06 | 2017 - 33.2

FARMING MATTERS

Experiences in family farming and agroecology

Formerly known as LEISA Magazine

agri cultures NETWORK GLOBAL EDITION

Food and the climate crisis

Surrounded by coal mines

My name is Wendy Bowman. I farm in Camberwell, a small village in NSW, Australia, surrounded on three sides by coal mines. In 2010, Chinese-owned Yancoal proposed to extend an existing open cut mine onto my grazing lands and to the banks of one of Hunter River's most important tributaries. I am determined to stay on my land and protect the community's health, land, and water from further destruction.

Water is life. Australia is the driest inhabited continent on earth. Many hundreds of farmers rely entirely on underground water from wells and bore holes for their animals and irrigation. However, over the last few decades, coal mining has destroyed many of the underground aquifers in the Hunter Valley. As a result, during droughts, which we appear to be facing more and more often because of climate change, farmers have to rely on stored dam water. Unfortunately, during droughts, the dams do not get replenished as they used to. It can potentially become a dire situation for livestock and for crops.

In 1991, I first met with some like-minded people and started the organisation called Mine Watch. Our aim was simply to find out what our rights were as land owners, and then try to decipher the *mine speak* in the very large Environmental Impact Statements (EISs). We had to read them to prepare our submissions to the planning authority when we opposed the mine proposition, but some of the EISs were as thick as three encyclopedias. It was a monumental effort to make sense of them, but it was worth it. Now, Mine Watch has grown in political and social importance. It has a substantial media presence, and a significant impact on government policy.

I still farm on my land, albeit surrounded by mines, but the work is far from over. Our underground water supply is now particularly threatened by the mining companies' desire for profits and the government's desire for royalties. Money still speaks louder than the need to protect our environment. This must change. We must all work together in our efforts to leave a viable land for future generations.

Wendy Bowman won the 2017 Goldman Environmental prize. This is an extract from her acceptance speech. Photo: Goldman Environmental Prize

CONTENTS

Agroecology
getting to the root causes of climate change

This issue of Farming Matters addresses the intersection of agroecology, food sovereignty and the climate crisis. Climate change is a political problem that highlights the need for systemic change to the way food is produced, processed and distributed. From agroecological practices that build resilience, to social movements that resist land grabbing, the articles presented here not only argue for changes to the food system but demonstrate some of the possibilities.

GRAIN, Jessica Milgroom and Madeleine Florin

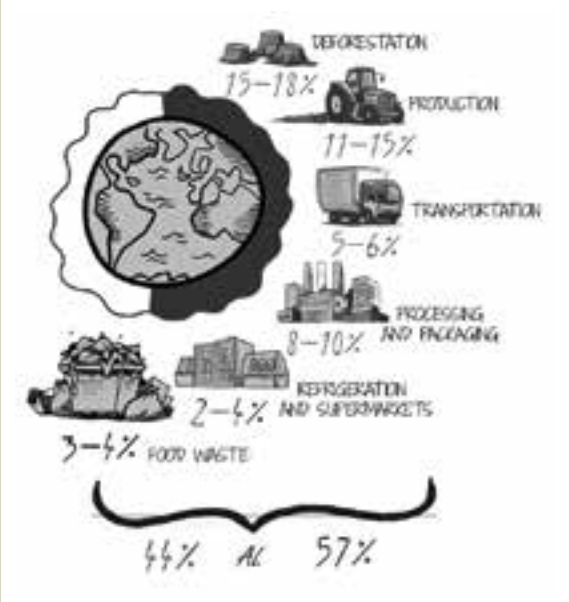
"Food has not been the focus of climate change discussions as much as it should have been. (...) We can still act and it won't be too late"
Barack Obama, 26 May 2017.[1]

Of course, Barack Obama can speak more freely now that he's not in the White House with the agribusiness lobby breathing down his neck. But he is right in that the climate–food connection has been largely absent from the climate discussions – at least in the official circles. This issue of Farming Matters focuses on this connection. It shows how the industrial food system is a main culprit when it comes to the climate crisis, and illustrates how agroecology and food sovereignty offer solutions by addressing the root causes of this crisis – political, social and environmental.

The latest studies calculate that the global food system – from farm to fork – is responsible for at least one third of all greenhouse gas emissions, a figure that seems to increase with the release of each new report.[2] GRAIN puts the figure closer to 50%, and stresses that it is the *industrial* food system which is mostly responsible for this.[3] Besides not feeding the people with enough healthy, culturally appropriate and sustainably produced food, the industrial food system is also leading us down the path of a global environmental crisis, of a scale and impact that humanity has never faced before.

