorical guises as 'climate-smart agriculture' and 'sustainable intensification'.

The forces driving agroecology and alternative food networks

People are engaging in agroecology across all regions of the world, often in response to the overwhelming dominance of huge transnational conglomerates in agriculture. For example, Mexican family farmers are saving and producing seed of traditional varieties because the seed market has created a genetic bottleneck (page 3). In a completely different context, in the Netherlands, family farmers organise in territorial co-

operatives and around soil enhancing practices to counter regulations that are in favour of large, industrial farms (page 34).

Other initiatives have developed as a response to situations of rural poverty and/or food insecurity. For example, in India, new practices of rice production have emerged because of a need for higher yields with less water, seeds, agrochemicals and labour (page 30) and in Argentina, the economic crisis of 2002 drove the citizens of Rosario to transform abandoned lots in the city into a gardens that provide fresh, affordable vegetables (page 40). Million Belay, coordinator of the Alliance for Food Sovereignty in Africa describes how agroecology can address rural and urban poverty in Africa (page 18).

Whatever their starting point, trajectories of agroecological innovation can be considered as localised expressions of a struggle for autonomy in the face of suffocating socio-political realities. By developing new forms of producing, processing, distributing and consuming foods, and developing innovative institutional arrangements based on new values and social relationships, many agroecological initiatives contribute to the relocation of agri-food systems and the re-appropriation of increasing portions of the political power and the economic value usurped by food empires. The spreading of Community Supported Agriculture and new peasant markets over the last decade is one testament to this promising trend (page 10).

New networks of agroecological innovation are emerging that facilitate crucial dialogue between experiences and knowledges and through this, fostering economic and political emancipation. Furthermore, it has become evident that women are often at the

Contradictions of the failed agri-food regime

Celebrated as one of the biggest examples of the ingenuity of science and technology because of its supposed capacity to definitively rid the human species hunger and malnutrition, industrial agriculture not only proved to be incapable of creating the conditions for this goal to be achieved, it is also responsible for engendering new, growing contradictions related to health and wealth. While one in seven people in the world struggle every day to have something to eat, another one in seven suffer the effects of obesity, heart disease, diabetes and cancer – diseases that are spreading like epidemics and that are a result of nutritionally imbalanced diets full of chemical additives.

This contradictory asymmetry is emblematic of a food production and supply system that treats food as just any other commodity. This system spread

worldwide in particular from the 1990s under the impetus of neoliberal globalisation. Monocultures that are structurally dependent on fossil fuels and the intensive use of pesticides have spread at the cost of biocultural diversity. To add to the contradictions, large areas have been reserved for environmental preservation in the name of conserving biodiversity and reducing greenhouse gas emissions, thereby expropriating the territorial rights of peasant communities who historically acted as custodians of natural resources and as producers of healthy foods. The combined effect of these patterns of occupying agrarian spaces is unequivocal: a concentration of wealth and the means of production; unprecedented environmental degradation; worsening levels of public health; out-of-control urbanisation; and increased vulnerability of agriculture to climatic and market variations.



New peasant markets for agroecology have been emerging over the last decade, such as this one in Brazil.

Photo: Margriet Goris

centre of these initiatives, promoting social transformation through the mobilisation of their valuable knowledge, skills and agency. For example, in Brazil, a network of female farmer innovators have linked experiments in agroecology with reflections about gender inequalities, and through this has changed the lives of hundreds of women (page 22).

In isolation, these emergent experiences may appear irrelevant or ineffective. But combined they reveal the powerful force of agroecology. Lifting these experiences out of their invisibility and isolation is thus one of today's major challenges, as agroecology is finally beginning to gain official recognition.

A new generation of public policies

Under the motto 'locally rooted, globally connected,' since the 1980s the AgriCultures Network (www.agriculturesnetwork.org) has identified, systemised and disseminated lessons related to agroecology initiatives around the world (page 46). All these decades of documentation reveal that agroecology starts and grows mainly in the convergence of (and dispute between) economic and socio-political interests in specific territories. This means that the spread of agroecology cannot occur through technocratic interventions that are conceived outside of the local socio-environmental and cultural context.

A new generation of public policies is needed that recognises and strengthens the role of local institutions, especially organisations of family farmers, in regulating agri-food systems and territorial development. (See IFOAM Organics International's policy toolkit on page 45) Such new policies, that can only be adopted and implemented in a democratic institutional environment, must enable farmers and other dwellers to act in networks to create and develop local alternatives based on agroecological principles. In one example, the city of New York has developed an innovative arrangement with upstream farmers who now protect the source of clean, safe water for people living in the mega metropolis (page 14). Elizabeth Mpofu, general coordinator of La

Vía Campesina, describes the type of institutional and policy framework that would facilitate sustainable development through agroecology (page 33).

Towards the SDGs

Trajectories of agroecological innovation are oriented towards valuing, re-organising and enhancing local resources, whether material or social, providing combined responses to the varied interests and strategic objectives defined and negotiated in local networks. At the territorial level, these trajectories are developing the multifunctional potential of agriculture by simultaneously achieving economic, social, environmental, cultural and political objectives. In fact, the global movement of organic agriculture has its origin in agroecological principles; together the agroecology and organic farming movements can make decisive contributions to achieving the SDGs (page 21).

This special edition of *Farming Matters*, prepared on the occasion of the second International Symposium on Agroecology, organised by the FAO in April 2018, brings together a small selection of articles recently published in the various regional and global magazines of the AgriCultures Network. The selected articles present systematised experiences on different continents where agroecology is being put into practice at significant social scales. Through the examples published here, we seek to demonstrate the effectiveness of these initiatives for contributing to the 2030 Agenda for Sustainable Development and for achieving the SDGs. We argue that agroecology has huge potential, especially when policies and institutional arrangements work towards scaling it up socially and geographically, to help humankind to take a more promising path towards the future now looming before it.

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Community, supported agroecology thriving in China



In only a decade, Community Supported Agriculture has become increasingly popular among urban consumers in China. Using agroecological approaches in an alternative food production and distribution model, it is providing safe and healthy food to the cities and helping to repopulate the countryside.

Judith Hitchman

Feeding the world's growing cities has become ever harder over the past 50 years. Migrants from the countryside used to have supplies sent from their families, or could buy from local farmers at street corner markets. But much of this has disappeared, replaced by industrialised agriculture and supermarkets. This shift, and the burning need to tackle climate change, makes it imperative that we further develop alternative food systems that support sustainable, local production of safe, healthy food that is available to all. This is the context in which Community Supported Agriculture (CSA) has emerged around the world: an alternative, locally based economic model of agriculture and food distribution, in which consumers pledge to support one or more local farms, and share the risks and benefits of food production (see box).

Chinese consumers, particularly the new middle class, are hungry not only for new foods, but also for new food systems. In the wake of various large-scale food scandals, food safety is a major concern for both the government and consumers. Compounded by pollution, pesticides and chemical fertilizers, trust in in-

dustrial farming has been undermined. Many people are buying food labelled organic, and over the last ten years, an increasing number of people have joined CSA groups that use agroecological approaches. While relatively new in China, there are already around 800 CSAs, with a membership of about 100,000 consumers. There are approximately 50 CSAs in the Beijing area only. The citizens and farmers involved in these initiatives have created a national network to share knowledge and other resources, and are also part of Urgenci, the global CSA network.

Building China's first CSA In 2008, Shi Yan, a soft-spoken but determined graduate from Renmin University, Beijing, helped to set up one of China's first CSA farms called 'Little Donkey' (www.littledonkeyfarm.com). It was a joint initiative between her university, the district government, and the Renmin Rural Reconstruction Centre. Shi Yan became the chief operator. She was inspired by her experience working with Earth-rise Farm, a small CSA in Minnesota, USA in 2008. Soon after she arrived back in China she moved to the northwest corner of Beijing's Haidian district to manage the Little Donkey

What is Community Supported Agriculture?

The CSA model was born in Japan, where, in the 1970s, as a result of mercury contamination (the famous Minimata disaster), a group of Japanese housewives started sourcing their food directly from organic farmers. This was known as Teikei, and the network is still flourishing in Japan today. The movement went global, with Urgenci, a network of national networks, now bringing well over a million producers and consumers together. There are also many thousands of groups that are not part of networks, especially in the USA. A key characteristic of all CSAs is that the members commit to buying from producers on a regular basis and, at least for a whole growing

season. This means that they share both the risks and benefits from the growing season. Payment is usually made in advance, but can vary, to allow even people in difficult situations to participate.

Distribution models vary between countries, and from one CSA to another. In some cases, boxes are prepared on the farm, with a number of collection points in the city. In other cases, consumers assist with planting, tending, harvesting, packing or distribution. There is a lot of good humour and exchange in all CSAs, and this is where community spirit is built. Many CSAs also have special festivals and newsletters to keep their consumers informed.



Shi Yan and her husband Cheng on Shared Harvest farm. Photo: Judith Hitchman

farm, going against the trend of young people abandoning rural villages for jobs in the city.

That wasn't the only trend bucked by Little Donkey. Chinese farmers are among the world's biggest users of chemical inputs, but cultivation at Little Donkey is chemical free. Although not certified organic through any third party (because of the high certification costs), Shi Yan, like many Chinese CSA farms, uses a Participatory Guarantee System, a peer-to-peer certification system. She builds soil health with traditional knowledge and techniques, permaculture, and agro-ecological 'natural farming' principles of the famous South Korean farmer Han Kyu.

Little Donkey has 'working share' and 'regular share' members. Those with a working share rent 30 m² and are provided with inputs such as seeds and organic fertilizers, tools and technical assistance to grow their own vegetables. Members with a regular share sign up for a weekly supply of seasonal produce, which they can either pick up or have delivered to their door. Most payments are made online. Little Donkey currently has around 700 members, most of them residents of Beijing city. The farm is also used for training and research and is a hub for community activities, field visits and demonstrations of ecological farming.

Some years ago, Shi Yan moved on from Little Donkey and now has another farm, Shared Harvest, with her family in law, on land they rent from the village authorities. They employ 25 young people who studied agriculture at university. Shared Harvest members include 500 families, four groups of parents from local schools, and organic clubs and restaurants in Beijing. They also host the 'Earth School', where children learn about ecological farming and the environment, how food is grown and what it looks like. In November 2015 the national CSA network of over 500 groups held their annual conference in the area, and visited Shared Harvest. They founded and promote a

seed-saving network, since part of the difficulty of CSAs in China is access to healthy locally adapted organic seeds.

Returning to the land

Since 2008, more CSAs have popped up in China. What makes them so popular? Besides consumers finding that CSA offers the alternative food system they are seeking, another big reason is that it creates an opportunity for young, qualified graduates who moved to the city to study, disillusioned by the bright lights, to return to their villages. Caring for elderly family members is an additional reason for many young Chinese to choose to return to their roots, as grandparents are often left alone when children and grandchildren all work in the cities. These 'new farmers' lead many of China's CSAs, often even leaving behind stable employment and a good salary in the cities to do so.

New farmers can usually rent additional land, either from other families or from the local authorities. In fact, with a shortage of people to work the land in the villages, CSA has been welcomed with open arms. Protected peri-urban land dedicated to agriculture is common across China, and supports the spread of CSA. It provides access to fresh organic food and a viable model for new farmers to return to the land. In addition, many new CSAs in China are diversifying their activities, such as through a farm restaurant, and some are supplying kindergartens with food.