Agriculture is supposed to be about turning the energy provided by the sun into food and fibre. But the corporate-driven global food system mostly relies on fossil energy: for chemical fertilizers and pesticides, mechanisation of the farm, pumping water for irrigation, etc.

Summary of how the agroindustrial food system contributes to the climate crisis.
Source: Together we can cool the planet, La Via Campesina & GRAIN, 2016. (see page 36)



Agroecological practices would massively build back organic matter into the soils and largely eliminate the need for chemical fertilizers (see page 38). Photo: Kate Sylvan

Deforestation driven by ever expanding commodity crop plantations, soil erosion driven by unsustainable practices, transport, processing and freezing of food produced in places far away from where it is consumed, and the tremendous energy waste in the increasingly centralised corporate retail and supermarket systems aggravate the problem. Each of these emit huge amounts of greenhouse gases into the atmosphere.

Despite the obvious connection between the industrial food system and the climate crisis, and the obvious potential that agroecology and food sovereignty offer to turn the tide, these links are nowhere to be seen in any of the governmental climate negotiations. Instead, government officials seem to be betting on financial carbon markets and other corporate-driven 'solutions' that get us in deeper trouble. As Michel Pimbert explains, these false solutions include 'Climate-smart Agriculture' initiatives which merely conform to the dominant industrial food and farming system and are working against a truly transformative agroecology (page 9). REDD+, carbon markets and biofuel policies are additional examples of false solutions that work against agroecology and food sovereignty. In another article (page 28), GRAIN shows how industrial meat and dairy production is encouraging over consumption of meat with a disastrous impact on the climate and human health.

It doesn't need to be this way. A radical shift towards food sovereignty would go a long way in solving the climate crisis: agroecological practices would massively build back organic matter (carbon) into the soils and largely eliminate the need for chemical fertilizers, and a focus on local markets and fresh produce would reduce the need for long distance transport, freezing and processing. Agrarian reforms aimed at supporting small scale food producers rather than promoting plantation farming would give back the land to those who produce food rather than those who produce commodities and help stop deforestation in the process.

Nurturing the soil, cooling the planet

The food–climate intersection is rooted in the earth. The expansion of unsustainable agricultural practices over the past century has led to the destruction of between 30-75% of the organic matter in soils on arable lands, and 50% of the organic matter on pastures and prairies. This massive loss of organic matter is responsible for a large part of the current CO_2 excess in the earth's atmosphere. But the good news is that the CO_2 that we have sent into the atmosphere can be put back into the soil simply by restoring and supporting the practices that small farmers have been engaging in for generations. This has the potential to capture more than two thirds of the current excess CO_2 in the atmosphere.[4]

On page 38, Nicholls and Altieri provide plenty of examples outlining the role of diversity, soil organic matter and soil cover in reducing farmers vulnerability to climatic shocks. Another article (page 26) documents the efforts being made in the United States to learn from farmers' innovative practices developed to take care of the soil. Increased intensity and frequency of drought is becoming a more common phenomena in many parts of the world. Soil and water conservation that promotes ecological resilience has been a key

A focus on local markets and fresh produce would reduce the need for long distance transport, freezing and processing. Photo: Shalmali Guttal (see page 32)

strategy for farmers in Haiti to continue producing food (page 14). But, these Haitian farmers also know that building resilience is not just an ecological question, and they are also challenging state power and defending their rights. The struggle against the climate crisis is also a question of equality and justice.

Climate justice Those who are most gravely affectedly climate change are those who are the least responsible for it. Shalmali Guttal (page 32) asserts that: "The struggles of local communities against forced evictions, industrial agriculture, extractive industry and large dams, and to protect their lands, territories, seeds and breeds are all struggles for climate justice." Today, small farmers are squeezed onto less than a quarter of the world's farmlands, but they continue to produce most of the world's food. Over the past 50 years, a staggering 140 million hectares – the size of almost all the farmland in India – has been taken over by four crops grown predominantly on large plantations for industrial purposes: soybeans, oil palm, rapeseed and sugar cane. The global area under these and other industrial commodity crops, is set to further grow if policies don't change. All too often alliances between states and corporations conspire to promote market-driven 'development' that undermines small scale producers' rights to land and natural resources. In the context of climate change and natural disasters, 'disaster capitalism' exacerbates this kind of dispossession and permanent displacement of people. For example, in the Philippines, the devastation caused by Typhoon Yolanda, was used to defeat farmers who had been resisting land grabbing for decades before the disaster struck (page 42).