In addition to feeding the local community, many CSAs near Beijing sell their surplus at the Beijing Farmers' market, one of a dozen across China operating together with CSAs. The legal situation of the farmers' markets is uncertain. Theoretically, markets require a permit, but in practice, farmers are allowed to sell their produce freely.

What does the future hold?

It is impossible to know how CSA will evolve in China, but the government is looking closely at the model as a supplier of safe and healthy food to the cities. The number of CSAs grows every year, proving that this food system, involving farmers, consumers and local authorities, is popular. Individuals such as Shi Yan have done much to show the power of Community Supported Agriculture.

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This is an updated version of an article published in Farming Matters, June 2015

New markets for peasant agroecology in China

China has the largest agricultural system in the world in terms of farm output and it includes a little more than 200 million smallholdings, representing at least 800 million people. On just 10% of all cultivated land in the world, these smallholders produce 20% of the world's total food supply. The average farm has only five *mu* of agricultural land, about one third of a hectare. However, China is self-sufficient insofar as the nutritional needs of its huge population are concerned.

The national Hukou household registration system provides Chinese not only with a right to education and medical care which is tied to their place of origin, but also gives rural people the right to access land. Having access to land is an important part of rural livelihoods and also represents a strategic fallback option for those who migrated (temporarily) to the cities. Hukou also shapes rural-urban migration flows which, in China, are circular. Many young people leave the villages in order to work in urban industries. After marriage and having their first child, women generally return to the village, while most men return permanently only years later to invest their savings in the farm. Many social struggles in the countryside rest on this right to land embedded in Hukou, and it enabled a number of peasants to start their own community supported agriculture initiatives.

Over the last four decades total food production and productivity in China grew more than in any other country. This was a result of the use of granaries, barter, and multiple cropping, as well as a massive and richly chequered provisioning of food from farmers to cities through a widespread network of interconnected food markets. The Xin Fa Di market in Beijing is one example where thousands of suppliers and buyers come together every day to provide Beijing residents with 30,000 tonnes of fruit and vegetables.

Ye, Rao and Wu (2010) refer to several new types of markets for peasant produce:

- the market for organic produce, that currently embraces more than 500 different products, mostly for export; the export value is about US \$ 400 million;
- the market for 'Green Food' (produced with low external inputs) that channels certified food within China, with total market sales currently equaling € 19 billion a year;

- the market for eco-agriculture that strongly builds on ancient agroecological traditions, mainly oriented at national consumption;
- the markets associated with 'One Village, One Product', centred mostly on typical regional or local products, e.g. high quality tofu or hand picked organic apples;
- the markets for agro-tourism, serving hundreds of millions of tourists and generating an income of some € 5 billion each year.
- new, small markets that may function as channels between urban consumers groups and rural producer groups, in the form of an internet hubs, urban peasant markets, or self-harvest arrangements at farms on the fringes of big cities.

Thus, a rich gamma of new markets for peasant agroecology is emerging. At the same time, markets remain contested. Especially in the crowded centres of the metropoles markets are regularly dismantled. The overall balance, however, is that China has far more market places than Western countries that claim to be 'market-oriented'.

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CSA members harvesting carrots on Little Donkey farm.
Photo: Jan Douwe van der Ploeg





Farmers ensure safe water for New York City

New York City's water is kept safe and clean by an innovative cooperation with farmers who have become guardians of the city's watershed. This experience demonstrates how farmers can increase their productivity while protecting the environment and benefiting a grand metropolis through inclusive institutional arrangements.

Daniel Moss

New York City's public water supplier has preserved a pristine water supply for its nine million customers. At the heart of how they produce 'the champagne of public water' – is a story of urban–rural collaboration. Farmers in the Catskill mountains, over 100 miles northwest from the giant metropolis, have become watershed guardians, keeping the water clean while producing food and working hand-in-hand with their thirsty urban neighbours. How did this unusual partnership develop?

Clean water under pressure What sets this case apart is that more often than not, the relationship between cities and farmers is an unhappy colonial one. Beginning in the 1830s, with the urban population exploding, New York City leaders looked for rural environments that could provide pure, affordable water. They created a series of reservoirs and built an engineering marvel – a concrete pipe a Volkswagen can drive through, surging with millions of gallons of water per second by gravity alone. This water system became the envy of cities throughout the world that struggled with dirty, scarce water and water-borne diseases like cholera.

However, by the 20th century, the sources were no longer so pristine. Upstream Catskill farmers began industrialising their farm operations. Nutrient use increased, dairy herds concentrated, erosion accelerated, and this led to pathogens showing up in New York City's water supply. At the same time, substandard sanitation systems spilled sewage, suburbs sprawled and city dwellers built second homes in the watershed, buying and developing forested lots that had previously served as crucial natural filters when owned by farmers.

By the end of the 1980s, public health specialists and the US Environmental Protection Agency (EPA) determined that the city would need to increase treatment of its drinking water and regulators began to apply pressure. The costs for new treatment facilities were estimated to be over \$US 4 billion to construct them and \$US 200 million annually to operate them, which

would double the cost of water in New York City. The impacts on low-income families would be harsh.

From 'grey' to 'green' infrastructure A management transition can be an opportune moment to initiate change. When, in early 1990, Al Appleton became the Commissioner of the New York City Department of Environmental Protection and the Director of the New York City Water and Sewer system, he stood at an interesting crossroads. He could deliver the bad news to an economically-strapped city administration that new 'grey' infrastructure was needed to treat the water. Or he could propose a greener alternative – restoring the ecosystems to their natural filtration capability.

Convinced that a good environment will produce good water and that it made little sense to allow Catskill drinking water purity to further deteriorate, they decided to:

1. identify pollution points;
2. convince politicians, regulators and engineers that less expensive 'green' infrastructure is a smart and profitable investment for New York City and;
3. enforce existing environmental regulations.

Pure Catskills farmers at a farmers' market.

Photo: Andy Ryan





The Ashokan water reservoir. Photo: Mike Groll.

From regulation to cooperation

Field researchers discovered that a primary source of pollution was cattle excrement flowing freely into creeks. Without consultation, the city sanctioned the local farmers and rural landowners, who, in turn, felt their livelihoods were undermined. In a series of community meetings, Appleton and his team took a pummeling and listened. They found out that the farmers were struggling to remain afloat, and that they considered water quality regulation to be top-down imposition by urbanites who don't understand the rural economy. His team returned to the drawing board.

The New York State Department of Agriculture then proposed a process of co-design with farmers in the watershed. The city's interest was affordable, clean water. The farmers' interests were sustainable, rural-based livelihoods. The task was to find common ground. "If you don't want the city on your back," Appleton said to the farmers, "design a programme that meets both your needs and ours. We don't want to run a regulatory agency; we want clean water. If your proposals can achieve that, we'll embrace it." It took 18 months of often tense negotiation between the city and the Catskill farming community but, in the end an innovative and far-reaching agreement was crafted.

With the city's support, the Catskill farmers formed the Watershed Agricultural Council and created a programme called 'Whole Farm Planning'. Rather than a *one size fits all* approach mandating specific practices, unique pollution control and forest management plans were developed for each participating farm, with technical support from experts of agencies such as the Department of Agriculture and Department of Forestry. Importantly, these plans often lightened labor-intensive tasks like shoveling cow manure, and therefore helped the farm become more profitable. Pollution mitigation measures that prevented cow feces from running off into streams would be 100 % paid for by the New York City water authority – largely through urban consumers' water bills which had been increasing an average of 14% per year during the decade prior to the pro-

gramme's start. In the 10 years after program implementation, rate increases were under the rate of inflation. The ecosystems services approach not only yielded better environmental results than traditional grey technologies but did so more cheaply.

Hurdles and achievements

There were still significant hurdles to jump. The farm community insisted that farmer participation be voluntary – a tough pill for the City to swallow. The final agreement was that no individual farmer would be required to participate, but the Watershed Agricultural Council would guarantee that 85 % of all watershed farmers joined within the first five years. If they failed, participation would become mandatory or penalties would be levied. A further sticking point was whether the farmers would be subject to regulatory enforcement related to water quality. The City agreed that farmers participating in the new programme would be exempt, barring flagrant and excessive violations of the regulations.

After five years the results were spectacular:

- 93 % of all Catskill farmers enrolled
- 75 to 80 % reduction in farm pollution
- Restoration of the pristine quality of the city's drinking water without spending billions on advanced water treatment. Generation of clean water at an affordable price.

Additionally, the fact that watershed conservation would be folded into consumers' bills created a sustainable pool of conservation financing, far more stable than many of today's popular NGO-led watershed funds. The programme helped shore up urbanites' support for additional watershed protection strategies, such as restoration of stream corridors, conservation agreements (easements) with private landowners and purchase and stewardship of city and state-owned lands. Some of these forests and reservoirs have been opened to recreational use. Over time, the Watershed Agricultural Council launched a line of farm products under the label Pure Catskills, including grass-fed beef, vegetables and timber, bringing urban consumers closer to rural growers. All products must be grown in ways consistent with a healthy watershed.

Success factors

While the New York programme offers both payments and tax incentives to farmers, the real practical and philosophical innovation in New York was not turning farmers into conservationists but rather helping them do what they know and do best – grow food and fibre. While environmental sustainability was required to meet New York's water quality needs, the measures did not undercut the farms' profitability.

The programme is not a temporary fix. Support to upstate farmers, via the Watershed Agricultural Council is a core item in the New York City water system's annual budget. According to Al Appleton, the programme facilitates "a righteous cycle of mutually supportive economic and ecological investments between urban and rural areas, leading to a more sustainable future for both."

Beyond New York City The programme has had other ripple effects. In 2014, New York State banned fracking in the watershed, due in no small part to vocal urban water consumers protecting their water supply. It catalysed interest in non-traditional conservation strategies by the US water industry, including investments in 'green' rather than, or in addition to, 'grey' built infrastructure, for example Denver's Forests to Faucets partnership between Denver Water and the U.S. Forest Service. On a broader scale, the Catskill arrangement has inspired similar programmes throughout the world – from Xalapa, Mexico to Cebu, Phillipines as a model for compensation for ecosystem services, which have become wildly in vogue.

Ironically, a core feature of New York's success, combining food production with conservation, is often lost in the design of other programmes which pay farmers per hectare to set sensitive land aside for forests. That approach creates a certain tension between different users of nature, especially when farms are small, and is often funded by NGOs, making it vulnerable to budget shortfalls.

In the global south, both consumers and public water utilities, as well as government ministries tend to be cash-strapped. Fragmentation and contradiction among water and land use laws, jurisdictions and public programmes can lead to formidable conflicts. Despite the difficulties, efforts are being made to innovate. Bogotá and Quito for example, have purchased and preserved sensitive lands high in the Andes where their water is sourced. Quito is home to a widely-admired watershed restoration trust fund, capitalised primarily through annual contributions from the municipal water utility, with private contributions as well. Lima, on the other hand, has a smaller watershed fund, funded privately, whose resources are no match for the damage caused by the pollution from the booming upstream mining industry. SUNASS, the national regulator of Peru has stepped forward with an innovative payment for environmental services programme that borrows lessons from New York.