The pages in this magazine demonstrate how small scale farmers bear some of the biggest burdens brought about by the crisis, yet, the agroecology that many practice and the food sovereignty that many strive for provide a pathway to cool the planet and feed its people. We won't be able to stop the climate crisis until this is recognised and accepted by those in power. Obama is right when he says that we can still act and it won't be too late. But it has to involve challenging the corporate food system and putting agroecology and small scale farmers first again.

GRAIN (grain@grain.org) is an international non-profit organisation that works to support small farmers and social movements in their struggles for community-controlled and biodiversity-based food systems.
Jessica Milgroom (j.milgroom@ileia.org) and **Madeleine Florin** (m.florin@ileia.org) both work at ILEIA.

References

1 https://www.theguardian.com/global-development/2017/may/26/barack-obama-food-climate-change
2 Climate Change & Food Systems: Assessing Impacts and Opportunities. Meridien Institute 2017
3 Food sovereignty: five steps to cool the planet and feed its people. GRAIN 2014
4 Earth matters - Tackling the climate crisis from the ground up GRAIN, October 2009

Photo: Magriet Goris

Agroecology as an alternative vision to Climate-smart Agriculture

Taken together, agroecology and food sovereignty represent an alternative paradigm to Climate-smart Agriculture and conventional development. This article focuses on the more transformative elements of agroecology and food sovereignty to clearly identify overlaps and divergences with Climate-smart Agriculture and highlight its incompatibilities with conventional development.

Michel Pimbert

Five years ago agroecology was barely recognised within official circles, but today it is centre stage in policy discourse on food and farming. This growing international recognition is good news for proponents of agroecology. But, agroecology means different things to different people. As has happened before with words such as 'sustainability', the meanings of agroecology are now increasingly contested and re-interpreted by different people and interest groups.

Simply put, the term 'agroecology' is now being used by different actors as part of their vision of the future that either seeks to conform to the dominant industrial food and farming system, or to radically transform it. An example of the former is the concept of Climate-smart Agriculture (CSA) in which 'agroecology' is presented as an important component, as developed by the UN Food and Agriculture Orgnization (FAO , 2010) and promoted by the Global Alliance for Climate-smart Agriculture (GACSA). In sharp contrast, agroecology developed within the paradigm of food sovereignty has a more transformative content, theory and practice (see box).

Climate-smart Agriculture and agroecology: overlaps

The proponents of CSA have selectively incorporated some agroecological practices and combined them with more mainstream technologies of industrial farming. At one level there does appear to be overlaps and possible convergences between CSA and the traditions of agroecology presented in the box. For example, FAO's general definition of CSA describes attributes that are also claimed by agroecology: "CSA sustainably increases productivity, resilience (adaptation), reduces/removes greenhouse gases (GHGs) (mitigation), while enhancing the achievement of national food security and development goals" (FAO, 2010).

Moreover, proponents of CSA realise that approaches that focus exclusively on agricultural production without taking into account environmental sustainability are likely to have negative, and possibly, irreversible consequences. Indeed, CSA advocates emphasise the need to sustainably increase agricultural productivity and incomes.

Climate-smart Agriculture and agroecology: divergences

Despite these broad similarities, agroecology and CSA are fundamentally different in other important regards. For example, CSA does not exclude practices and technologies that can undermine, or are incompatible with, agroecological approaches. Along with environmentally friendly agroforestry and intercropping practices, CSA also embraces and promotes an eclectic mix of herbicide-tolerant crops, toxic insecticides and fungicides, genetically modified seeds and genetically engineered livestock and fish, proprietary technologies and patents on seeds, as well as energy-intensive livestock factory farming, large scale industrial monocultures and biofuel plantations. Influential actors backing CSA also support finance and investments for market-based approaches to climate adaptation and mitigation as well as the funding of CSA projects by carbon-offset schemes. The commodification of carbon and the creation of private carbon rights in the name of 'green growth' is part of CSA's agenda.