A model worth replicating The relevance of the whole farm payment for environmental services model cannot be overstated. Around the world, 100,000 people a day migrate to cities, many

with insecure water systems. Rural landscapes are being transformed faster than at any time in history. Initiatives like the one described here can strengthen sustainable rural land use and stewardship by increasing urban support for farmers producing environmentally-friendly food and fibre. Through the programme, monies flow from richer urban areas to poorer rural areas, helping to decrease income inequality and improve rural services.

The real innovation was not turning farmers into conservationists but rather helping them do what they know and do best – grow food and fibre

Moreover, the New York City example offers lessons for both climate change adaptation and mitigation. Its water supply and watersheds have proven adaptive and resilient: they were not compromised during Superstorm Sandy – a devastating 2012 class four hurricane. The New York City partnership with upstream farmers produces healthy, carbon sequestering soils, a climate mitigation strategy highlighted during the 2017 Bonn climate negotiations.

The New York case demonstrates that an integrated form of urban and rural planning can bring environmental and economic benefits to both urban and rural landscapes. Those links are growing stronger within movements for local and agroecological food systems. The bumper sticker, 'No Farmers, No Food' speaks to urban–rural interdependence and cooperation. In fact, the relationship runs deeper, right down into the aquifer. Healthy farming will produce healthy water. Here's a modified message to consider: 'no agroecological farmers, no safe water'.

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An interview with Million Belay

“Agroecology is the way forward for Africa”

In this interview, Million Belay describes in which ways agroecology is the best model of agriculture for Africa and how agroecology can contribute to reaching the Sustainable Development Goals across the continent.

Interview: Paulo Petersen and Edith van Walsum

"African agriculture is at a crossroads" concluded the comprehensive agricultural assessment IAASTD ten years ago, in 2008. Has anything changed since then?

African agriculture is at a crossroads, and sadly it has gone in the direction of high input, commercial agriculture. Both outside and inside the continent many people have come to the conclusion that the future of African agriculture should be to produce food for the market. The main thrust of their reasoning goes like this: 'Services for the industrial sector in Africa cannot propel the economy and take Africa out of poverty, but agriculture can. This is because Africa has a huge amount of unused land, about 800 million hectares, and a big yield gap that should be closed. The need for food is expected to double in a few years. Most of the poor in Africa are smallholder farmers, and an increase in productivity will take a large number of these people out of poverty.'

The actors who are pushing for this narrative and for commercialising African agriculture insist that using agrochemicals, irrigation, hybrid seeds, producing high value crops, and engaging in contract farming in which farmers produce a commodity crop for a business, is the way forward. They are now calling it Inclusive Agricultural Transformation. USAID, Bill Gates and Rockefeller institutions even started a new initiative called Partnership for Inclusive Agricultural Transformation in Africa (PIATA).

The big question is, in this time of uncertainty exacerbated by climate change, loss of biodiversity, and land degradation, if this kind of agriculture is indeed best for Africa. It is my view that, while agriculture in Africa needs all the attention it has been craving for years, we have to promote a different pathway, which is agroecology, to address rural and urban poverty in Africa. It has been demonstrated that agroecology can double, and even triple productivity, is efficient in using land and livestock resources, can address nutrition and health, and is also beneficial to the environment.

What role can you see for agroecology with respect to the Sustainable Development Goals in Africa?

In fact, AFSA carried out a study to answer the question about whether or not agroecology could work for Africa while addressing the SDGs. To this end, we collected cases of agroecology from the continent. We analysed whether agroecology brought more food and income to the families, whether it is a model that considers men's and women's knowledge, whether it is friendly to the environment and whether it gives pride and honour to the family. In other words, we wanted to find out if agroecology supports the sovereign right of local people and countries to

produce what is culturally appropriate for them, not necessarily for commercialisation alone. The analysis (see www.afsa.org) showed that agroecology addresses at least 11 of the 17 SDGs, it reduces hunger, it brings more income to the family, it increases the capacity of farmers as they learn more techniques of agroecological farming through farmer to farmer exchange, it produces nutritious food, and it also engages the whole family.

I feel that the SDGs are a great opportunity to show that the focus on commercialisation of agriculture goes against sustainable development, and that what actually works for farmers and urban people is agroecology. Agroecology has the potential to address the SDGs in a holistic manner. It services the ecosystem and the ecosystem in turn services all who depend on it. And yes, Africa can commercialise agroecology, of course, after feeding its own people with healthy and nutritious food.

Can you tell us about successful upscaling of agroecology in Africa?

One of the greatest agroecological initiatives started in 1995 in Tigray, Northern Ethiopia, and continues until today. It began with four villages, in each of which one plot of land was treated with compost, a second with artificial fertilizer and a third functioned as a control plot. Other soil and water



Million Belay

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Women are proud to grow ginger. Photo: AFSA

conservation techniques were also experimented with and trees and grasses were planted to increase biomass. After five years, it was already evident that the plots treated with compost were doing much better. This initiative then scaled up to 83 villages and finally to the whole Tigray Region. It was recommended to the Ministry of Agriculture to be scaled up at the national level. The project has now expanded to six Regions of Ethiopia and is regularly mentioned as an example in international forums.

There were many elements to this success. The first is the simplicity of the intervention and the soil and water conservation practices that were used. The fact that it was supported with research by the Ethiopian University at Mekele has proved to be critical in convincing decision makers that these practices work and are better for both the farmers and the land. The local government was also committed to the initiative and one officer worked full time on the project. The local community was heavily involved and could see the results on their life. Women were particularly motivated to participate actively, which was key for the success. The farmers produced bylaws to protect the newly rehabilitated areas from grazing and this helped ensure lasting results.

However, the project was not without challenges: it was difficult to prepare enough quality compost, the newly-made soil and water conservation structures turned out to be breeding ground for rats, there was a strong push for commercialisation of agriculture, and the funding didn't match the need for more extension

and training. These are just some of the stumbling blocks the initiative encountered over time.

Another agroecological practice that spread widely across East Africa is called 'push-pull'. This method manages pests through selective intercropping with important fodder species and wild grass relatives, in which pests are simultaneously repelled—or pushed—from the system by one or more plants and are attracted to—or pulled—toward "decoy" plants, thereby protecting the crop from infestation. Push-pull has proved to be very effective at biologically controlling pest populations in fields, reducing significantly the need for pesticides, increasing production, especially for maize, increasing income to farmers, increasing fodder for animals and, due to that, increasing milk production, and improving soil fertility.

By 2015, the number of farmers using this practice increased to 95,000. One of the bedrocks of success is the incorporation of cutting edge science through the collaboration of the International Center of Insect Physiology and Ecology (ICIPE) and the Rothamsted Research Station (UK) who have worked in East Africa for the last 15 years on an effective ecologically-based pest management solution for stem borers and striga.

The biggest challenge for upscaling agroecology lies in the push by big business and philanthro-capitalists for commercial agriculture in Africa. The narrative of this group sees African agriculture as a business opportunity and as desperate for outside support. Research is skewed towards producing crops which respond to agrochemicals, policy is directed towards commercialisation of agriculture, and international aid is tied to promoting approaches geared only to productivity. Agroecology, however, is the way forward, as shown in the case studies that I mentioned earlier.

What is women's role in agro-ecology in Africa? In Africa, women farm as much, or even more than men. They are key in changing the farm from a conventional to an agroecological system. In addition to participating in farming, women care for the children as well as the household and the garden around the homestead. They produce nutritional and healthy food in their backyard. They are also the custodians of seeds in most communities and they can be encouraged to conserve farmers' seeds in the households. Women should therefore be central in scientific research about increasing productivity and about producing nutritious food. Women are a powerful force for agroecology as theirs are authentic voices that really understand what nutrition is, with broad historical and cultural knowledge. I think that by enhancing the participation of women in decision making on agriculture and accessing productive resources, we create a huge opportunity for agroecology to feed the world with nutritious food.

I am often asked about the difference between 'agroecology' and 'organic'. Agroecology is a scientific discipline, a practice and a movement. Organic philosophy was inspired by farmers and other pioneers from around the world, and a social movement developed the practice, based on the science of agroecology. It was further turned into a marketable production system with the support of over 100 governments. Today, we have organic consumer purchases of 90 billion US\$ across the world, and a certified area of 100 million hectares in 180 countries. In some countries, organic food has a market share of up to 10% and some countries have a very high share of land under organic production, with the Indian state of Sikkim being the first of reaching 100%.

Agroecology and organic agriculture are both based on ecological and social intensification of natural systems. They optimise performance through intensification of biological processes rather than through intensification of external inputs (e.g. finance, chemicals and energy). Most importantly, they are both the antithesis of the industrialisation of agriculture and food systems, which has far reaching negative impacts on environment, on society, and on people's culture and health.

Even if we find internal contradictions, both models provide healthy food, sequester carbon through increasing the organic matter in the soil, and increase biodiversity in soils. Both approaches intensify social interactions of producers and consumers and enrich cultures while raising awareness and contributing to the democratic development of societies. Emphasising commonalities does not mean denying diversity. Insiders recognise differences, strengths and weaknesses of the various approaches that not only comprise 'organic' and 'agroecology' but include also biodynamic, ecological, permaculture or low external input farming. Generally, we can say that agroecology is a holistic approach based on principles and best practices, while considering the political context. At the same time, agroecology is understood in remarkably diverse ways. Organic agriculture, on the other hand, has well-established standards and market systems. There are universal organic principles, clear criteria for equivalences of standards, a common best practice description and a range of united positions. However, local systems of trust building between consumers and producers are very diverse and there are constant discussions, for instance about the tradability of organic products or where to draw the line between organic and non-organic.

Together, organic farming and agroecology are perfectly synergistic. Transforming the global food system to 100% truly sustainable and healthy nutrition needs both approaches. Countless farmers have understood that long ago and use from both what is best for them. It is good that food movements too are starting to understand this too.

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Organic and agroecology: Synergetic approaches

Women in Brazil build autonomy with agroecology

A strong network of female farmer-innovators in Paraíba, Brazil has been driving fundamental change in the lives of hundreds of women. Collective learning among farmers has brought rural women out of their isolation and into positions of leadership. The success of the women's movement lies in its link between experimentation with agroecology and reflection on inequalities.

Adriana Galvão Freire

/// **I** am not a slave, nor an object – I have no owner, I am not a piece of property – I want freedom to be a woman..." These are the chants of over 5000 women smallholder farmers from the Borborema Pole farmers' union and from other regions in the state of Paraíba in Brazil as they march through the city of Lagoa Seca in March of each year. Their songs have become the marching call in the struggle for autonomy, for an end to all forms of oppression and violence against women, and in support of agroecology. Dressed in white or in lilac, with flags in hand and hats on their heads, the women take to the streets as part of the March for the Lives of Women and Agroecology. They share experiences and discuss different forms of violence that they experience. The annual marches are organised by a strong network of female farmer-innovators who have been driving change in the lives of hundreds of women, and creating a development plan for the region based on agroecology.

A network of female farmer-innovators The Borborema Pole is a forum of rural workers' unions and family farming organisations covering 14 municipalities and more than 5000 families in the semi-arid Borborema region. From the early 2000s onwards, the Borborema Pole and AS-PTA, our NGO that is active in the region (and also a part of the AgriCultures Network) began to devise collective, local development plans based on strengthening family farming and the promotion of agroecology. Methodological principles of building on local knowledge and collective learning among farmers lie at the heart of our work. Through these principles we have supported family farmers in developing numerous agroecological innovations to overcome technical, economic and socio-organisational barriers over the past 15 years. Despite successes, however, a patriarchal culture remained dominant both within the family and in organisations in the region. This made women's knowledge, their prac-

tices, and their importance for the farm household invisible. Their capacities were not fully being put to use. The inequality between men and women was a barrier to the full implementation of agroecology across the region.

In 2002, the gender issue came to the fore. A group of women began reflecting on what they were doing on their farms and in their daily lives. Through this participatory appraisal the women began to work towards a collective understanding of their role in the family farm. An important realisation was that most of their activities were concentrated within the house and its immediate surroundings.

Arredor de Casa: the women's space This space was coined Arredor de Casa, which literally translated means 'around the house' and refers to the yard, the outdoor space around and pertaining to the house. The women identified the different components of their yards, the multiple functions they have and the significance of their own knowledge and practices in relation to that space. They found that it is an important space where the women are involved in many farming activities: they effectively re-use water, preserve medicinal plants, and test new seed varieties. The crops and small livestock they produce there, moreover, form an important contribution to the household economy.

The women also started to identify the main challenges they faced and how they could overcome them. A major challenge was land. The area of the Arredor de Casa was under pressure. Borborema is an area with a high concentration of family farms and subject to land fragmentation due to inheritance. With smaller areas available, the fertile and humid land surrounding the houses was largely being replaced by fields in which men would plant beans and maize. Conflicts of interest over these areas of land resulted in an increase in the economic and social vulnerability of the women, leading to extreme situations of subordination, dependence and increased poverty.



Women speak out at the March for the Lives of Women and Agroecology. Photo: Luciano Silveira

To make the work of women more visible and valued, the Regional Seminar on Arredor de Casa was held. Over 150 women participated, and successful Arredor de Casa practices were shared. They also presented their experiences at a meeting of the Borborema Pole and this led to the establishment of the Borborema Pole Committee for Food and Health. The committee went on to organise, implement and monitor a training programme for women farmers. A movement to revitalise and reorder these spaces was taking shape.

Unearthing the knowledge of women

The committee acted as a catalyst for farmer-to-farmer exchanges, based on the methodological principles of collective learning that are deeply

engrained in the work of the Borborema Pole. This gave rise to a network of over 1300 women farmer-innovators. The women addressed specific technical problems with their own solutions based on principles of agroecology, and visited other farmers both from within and outside their municipalities. The Committee for Food and Health supports women in adapting and implementing the solutions they identify for their own farms.

The women also carried out specific studies on medicinal plants, small livestock, native fruits, poverty alleviation and economic monitoring of home farms. This was key in unearthing and organising the wealth of knowledge of agroecology held collectively by women – often diffuse, fragmented and undervalued, even by the women themselves. Making this visible and explicit motivated many women to experiment more. The exchanges were also vital in overcoming the isolation that many women experienced. They could now meet and get to know each other, allowing for the gradual removal of cultural barriers which had ‘tied them to the kitchen.’ Through these meetings a collective identity was being forged, that of women farmer-innovators.

Two major perceptual shifts were fundamental for the consolidation of this process. The first was the recognition of the backyard as an important subsystem within a family establishment for its potential to generate wealth, food security and sovereignty and wellbeing for the family. The second was that women gained more both public and private spheres as they reclaimed control of the backyard areas and were successful with their agricultural and economic undertakings.

Rotating Solidarity Funds – a tool to self-organise

The Committee for Food and Health established Community Rotating Solidarity Funds (RSFs) to support women in applying their learning and ideas from the exchanges at home. The RSFs are based on the principles of reciprocal exchange and mutual support that have long existed in the practices of rural communities in the region. Now, a growing number of women farmers from over 90 communities are part of Solidarity Funds.

When women left the house and returned with a concrete way of improving the wellbeing of the family, their relationship with the other members of the household changed. Suddenly women could overcome their financial limitations and implement change. Furthermore, they learned to self-organise to overcome inequality and oppression. At times, their journey led them into conflict within the family, revealing the oppression and subordination of women of the patriarchal culture in which they live.

Breaking out of isolation

“Today I am a different woman. Before when I saw people I never felt like talking, being open. I just listened to them speak. Today no! Today I speak with the whole world. I became stronger, as a women, as a mother. I am part of many of the changes in the community because I began to participate and share my experiences with friends, neighbours. I am proud of that. When I and other women started participating, something men were already doing, many things changed in my community. Especially for me. I feel fulfilled and will continue to participate!”

- A woman farmer in Remigio

This gave rise to further analysis of gender inequality by the women themselves. It became clear that progress towards a political strategy for women to reclaim territory could not be achieved without understanding and challenging the inequality between men and women.

Overcoming oppression and gender inequality

At the end of 2007, AS-PTA and the Borborema Pole began to look for ways to make these changes in the lives of women permanent. Three women farmers who had taken on leading roles in the promotion of agroecology shared their personal stories in the network of women farmer-innovators. These stories opened the doors for other women to express the lack of recognition for their work, and the inequalities with respect to the use of space, time and money that they experienced, many for the first time.

Creating a direct link between agricultural experimentation and reflections on inequalities generated new concepts of roles

Through this sharing, the group of women were filled with courage to overcome subordination. Pathways to new forms of leadership emerged. From this point forward, gender equality was mainstreamed across all aspects of the work of the Borborema Pole and AS-PTA. The stories catalysed action, not only the within the Pole, but countrywide when they were shared by the Brazilian National Articulation of Agroecology (ANA). When ANA began to promote this work, it was an important tipping point for selforganisation of women.

The struggle continues With the annual March for the Lives of Women and Agroecology, the women's movement is now more visible than ever. Participation grew from 700 women in 2010, to 1800 in 2011 and 5000 in 2015. In the beginning the majority of the women joining the march were farmer-innovators. Now participation is much broader. Events at the marches focus on how to combat the cultural barriers that uphold the inequality between the sexes.

It is clear that the success of the women's movement lies in creating a direct link between agricultural ex-

perimentation and reflections on inequalities. This generated new, accessible, and functional concepts of roles that helped both genders in family farming to flourish. One result of this work is that women now play important roles in the management of the Borborema Pole at the municipal, state and even national level, contributing decisively to the Pole's political project.

The leaders of the Pole say that "now is not the time to pack away our flags, the struggle continues every day." With the aim of resolving conflicts, relationships between men and women are gradually evolving. It is fair to say that there is still a long way to go. Nevertheless, what matters is that these women are leaving their mark on the historical struggle for social change, in the struggle for the lives of women and agroecology.

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A political strategy for women to reclaim territory could not be achieved without challenging the inequality between men and women. Photo: AS-PTA



Land grabbing threatens agroecology in Senegal

Farmer experiments in four parts of Senegal are demonstrating that agroecological family farming can make a significant contribution to the Sustainable Development Goals, especially the fight against hunger and the preservation of natural resources. However, land and water grabbing is threatening the spectacular achievements that farmers are making with agroecology.

Laure Brun

The experience of farmers in four agricultural zones in Senegal have shown that political organisation must go hand in hand with technical training in order to spread and amplify agroecology. This combination has proven to be a powerful basis for upscaling. Most notably, it can enable farmers to work with local politicians to secure and manage their own resources, particularly land, and it can help farmers to gain access to the means of production necessary to make their farms profitable.

The four regions where farmers are amplifying agroecology in Senegal each have their own particularities and are showing progress at different levels.

1. Amplifying agroecology in the Senegal River Valley

After the construction of the Diamal and Manantali dams in the Senegal River Valley in the 1980s, diversified flood control agriculture was replaced by irrigated agriculture based on cash crops such as rice. This type of production depended on fossil fuels and led to an increased use of fertilizers and chemical pesticides. Going against the current, agroecological experiments in Farmer Field Schools started to produce yields that exceeded those of conventional farming. The desire to farm using agroecology on a permanent basis has motivated farmers to organise themselves into a federation and create a savings and credit union which continues to

grow. In 2009, a network of ten schools, the “Eco School Network” started to bring together children and parents to work on composting, collecting, sorting and recycling waste, and individual and community reforestation. The aim was to instill values of environmental preservation within the children and to reunite them with their farming environment. This “école-milieu” (school-environment) approach amplifies agroecology among families and the village community, bringing about initial changes in behavior through concrete practices. This approach to environmental education has also served as the basis for schools in other areas, although these initiatives are still struggling to make progress.

2. Amplifying agroecology on the Thiès plateau

In the northwestern region Les Niayes, the Agropastoralist Federation of Diender (Fédération des Agropasteurs de Diender, FAPD) has experimented with nursery protection, organic fertilization, pest control and peasant seed production. Around Lake Tamna, they also carried out reforestation actions to combat land salinisation, reclaiming 110 ha of land. In the neighbouring commune of Keur Moussa, lands located in the Thiès plateau are affected by water erosion, which takes away the fertile layers and threatens villages. Through practices that stop erosion, such as the construction of small dikes, weirs and half-moons, farmers have managed to reduce runoff, restore vegetation and reclaim more than

Reforestation with local plants in the center of Senegal. Photo: ENDA Pronat.



AGROECOLOGY AND THE SDGS > LAND GRABBING

30 hectares of degraded land in seven villages. After establishing a farmers' federation (Woobin), they developed this land using agroecological production techniques and set up markets for healthy agroecological fruits and vegetables, which have become the main

The combination of political organisation and technical training has proven to be a powerful basis for upscaling

lever for engaging more producers with agroecology. A new solidarity farmers' cooperative organises weekly markets in Dakar, thus rewarding the efforts of producers involved in agroecology.

3. Amplifying agroecology in Eastern Senegal In Koussanar in the East of Senegal, the entry point for agroecology has been the experimentation with organic cotton production, starting in 1994. After proving the technical feasibility of organic cotton and engaging more than a hundred producers in about thirty villages, the Yakaar Niani Wulli (YNW) producers' federation obtained its first organic certification in 1997. In order to overcome the difficulties of finding a profitable market, YNW farmers have gradually diversified their production by integrating fonio, sesame and bissap into the rotation scheme and developing processing activities for these products. To address food insecurity, YNW is also setting up village seed banks. In recent years, the costs of certification and ginning (the process to separate lint and seed) have continued to increase, while the selling price of organic fair trade cotton fiber has not changed. This discourages YNW's organic cotton producers. Animal husbandry and the exploitation of natural resources

provide essential complementary income for the families. Understanding the importance of natural resource preservation for their own survival, people in a dozen villages have put more than 100 hectares of forest under protection, which entails a significant starting point for drawing up sustainable ecological management and use plans for their communities.

4. Amplifying agroecology in the

Groundnut Basin In this area, decades of groundnut and millet production in monocultures have caused soil depletion and accelerated the appearance and invasion of fields by a parasitic plant called striga. In some places, the invasion is such that the land becomes unsuitable for production. After three years of collective work, millet and groundnut yields improved in the fields of nearly 200 producers who applied organic fertilization techniques. These production activities were accompanied by discussion and debates on the dangers of GMOs and, increasingly, on the phenomenon of land grabbing, an increasing threat to agroecology.

Towards supportive policies Over the past years, the various farmers' federations of these regions have come together to share experiences. They developed a joint vision for healthy and sustainable production systems and for community-led land governance. The federations are currently implementing strategies to strengthen the governance of their communities and secure resources for rural activities.

As a follow-up to these territorial initiatives, in 2008 our NGO Enda Pronat co-hosted a national workshop with the Ministry of Agriculture and FAO to ensure that the four agroecological experimentation zones would be officially recognised as protected pilot zones, and be safeguarded particularly from Genetically Modified Organisms (GMOs). One of the key results was that in 2010 the government included the concept of 'healthy and sustainable agriculture' in its agricultural policy and earmarked a specific budget for the promotion of biofertilizers and biopesticides. This was an encouraging signal for agroecology.

Sowing sorghum in the Senegal river valley. Photo: ENDA Pronat.



However, this progress was disrupted when the same government pushed for the establishment of multinational corporations in these territories, arguing that it was the only way towards food security. This transformed family farmers into farm workers on their own land, while putting the environment at risk. While only six cases of land grabbing were recorded in Senegal between 2000 and 2007 (totaling 168,964 hectares) there were 30 cases recorded between 2008 and 2011, accounting for a staggering 630,122 hectares. This is an unprecedented increase that sparked outrage and led to protests.

Existing agro-industrial facilities and mining companies have often failed to carry out environmental studies, particularly with respect to contamination of water with chemicals and other effects on water resources. Depletion of various layers of groundwater is starting to occur as a result of excessive water extraction by agribusinesses that produce fruit and vegetables for the European market. Early signs of conflict over water are beginning to emerge precisely in the areas where agroecology has taken root as described above: Niayes, Keur Moussa, the lower valley/Lac de Guiers and the Petite Côte.

Land: a major scaling up agro-ecology

The grabbing of various resources, particularly land and groundwater resources, is threatening farmer societies of our countries. It sweeps away all the gains achieved among rural communities who are working hard to be part of a farming model that is innovative, healthy, and sustainable, with agroecology at the center. Farmer organisations and their allies in Senegal are therefore committed to combating this phenomenon of resource grabbing. Our fight on this front can be described in three main phases:

- In the first stage we alerted people to the dangers of the phenomenon of resource grabbing, followed by a call for mobilisation. In August, 2010, farmer organisations, civil society organizations, government authorities and donors came together and drafted a Framework for Reflection and Action on Land Tenure in Senegal (CRAFS). Since then, a great deal of research, case studies and conferences have been organised to fuel advocacy and energise the struggle.
- Between 2011-2016, workshops and training on land legislation with the communities of the four zones described above have taken place, in collaboration with various CRAFS actors. Monitoring and advocacy platforms for local people's land rights were created to contribute to the national debate on land reform.
- Farmer organisations developed their own policy proposals. Intentionally they combined proposals strictly related to land and proposals related to other natural resources. Their proposals point out that



Women take action against erosion in the Niayes region. Photo: ENDA Pronat.

land must be addressed in connection with the community, social and political life in its broadest sense for the success of farmers' activities and the conservation of resources.

The basic principles defended by farmers in this fight are that land resources must be in the hands of the communities and that an agricultural policy must be based on a system of financing that is favorable to family farming. They call for the re-establishment of a 'guarantor government', which supports and accompanies family farmers while implementing an integrated rural development policy in order to achieve food sovereignty. These principles have been supported by other civil society organisations. As a result of this advocacy work, the National Commission for Land Reform (CNRF) has adopted an inclusive process by integrating some civil society organisations into its steering committee. Importantly, the Commission has decided not to promote the commercialisation of land (World Land Forum, 2015).

These technical, organisational and political results encourage farmers and NGOs like ours to pursue our mission of supporting rural families in reclaiming the governance of their land and the implementation of integrated development strategies that lead them towards food sovereignty. Agroecological food production and consumption can be a strong force for social change, ensuring sustainable livelihoods for family farms.

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Scaling up the System of Rice Intensification in India

The System of Rice Intensification is a method of growing rice that enables farmers to achieve higher yields with less water, seeds, agrochemicals and labour. SRI spread in India despite the fact that the new farming practices were contradictory to conventional thinking about growing rice. This successful upscaling happened as a result of experimentation, co-creation of knowledge and institutional support.

Biswanath Sinha Tushar Dash and Ashutosh Pal

India produces rice on 44 million ha, accounting for 29% of the world's total surface area under rice cultivation, and for 20% of global rice production. The Green Revolution led to an increase in the use and costs of external inputs in rice production, but this increase has not resulted in higher productivity and has led to many

negative side effects on the environment and on peoples' and animals' health. As these negative effects became evident, the need for a low cost and ecofriendly practice which increased productivity in a sustainable manner became urgent.

Higher yields with the System of Rice Intensification The System of Rice Intensification (SRI) came to India in the early 2000s, after it had been developed by farmers, scientists and grassroots extension workers in the 1980s and 90s in Madagascar. SRI is an agroecological method of growing rice that enables farmers to achieve higher yields with less water, seeds, agrochemicals and labour. Its specific practices include planting younger seedlings at wider spacing, mechanical weeding, maintaining a non-flooded, moist field and managing



Women are testing a weeder in Odisha. Photo: Pragasi

soil health organically. These largely contradicted traditional farming practices and beliefs at the time.

But, seeing initial results of these practices, many people were convinced that SRI had the potential to help millions of small scale and marginalised farm families improve their rice production. However, there was a need for farmers to thoroughly understand the principles of SRI, and to believe in it. It is a knowledge-intensive method, which makes upscaling challenging, and the role of farmer to farmer learning very important.

Upscaling SRI A comparative analysis of sample MIS data, collected by the partner organisations of 5000 farmers, revealed an average grain productivity of 4.7 tonnes/ha with SRI, which is 38.9% more than the conventional method (3.4 t/ha) and 44.9% more than the national average (3.2 t/ha). Similarly, the straw productivity in SRI (5.1t/ha) is 38% more than the conventional method (3.7t/ha). This means that a family of six people with a daily rice consumption of 2.5kg and practicing SRI in 0.5 acre has 69 more days of food security than a conventional rice farming family.

A family of six with a daily rice consumption of 2.5kg practicing SRI on 0.5 acre has 69 more days of food security

As farmers began to see the results of SRI, the practice quickly spread across India. The Shri Dorabji Tata Trust, a strong promotor of SRI, started working with 11.000 farm households in 14 districts over 2 Indian states in 2006 and grew to work with 150.000 farm households in 94 districts over 11 states in 2012. This spread has been the result of on-farm experimentation and monitoring, co-creation of knowledge, and collaboration between many different actors.

Farmer experimentation and monitoring For small and marginal families farming under rainfed conditions, SRI poses initial challenges. Until they see a significant incremental return from SRI, they find it hard to believe that growing less seedlings with a wider spacing will give a better earning and more food. A crucial factor for the successful adoption of SRI is when farmers can

Healthier work for women

A frequently made assumption is that agroecological practices increase the workload of women. This assumption does not hold true in the case of SRI because SRI fundamentally improves the conditions under which farmers, often women, have to work.

It is said that 'rice is grown on women's backs'. Globally, women provide between 50 and 90 percent of the labour in rice fields. They perform backbreaking tasks like seedling removal, transplanting and weeding in bent posture and under wet conditions for more than 1000-1500 hours per hectare. In addition, they are exposed to chemicals. Women working in flooded fields for long hours come into contact with various disease causing vectors exposing them to multiple health risks like intestinal to skin diseases and female urinary and genital ailments. This affects their ability to work and earn, and furthermore, it drains out their money on healthcare, sometimes making them indebted.

But the System of Rice Intensification enables women to work under healthier conditions. With SRI practices, rice fields are no longer kept continuously flooded, thus reducing women's prolonged exposure to these water-borne disease vectors. Furthermore where organic SRI is being practiced, women do not face problems from chemical fertilizers and pesticides.

SRI practices that reduce drudgery for women:

- **Planting of single seedlings at wider spacing.** This implies fewer seeds, which requires less work, less manure and ultimately reduction of the total workload.
- **Careful removal of younger seedlings from the nursery and planting them as quickly as possible to avoid transplanting shock.** This implies that the nursery should be made in a place inside or near to the main field, which reduces the walking distance.
- **Transplanting fewer seedlings in total.** This means workers do not have to remain inside the mud or water in bent posture for longer hours.
- **Use of the weeder.** This enables women to move from a permanently bent position to an upright position. Hours spent on supplementary manual weeding is reduced.

This box is based on an article published in Farming Matters, December 2015, by Sabarmatee Tiki, Liang Chun and Oeurn Savann



A woman transports SRI rice seedlings to the field.

Photo: Sabarmatee Tiki

monitor the production process, and see the results. Farmers often experimented with small patches of SRI before committing their whole farm to it.

One of the major changes introduced by SRI is the use of weeders. Low-cost weeders and markers (indicating where to plant the seedlings) did not only lead to higher crop yields but they also reduced the workload of those responsible for weeding, mostly women (see box). A helping factor in the successful development and spreading of the weeders was that partner organisations, innovative companies and farmers succeeded in improving the functionality and bring down the cost of these tools through joint experimentation. This also encouraged more farmers to take up SRI. Farm owners noticed that thanks to the weeders, the labour shortage in weeding had significantly reduced; hence they decided to expand their area under SRI cultivation.

Co-creation of knowledge on SRI

As SRI is a knowledge based system rather than pure technology perfection, knowledge sharing at all levels is crucial. A network of grassroots level organisations developed spaces for knowledge co-creation between key actors which contributed to long-term change towards more sustainable rice farming. For example, to facilitate knowledge exchange between farmers, extension workers and researchers, Tata Trusts launched the SRI India E-group. All Tata Trusts partners, including well known SRI practitioners and distinguished researchers, were invited to participate in this cyber forum. The E-group has become a respected and widely used arena for the exchange of ideas and experiences in the Indian SRI movement.

Another example of knowledge co-creation is a model for knowledge sharing based on practical experimentation and learning which proved successful in extension work. This model involved a sort of training of trainers so that local people could teach each other the skills involved in SRI. One of these trainers (Village Resource Persons) generally engages with 50-60 SRI farmers. There is a local Skilled Extension Worker (SEW) who works with 15-20 Village Resource Persons and a Subject Matter Specialist oversees 3 SEWs for quality control and skills up-gradation.

Collaboration and institutional support

The SRI program could spread significantly thanks to the engagement of state level nodal NGOs. These played an important role in engaging grassroots organisations and creating an alliance of civil society organisations for spreading SRI. Influencing policy at various levels have been crucial for making SRI acceptable beyond the boundaries of civil society and for enabling it to spread further.

Way forward This experience teaches us that up- and outscaling SRI across regions and crops will require a change in the mindset of farmers and many others. In addition, it is crucial that collaboration between government and civil society organisations is strengthened.

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The SDGs present an impressive commitment to eradicating poverty, ending hunger, achieving food security, promoting nutrition and sustainable agriculture and ensuring that no one is left behind. Agroecology is based on traditional and indigenous farming knowledge, and when carried out by peasants has shown to be much more productive per hectare than industrial, agribusiness monoculture. It therefore has great potential for contributing to the SDGs.

But agroecology cannot expand as long as land continues to be concentrated in the hands of a few wealthy and foreign investors. Urgent and deep structural transformations are needed, including true agrarian reform, and defending, protecting and keeping territories under the control of small scale and peasant farmers, pastoralists, indigenous women, mountaineers and fisherfolk. A different kind of society based on democratic ownership of resources and on full participation in economic activities is imperative. I have experienced such a process in Zimbabwe where land reform made the land more productive and sustainable, boosted food production for the local and national economy, and offered a life of dignity for the rural poor. Most African governments' policies are biased towards promoting prescriptive, unidirectional top-down industrial agriculture. The consequences have been dismal. What is needed is building resilience based on diversity. Food diversity based on crop diversity, grown by the small scale farmer (the first consumer) is an effective way to fight malnutrition. This is found in agroecology because peasants work with biodiversity to experiment and exchange knowledge. Shashe Agroecology School run by the Zimbabwe Smallholder Organic Farmers' Forum is one example where farmers learn from peer farmers. This methodology is effective, as we know farmers tend to trust the things they learn from other farmers. As part of its process to support agroecology, the FAO should leverage its institutional muscle to influence national policies to support such spaces for learning.

This should be supported by an institutional and policy framework which provides the building blocks for agroecology: access to land, water, credit and critical functional biodiversity, underpinned by a vibrant peasant seed saving systems to provide adequate and appropriate nutrition in the face of a changing climate. Agricultural finance should support peasants, especially women, and family farmers, instead of being biased toward agribusiness, and burdening peasants and their families with unpayable debts. Let it be clear that Green Revolution and conventional agriculture have not been sustainable, and only served to increase inequality. Agroecology offers our best hope of truly reaching the SDGs, particularly addressing hunger and poverty. It provides a different model of agriculture that ensures just economic wellbeing for small scale farmers and their communities while producing enough healthy food that is accessible to everyone. My own experience in Zimbabwe is testament to the fact that agroecology underpinned by agrarian reform can be a fundamental pillar of sustainable development.

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Agroecology is our best hope for sustainable development



From territories to policy: Peasant agroecology in the Netherlands

In a context of highly industrialised agriculture, peasants in the northern part of the Netherlands are constructing agroecological alternatives that strengthen their territories. These territories have grown into bastions that fuel further scaling and institutionalisation of agroecology.

Leonardo van den Berg

The advent of industrial agriculture and centralised environmental management has put considerable pressure on European farmers, and many are disappearing as a result. After World War II, European policy and science was oriented towards industrialising agriculture by pushing for farm growth, mono-cropping and the use of both chemical fertilisers and imported animal feed. When groundwater pollution and acid rain plagued many parts of the continent in the 1980s, it was evident that industrialisation came at a price. In response, the European Union adopted directives to reduce the emission of ammonia and protect natural areas.

Challenging industrial farming

Peasants in the Northern Frisian Woodlands, an area in the north of the Netherlands, did not want to have to expand the size of their farms. It went against their ways of life in small scale dairy farms composed of small fields separated by, and producing in harmony with, surrounding ponds, hedgerows and embankments of alder, oak and bush. Furthermore, when following the European directives, a new environmental law declared all hedges as 'acid sensitive' in the 1980s and put severe limitations on the type of agricultural activities that could be carried out near them, peasants in the Northern Frisian Woodlands came together to protest against these regulations.

They were able to convince municipal and provincial authorities that their way of farming actually helped conserve rather than damage these hedges. In exchange for a commitment to maintain the hedges, ponds, alder rows and sandy roads that enriched their landscape, they were exempted from the new regulations.

This was only the first of many challenges. The increasing pressure to intensify production and produce cheaply for the market, combined with stricter environmental regulations threatened peasant territories which had always combined nature and agriculture. The peasants of the North Frisian Woodlands did not stay idle but responded to these challenges by founding their first territorial cooperatives. Others followed, and in 2002 all territorial cooperatives in the region joined in the overarching Northern Frisian Woodlands (NFW) territorial umbrella cooperative which currently has a total membership of more than a 1000 dairy farmers.

The cooperatives sought not only to address new threats but to create agroecological alternatives that strengthened their territory. They did this at the farm level and the landscape (or territorial) level. From there, they influenced changes in the wider political-institutional environment that allowed for the further spread and acceptance of peasant agroecology, up until the level of European policy.

Creating political space for closed-cycle farming

To create alternatives at the farm level, farmers distanced themselves from dominant technologies and policies by rejecting prescriptions from agronomists, veterinaries and farmer advisory services for feeding animals, applying chemical fertilisers, assessing animal health, and managing grasslands. Instead, they experimented with agroecological practices that maximised the use of farm and territorial resources.

They influenced changes in the wider political-institutional environment that allowed for the further spread of peasant agroecology

For example, peasants faced a new regulation to reduce ammonia emissions which prohibited the spreading of manure on the land, as the peasants had always done, and required injecting it into the soil instead. Peasants in the Northern Frisian Woodlands considered this injection inappropriate for their way of farming. For one, the machinery for slurry injection was expensive and their fields were too small and wet for these heavy machines. But even more importantly, peasants also knew that the injection of slurry would lead to greater leaching of nutrients in the groundwater and that it would kill soil life.

They were able to convince government that they could develop better solutions to reduce nitrogen

Field visit to the Northern Frisian Woodlands by officials of the Ministry of Economic Affairs. Photo: NFW



Table: Principles, practices and results of closed loop farming

Principle	Practices	Results
Feed quality and animal health	Production of own fodder crops, using roughage from natural reserves, reducing digestible crude protein content of feed	Less imports of feed; healthier cows; fewer young cattle are kept as cows live longer; improved milk and meat quality
Soil health	Use of light machinery; less ploughing; direct sowing in the sod; feeding the fungi and bacteria in the soil with more carbon and less nitrogen	Less compaction, more organic matter, more soil life; prevent mineralisation of organic matter, loss of nitrates and emission of CO2.
Grassland quality	More permanent grassland; integration of herbs in grassland	Improved animal and soil health
Nutrient use efficiency	More frequent application of smaller amounts; dung is separated from urine in the stables, separate application of the liquid fraction and the solid fraction on the land	Less compaction and better soil structure; lower fertilization levels, lower leaching, reduced ammonia emissions (contains more Organic Matter (C) with slower release of minerals

Source: van den Berg et. al. 2016

leaching by developing a different farming model through integrating environmental management. In 1995 the cooperative was exempted from the injection regulation and granted the status of an “experiment”. In 1998 researchers from Wageningen University

joined the experiment. The NFW distanced themselves from conventional ways of doing research and instead developed farmer driven methods of innovation. Using innovative action research approaches, field experiments were carried out with over 60 farmers and with researchers from different disciplines (see box).

From these experiments, a new approach emerged: *kringlooplandbouw*, an agroecological mode of farming which can be translated as ‘closed-cycle farming’. Closed cycle farming seeks to maximise the use and quality of farm and territorial resources. To improve the quality of their manure, peasants began to grow more fibrous feed for their cattle including a diversity of grasses and herbs. They fed their cattle less soy and other high protein imported feed. This contributed to the health of the cow as well as to higher quality manure. Before application on the soil, the manure was mixed with straw. These and other changes (see table) not only reduced nitrogen leaching but also improved the quality of both the milk and the soil while reducing expenses of chemical fertilisers and cattle health care.



Open house at the NFW farms for the citizens of surrounding towns. Photo: NFW

Economic advantages of farming with nature

“If you manage the landscape well, biodiversity increases and the farm reaps the benefits. For instance, more grass species positively affect the cows’ health. Careful maintenance of the tree belts attracts more birds, which eat the insects that destroy the roots of the grass clumps. This means we need to use less insecticide. Nature and landscape management thus brings economic advantages to our farms. That is what I have learned in the course of time”.

- A farmer in the Northern Frisian Woodlands

Alliances between peasants and environmentalists

At the landscape level, territorial cooperatives challenged the historical antagonism between agriculture and nature conservation that was, and in many cases still is, deeply ingrained in governments, policies and laws by forming unique alliances with nature conservation organisations. These new alliances managed to convince the provincial authorities to remove legislation that excluded agriculture as a landscape and nature management activity. Together with local government, they developed an ecological, landscape management plan that combined agriculture with

nature conservation. Currently, around 80 percent of the natural landscape of the area is managed by the cooperative. This includes 1,650km of wooded belts, 400 ponds, and 6,900 ha of common areas that host meadow birds and 4,000 ha that host geese. As a result, the area has grown richer in biodiversity and the landscape has become more attractive. The NFW cooperative has taken advantage of the opportunity to promote tourism in the area, re-opening ancient trails for cycling and walking.

The farmers' territorial cooperatives challenged the historical antagonism between agriculture and nature conservation

Institutionalisation and scaling

For a long time the idea of farmers managing landscapes was ignored or marginalised by policy makers and mainstream farmer organisations. This changed once closed loop farming and farmer-managed landscapes in the Northern Frisian Woodlands gained recognition. Due to their success, new territorial cooperatives began to emerge all over the Netherlands, large projects on closed-loop farming were set up in various provinces and 5% of all dairy farms in the Netherlands became closed-loop.

Furthermore, territorial cooperatives and their allies managed to transform aspects of the wider political-institutional environment of agriculture in the Netherlands. Advisory services and veterinarians now recommend the inclusion of more fibre in feed and dairy processors now recognise that closed-cycle farms produce higher quality milk. Researchers support pioneering farmers more than before, and certain provinces (and the European Union) now recognise that agriculture does not necessarily damage, but may also support environmental conservation. Until recently, European and Dutch subsidies for nature and landscape management were granted only to environmental organisations. Now, new provisions in the 2015 Common Agricultural Policy of the European Union reward collectives of farmers for services that they bring to society, including nature and biodiversity management. These are important strides for the agro-ecological transition, offering a promising pathway for peasants who cannot, or choose not to, survive in the industrial agricultural sector in the Netherlands.

Innovative approaches to learning

In contrast to the technological fixes and measures developed by agronomists and recommended to farmers, the NFW cooperative adopted different forms of horizontal learning and exchange that give the experience, values and aspirations of farmers a central role. New knowledge is gained and disseminated among farmers through a wide range of methods including excursions to other farms in and outside of the region, and small study groups in which farmers discuss their successes and failures. Another innovation is the NFW's involvement in farmer-led scientific research. Farmers raise their questions with scientists, carry out research with them on their own farms and discuss the results together, as well as within the broader communities.

Much of what is learned in these 'field laboratories' builds on traditional, and often 'tacit' knowledge. To farmers, regional characteristics, such as belts, hedgerows and embankments of alder trees have always been a self-evident part of their farms. Knowledge about crops and cattle breeds has also been passed down through generations as a base for local agrobiodiversity. The NFW territorial cooperative takes advantage of this wealth of knowledge, revalues it, and spreads it further among other farmers.



Landscape management is a core activity of the NFW farmers cooperative. Photo: NFW

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Farmer to farmer learning builds resilience in Nigeria

Over the past two years, intercropping has spread like wildfire from farmer to farmer within the Nigerian state of Kaduna. After severe crop losses to the tomato leaf miner on farms practicing mono-cropping, farmers learned the benefits of intercropping. Upscaling of agroecology is taking place autonomously through farmer to farmer learning, without state intervention.

Ahmed Inusa Adamu

Two years ago, the tomato leaf miner (*Tuta absoluta*), locally known as tomato ebola, devastated most of the tomatoes grown in the state of Kaduna, as well as in other states of Nigeria. Previous to this event, mono-cropping of tomatoes was the dominant practice.

However, in the village of Rafin Guza, a community of about 500 periurban farmers near Kaduna, several farmers experienced minimum damage from the pest. This was because tomato was not their sole crop. They were intercropping tomato with pepper, onion, garden egg, okra and other crops. Although the tomatoes were destroyed by the pest, they were able to harvest their other crops. Intercropping was the traditional practice of these farmers.

Farmer to farmer learning The Kaduna River passes through Kaduna city. For more than a century urban and periurban farming has flourished along the river because of access to irrigation water and animal manure. Farmers could buy manure from the many Fulani nomads camping at the periphery of the city or from smallholder poultry farmers. Until recently, the major crops cultivated were maize, tomatoes and cabbage. Most of the products were for the city's urban markets.

When the benefits of intercropping became clearly visible, the practice spread amongst the majority of farmers in the community. These farmers, including several community leaders, together started to diversify their cropping systems on their own. They were rarely visited by extension workers and there are no current efforts by government or other organisations to evaluate their achievements. Therefore, they assisted each other to discover which practices were most successful to reach their goals.

Farmers' indicators "This system of farming [intercropping] gives us more income and more food to feed our family. It also saves us from the devastating effect of tomato ebola", said Adamu Musa, one of the urban farmers practicing intercropping. According to him several indicators are useful for demonstrating the benefits from their systems.

- First, intercropping helps them grow a greater variety of crops, which in turn enables them to sell more food in the market. The result is not only an increase in income but also an increase in 'income spread' as they sell their produce at different times of the year. A very clear indicator of this is that Adamu Musa now sends his children to one of the city's private schools. Moreover, more than 80 % of the harvesting and retailing of vegetables is carried out by women who, as a result, share in the benefits from increased income.



Intercropping "gives us more income and more food to feed our family". Photo: Ahmed Inusa Adamu

- Second, farming families are healthier. Many farmers attest to the fact that their families are healthier than before as they consume a greater variety of vegetables and fruits.
- Third, the farmers confirm that their soil health has improved. This is because it is always covered by crops and therefore protected from erosion caused by rain splash, a serious problem during the rainy season.
- Fourth, the practice of intercropping also helps to control other pests. For example, farmers report that pests such as tomato fruit worm (*Helicoverpa armegera*) are less prevalent when practicing intercropping.

Role for researchers in upscaling agroecology The farmers' experience, supported by their own indicators, justifies their growing enthusiasm for agroecological practices such as diversification through intercropping. Yet, in Nigeria, there is little formal data on the impact of agroecology, and there is little institutional support for the spread of these kind of practices. In fact, the government continues to push strongly in the opposite direction, towards monocropping and agrochemical based agriculture.

When the benefits of intercropping became clearly visible, the practice spread amongst the majority of farmers in the community

There is a role for researchers to work with farmers to develop and analyse innovative systems such as agroecological management of insect pests. Moreover, an enabling institutional framework and supportive policies can help agroecology gain ground, not only among urban and periurban farmers but amongst Nigeria's rural population as well.

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Photo: Silvio Moriconi

Social transformation through urban agroecology in Argentina

The well-known urban agriculture programme in the city of Rosario, 300 km northwest of Buenos Aires, began as a response to the 2001 economic crisis in Argentina. It is now one of the most successful urban agroecology initiatives in South America, connected to consumer groups, educational institutes, public policy and the gastronomy movement, and offers a great model that many are learning from.

Antonio Lattuca

With over one million inhabitants, Rosario is the third city in Argentina, located in the province of Santa Fe. In a highly successful urban agriculture program, the city has converted empty lots into vegetable gardens and unemployed people into gardeners. There are currently 600 groups of around 10 persons each in the city. Over 1500 farmers were trained in urban farming, of which 250 are currently selling their excess produce. The farmers are growing their fruits and vegetables in families' gardens, in schools or public parks. Additionally, on 24 hectares of 'unused' land in the city, plots of between 600 m² and 2000 m² are assigned to interested families to use for free, and with secure tenure. Besides food, some families produce medicinal plants and make cosmetics and herbal medicines on these plots. There are four farmer-led, agro-industrial facilities in the city that process vegetables and medicinal plants. Women now make up 65% of the producers. They are active in gardening, processing, management, and they take a leading role in selling at local markets.

From crisis to food sovereignty

During Argentina's economic crisis in 2001, some 60 percent of Rosario's entire population fell into poverty. As unemployment rates soared and families in the city were struggling to feed themselves, new players became interested in urban agriculture. An inclusive municipal policy on food production in disadvantaged urban neighbourhoods was established. It sought to improve neighbourhood landscapes through the production of healthy organic food and markets that directly connect farmers with consumers. The thinking was that this would uncover the potential of unemployed people while ensuring food sovereignty of vulnerable families.

This was the context in which we started our urban agriculture programme. It brought together urban farmers, municipal officials, agricultural experts and representatives of non-governmental organisations to

assist urban families in securing and protecting agricultural spaces, and in establishing new markets. We emphasised agroecology, because it has the advantage of using accessible technology while reducing dependence on external inputs. In other words, farmers learn to produce their own inputs, such as compost, so that they can manage the entire production process themselves.

Learning and spreading Training, horizontal learning and long-term capacity building are at the core of our work. We value all types of knowledge and wisdom embedded in farming practices. In our approach, learning starts in the field and is complemented by workshops, meetings, exchanges, excursions, seminars and congresses. We work with 40 schools that have vegetable gardens to promote healthy food and care for the environment. Besides that, we organise field visits and lectures with different faculties at the University of Rosario, including the Faculties of Agrarian Sciences, Architecture, Medicine and Civil Engineering. And a couple of years ago, we created our own mobile school that focuses on knowledge exchange related to ecological crop production practices.

Growing fresh and affordable vegetables in the city.
Photo: Silvio Moriconi





Urban farmers are now considered capable of increasing the resilience of cities. Photo: Silvio Moriconi

Creating markets The market for the programme's products is expanding rapidly, and it has transformed from a niche market into a 'mass' market. Rosario's urban farmers now produce the only agroecological fruit and vegetables in the city. This food is now widely available for fair prices at farmers' 'agrochemical-free' markets, through vegetable box schemes, directly at the farms, or when dining out in the city, as a fair number of urban farmers also sell their vegetables to restaurants. Much effort has been made to ensure that the most vulnerable can produce or afford to buy seasonal fruit and vegetables. During its 16 years of existence, the programme has built relationships of trust between the state, urban farmers and consumers.

Involving young farmers The Network of Gardeners of Rosario is very strong. It is comprised of farmers from Rosario's peri-urban zone but also from rural areas further away. Farmers with a rural farming background are proud to share and promote their knowledge, particularly about soil improvement and pest management.

Urban farmers have established their own identity and their social and political legitimacy in urban development

Unfortunately, our society still does not adequately appreciate farmers' work and knowledge. We believe farmers should be at the highest level of the social hierarchy because without food, there is nothing. We therefore make an effort to improve the image of farmers and gardeners as producers of healthy food

and as caretakers of the environment. This helps to make urban farming more attractive to our youth. Young people are increasingly active within the programme. About 140 youth have been trained to become urban farmers. Some are members of cooperatives which offer ecological gardening services, while others provide courses in vegetable gardening, or train school children in the city center. This latter work is particularly important because it encourages interactions between young people from the poorest neighbourhoods and those from the wealthier city center.

Institutional recognition In Rosario, urban agriculture has now become a permanent activity and the multiple benefits have spread widely. Urban agriculture has transformed abandoned lots and spaces into productive gardens while revitalising neighbourhoods. Urban agriculture has also been formally incorporated into the city's strategic development plan, recognising it as a permanent and legitimate use of urban land. It promotes the integration of

Farmers are proud to share their knowledge.
Photo: Rosario Urban Agriculture Programme Team



urban farming into other sectors related to management of green areas, including equipment, housing, infrastructure, and transportation, etc.

In May 2016, the Municipality of Rosario launched the 'Green Belt Programme' to convert existing peri-urban horticulture in the wider Rosario metropolitan region to ecological production. Today there are 35 hectares in transition and 15 gardeners who are working with agroecological approaches. They sell their vegetables directly. In July 2017, the provincial government of Santa Fe implemented the Peri-urban Sustainable Food Production Programme which also has an agroecological orientation, in which 33 municipalities and communes participate. Over 50 farmers are now producing vegetables, oilseed and pastures for livestock on over 600 ha, as part of this programme.

In addition, from 2014 onwards, we helped to create the national Secretariat for Family Farming in Argentina. The positive experience in Rosario was one of the reasons that the importance of urban family farmers was officially recognised by this new institution, which means they can be recorded in the National Register of Family Farmers, which entitles them to beneficial tax and pension schemes. In this way, urban farmers have established their own identity and their social and political legitimacy in urban development. It has helped raise their self-esteem and they are now considered capable of increasing the resilience of cities and their inhabitants.

Inspiring others Rosario's urban agriculture programme is also linked to organic farmer networks across Argentina and our programme has become a focal point for a movement promoting agrochemical-free rings around Rosario and other towns in the highlands.

Across Argentina, our pioneering experience has inspired other urban agroecology initiatives: in Morón, Mar del Plata, Rio Cuarto, Corrientes, Tucumán and Santiago de Estero. We are also a member of the Latin American Agroecology Movement MAELA and we have inspired other Latin American cities that are now implementing urban agroecology initiatives, including Lima in Peru, Belo Horizonte and Guarulhos in Brazil, and Bogotá in Colombia. Politicians and professionals from other places have visited us to learn from our experience.

Social transformation in challenging situations Although we work primarily on urban farming, our programme is strongly focused on social issues such as territorial approaches, agroecology, social inclusion and environmental protection. We, therefore, see urban agroecology as a means for social transformation in challenging situations.



Women make up 65% of the producers in the programme. Photo: Silvio Moriconi

We see urban agroecology as a means for social transformation in challenging situations

The programme has built bridges between the rural and the urban, between the public and private sectors, and between farmers, consumers and civil society as a whole. And in particular, we have helped to transform the image of farmers into a positive one, and farmers are now appreciated in Rosario as caretakers of the earth and of our landscapes. And perhaps, most importantly, the youth, the farmers of the future, have been infected with enthusiasm for agroecology.

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This article is based on an interview published in LEISA Revista de agroecología, June 2015

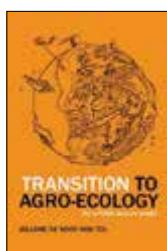
MIND! > BOOKS ON AMPLIFYING AGROECOLOGY



From Uniformity to Diversity: A paradigm shift from industrial agriculture to diversified agroecological systems

Emile Frison (ed), 2016. IPES-Food

This book examines how the problems in food systems are linked specifically to the uniformity at the heart of industrial agriculture, and its reliance on chemical fertilizers and pesticides, and makes a plea to diversify agriculture and reorient it around ecological practices. It identifies eight key reasons why industrial agriculture is 'locked' in place and maps out a series of steps to break these cycles. It is not a lack of evidence holding back the agroecological alternative, the authors argue. It is the mismatch between its huge potential to improve outcomes across food systems and its much smaller potential to generate profits for agribusiness firms. They recommend steps to diversify agroecological farming, democratise decision-making and rebalance power in food systems.



Transition to agroecology for a food secure world

Jelleke de Nooy van Tol, 2016. Authorhouse UK

This book takes you along in the transition to agroecology, which is already happening, worldwide. The author presents the dispersed but growing movement of farmers, projects, programs, research, and policy agendas that are making the change. Providing keys for transition, the author looks back from 2030. What have we done by then to arrive at a changed food-secure world where agroecology is 'the new normal'?



Food sovereignty, agroecology and biocultural diversity

Michel Pimbert (ed), 2018. Routledge.

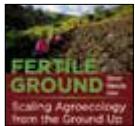
The production of knowledge – and who controls it – is a key focus of social movements and others who promote food sovereignty, agroecology and biocultural diversity. This new book argues that there is a need to re-imagine and construct knowledge for diversity, decentralisation, dynamic adaptation and democracy. It critically explores the changes in organisations, research paradigms and professional practice that could help transform and co-create knowledge for a 'new modernity', based on plural definitions of wellbeing. The book thus contributes to the democratisation of knowledge and power in the domain of food, environment and society.



Scaling up agroecological approaches: What, why and how

Stephane Parmentier, 2014. Oxfam Solidarity.

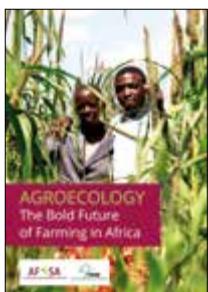
This paper provides key recommendations for upscaling agroecological approaches. It explains what agroecology is, situating it in both peasant and industrialised agriculture, and starting from its dimensions as a science, a practice and a movement. It introduces the discussion on the technical feasibility of applying agroecological principles to large-scale industrial farms. The paper then clarifies how the agroecological transition can contribute to achieving sustainable agricultural and food systems, identifies the main challenges for upscaling and formulates recommendations to address them.



Fertile Ground: Scaling agroecology from the ground up

Steve Brescia, (ed), 2017. Food First.

Agroecology is our best option for transitioning to food and farming systems capable of nurturing people, societies, and the planet. This book makes that clear through nine case studies, authored by practitioners from Africa, Latin America, the Caribbean, North America, and Europe, that demonstrate how agroecological innovation can be deepened, scaled up and scaled out by spreading it among ever growing numbers of farmers, and integrated into markets, discourse and public policy.



Agroecology. The bold future of farming in Africa

Michael Farrelly, G. Clare Westwood, Stephen Boustred (eds), 2016. AFSA & TOAM

A wealth of evidence is presented here that agroecology works in Africa. Case studies show that many farmers in Africa are already practising agroecology successfully. It analyses the catastrophic failure of the industrial food system, which "voraciously devours precious natural resources, spews out a third of global greenhouse gas emissions, and fails on almost every count of sustainability". It then offers a vision of a global food system that is sustainable and equitable for all; a vision with people-centred values and ethical systems. The book makes overwhelmingly clear that a growing movement of African farmer organisations and networks is committed to agroecology as the way forward.



Global Policy Toolkit on public support to organic agriculture

IFOAM – Organics International, 2017.

This is a toolkit resulting from a one-of-a-kind global study on policies and programmes that have been set-up by governments to support organic and sustainable agriculture. The toolkit is aimed at anyone involved in advocating for pro-organic policies, designing them, or deciding on them. It contains a comprehensive study report, a series of policy briefs, Power Point presentations for advocates to use in each topic, tips, a policy template, a decision-aid online tool to help prioritise appropriate policy measures, etc. Download at www.ifoam.bio.



New method: Estimating agroecological producers in a territory

IFOAM – Organics International and FAO, 2018

IFOAM and FAO developed a 'best-guess method' to provide an indication of the overall number of agroecological producers in a territory or country, and their agricultural area. The methodology is based on the estimations of a minimum of three independent locally engaged expert groups. During workshops experts exchange their insights and experiences in a dynamic way, gaining understanding of the number of food producers using agroecological practices and the agricultural area they use for its production. The results illustrate the knowledge and experiences of local stakeholders and are an attempt to develop a new inclusive view on agroecology. Results of estimations in two pilot countries will be presented at FAO's Agroecology Symposium in April 2018 in Rome.

Learning from experience is crucial for upscaling

Successful experiences in agroecology exist everywhere, as over 30 years of documentation by ILEIA and its partners in the AgriCultures Network have shown. These experiences are often powerful and consistently produce results that contribute to the Sustainable Development Goals. However, only in a supportive institutional environment can these experiences break out of isolation and reach a larger scale.

Coen Reijntjes and Edith van Walsum

One crucial source of knowledge and inspiration for the agroecological movement has been the identification and documentation of initiatives in agroecology and the dissemination of the lessons learned. This has always been the core approach of ILEIA, and although the institution has closed its doors in 2017, the approach remains alive. It now has a central space in the debate on 'upscaling' agroecology, and rightly so. In this reflection we would like to both look back *and* forward.

In 1984, several Dutch development workers who returned home from their first work experiences in Africa shared the same observation: the farmers they had worked with did not benefit from the extension and research approach which introduced market-oriented, 'modern' agriculture based on external inputs such as chemical fertilizers, pesticides, improved seeds and breeds, irrigation, and blueprint- and science-based knowledge. For the specific conditions of small scale farmers in rainfed areas, these external inputs were too expensive, often not available, not fitting, and full of risks for health and ecology. This observation led them to the question: might farmers benefit from

sharing their unique insights about effective practices in ecological agriculture around the world? The Dutch group then started ILEIA, an organisation that aimed to share information about what was called Low External Input and Sustainable Agriculture (LEISA). Their ILEIA Newsletter facilitated the exchange of lessons from existing experiences, and is now known as Farming Matters magazine.

Learning from farmer practices

In the late 1980s, a pioneering group of activists and scholars, including the founding members of ILEIA, took *Participatory Technology Development (PTD)* as a starting point: a joint learning process in which farmers and scientists merge indigenous and scientific knowledge. Respect for farmers' traditional and local practices, seeds, breeds and knowledge encourages farmers to strengthen their experimentation with technologies and concepts that fit the conditions of their own place, culture and economy. Development and extension workers as well as scientists can support these processes with their skills, knowledge and influence.

Initial work of this group included systematic documentation of farmer practices of working with nature

to regenerate locally available resources. They brought farmers, researchers and practitioners together to combine their knowledge and jointly tackle issues of water, soil and pest management, agrobiodiversity, agroforestry, traditional seeds and breeds etc. In 1992 all the 'new' and 'old' concepts explored over decades were brought together in a resource book, *Farming for the Future*, which was translated into seven languages and became an important reference in the growing body of knowledge on ecology-based agriculture which today is called *agroecology*.

Towards an enabling institutional environment ILEIA identified organisations in different parts of the world that worked with similar perspectives in their countries and regions. Bringing these networks together opened channels of communication so that knowledge about practical experiences could flow across continents. Inspired by *Farming Matters*, some of the organisations started to develop their own regional magazines in different languages, forming the AgriCultures Network. The lessons from their systematic documentation of farmers' experiences did not only find their way into magazines but also into policy proposals presented at international fora such as the Rio+20 Conference, FAO symposia on family farming and agroecology, and the UN Convention on Desertification.

Successful experiences can be found everywhere. Existing practices and initiatives are often powerful, involve many people and consistently produce results that contribute to reaching the SDGs. Understanding why the practices work is a key stepping stone in amplifying agroecology. But it is not enough. If the institutional environment does not change, these experiences remain small and isolated. An enabling policy and legislative framework at the level of ter-

People's knowledge

In the November 1985 issue of ILEIA's magazine, Hans and Ana Carlier stated: "Farmers can solve the majority of their problems themselves when you help them to regain their self-reliance, which has been destroyed over many years of so-called development." They continued: "Traditional knowledge gets lost simply due to the silence around the experiences of rural people. In universities, nobody talks about traditional agriculture, food systems or medicine. Even anthropologists are not interested in the technology of the survival of peasants. The culture of small scale farmers does not appear in mass media, agricultural schools or research stations. These are the main reasons why peasants lose their self-confidence, and consequently their traditions and their skills to adapt to changing conditions."

Reflecting on these statements, we see much has changed since 1985. Peasants now have a much stronger voice, and traditional knowledge is no longer silenced, thanks to the work of many people around the world over the last 30 years.

ritories, national states as well as internationally, and a supportive discourse in society are fundamental for experiences in agroecology to grow, amplify and reach scale.

Coen Reijntjes (c_j.reijntjes@planet.nl) was ILEIA's editor between 1985 and 2003. Edith van Walsum (em.van.walsum@gmail.com) was director of ILEIA between 2007 and 2017.

COLOPHON

Farming Matters

Experiences in family farming and agroecology

This issue of *Farming Matters* is published by the AgriCultures Network in collaboration with IFOAM – Organics International.

www.agriculturesnetwork.org
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The AgriCultures Network

The AgriCultures Network consists of five organisations that provide information on agroecology and family farming around the world and that publish LEISA revista de agroecología (Latin America, in Spanish), LEISA India (in English, Hindi, Kannada, Marathi, Oriya, Punjabi, Tamil, Tegulu), AGRIDAPE (West Africa, in French), Agriculturas, Experiências em Agroecologia (Brazil, in Portuguese) and Wegel (Ethiopia, in Amharic). The secretariat of the AgriCultures Network is based in Dakar, Senegal.

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Women farmers in Burkina Faso practicing agroecology. Photo taken by Association Nourrir Sans Détruire (ANSD)/ Groundswell International.

The editors have taken care to ensure that the contents of this magazine are as accurate as possible. The authors have ultimate responsibility, however, for the content of individual articles.

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The biggest challenge for upscaling agroecology lies in the push by big business and philanthro-capitalists for commercial agriculture in Africa

Million Belay, page 20

AGROECOLOGY OFFERS OUR BEST HOPE OF TRULY REACHING THE SDGS, PARTICULARLY ADDRESSING HUNGER AND POVERTY

Elizabeth Mpofu, page 33

FARMER-TO-FARMER EXCHANGES GAVE RISE TO A NETWORK OF OVER 1300 WOMEN FARMER-INNOVATORS

Adriana Galvão, page 24

Farmers challenged the historical antagonism between agriculture and nature conservation

Leonardo van den Berg, page 36



Farming Matters is published by the AgriCultures Network, a global network of organisations that share knowledge about agroecology and family farming. This issue was produced in collaboration with IFOAM - Organics International. **Download your magazine from www.agriculturesnetwork.org.**