A clear definition of what CSA is – and what it is not – is absent. This allows the concept to be co-opted by some of the world's biggest industrial contributors to climate change. Agrichemical corporations and

A brief history of agroecology

At the heart of agroecology is the idea that agroecosystems should mimic the biodiversity levels and functioning of natural ecosystems. Since the term was coined in 1928 by Bensin, agroecology's transformative content, theory and practice has evolved:

- Increasing awareness about the environmental impacts of, and pollution caused by, industrial farming really set the stage for closer links between agronomy and ecology in search for more sustainable agriculture(s).
- Initially there was a strong focus on ecological science as the basis for design of sustainable agriculture.
- The importance of farmers' knowledge for agroecological innovation became increasingly recognised and championed by the pioneers of agroecology. Agroecological approaches consciously seek to combine the experiential knowledge of farmers and indigenous peoples with the latest insights from the science of ecology.
- In the 1990s, agroecology moved from the agroecosystems scales towards a focus on the whole food system. This broader perspective encouraged closer links with farmer organisations, consumer-citizen groups and social movements.
- For many farmers' organisations and social movements today, agroecology is explicitly linked with food sovereignty.

A process of 're-peasantisation' is slowly unfolding as more national and regional organisations proudly embrace the term 'peasant' to describe themselves. Photo: FIPAH

their lobby groups are strongly represented in the major alliances and initiatives promoting CSA today. For example, CSA is one of the World Business Council for Sustainable Development's Low Carbon Technology Partnerships Initiative's (LCTPi) eight main priority areas, and involves major corporations in the food and agriculture-related sectors. The programme is co-chaired by Monsanto and also includes Yara, DuPont, Dow, Olam, Walmart, Tyson Foods, PepsiCo, Diageo, Starbucks, Kellogg's, Jain Irrigation, ITC, Uniphos, Coca-Cola and Unilever. In today's competitive world capitalism, the chief executives of all these companies involved in CSA are obliged to prioritise profits over equity and sustainability.

CSA – and the corporate version of CSA in particular – thus represents a continuation of business-as-usual industrial agriculture in which farmers are increasingly dependent on agrichemical corporations for external inputs and global commodity markets for the sale of their farm produce. Moreover, the corporate drive to expand CSA markets for nitrogen and phosphorus fertilizers, as well as genetically uniform seeds, is likely to further destabilise the earth system and its capacity to support contemporary human societies. As such, CSA's practices are not at all compatible with the more transformative visions of agroecology.

Four dimensions of agroecology for food sovereignty make it radically different from the vision of CSA and conventional development.

> Agroecology in the context of food sovereignty goes much further than Climate-smart Agriculture's focus on agricultural production alone

A new modernity and peasant identity

The 2.5 billion small scale farmers, pastoralists, forest dwellers and artisanal fisherfolk that still provide most of the world's food through localised food systems, are largely ignored, neglected or actively undermined by governments and corporations. First, the dominant development paradigm envisions having less people living in rural areas, farming and depending on localised food systems. Many development policies are indeed based on the belief that those subsistence producers should 'modernise' as quickly as possible. They should become fully commercial producers by applying industrial food and agricultural technologies that allow for economies of scale. Second, the global restructuring of agri-food systems threatens local food systems, with a few transnational corporations gaining monopoly control over different

links in the food chain. This modernisation agenda is seen as desirable and inevitable by most corporations and governments.

However, the idea that small scale producers and indigenous peoples as a group are bound to disappear reflects just one vision of the future – it is a political choice that is disputed and rejected by social movements working for agroecology and food sovereignty. A process of 're-peasantisation' is slowly unfolding as more national and regional organisations proudly embrace the term 'peasant' to describe themselves, projecting an alternative identity and modernity rich in meaning and hope for the future. Embraced by a growing number of youth, this vision of modernity rejects the idea of development as a process of commodification of nature and social relations and looks to other definitions of 'the good life' – including *Buen Vivir* or *Sumak Kausai* in Latin America, Degrowth in Europe and Ecological *Swaraj* in India.

From linear to circular food systems

Agroecology in the context of food sovereignty goes much further than CSA's focus on agricultural production alone: it questions the structure of the entire food system. From field to plate, the globalised supply chains that feed the world rely on the intensive use of fossil fuels for fertilizers, agrochemicals, production, transport, processing, refrigeration and retailing. Together, these are a major contributor to climate change and air pollution. Worldwide, food and agriculture may be responsible for up to 50% of global GHG emissions. Modern industrial food, energy and water systems are fundamentally unsustainable. The imperative is now for transformation rather than reforms that leave the basic structure of modern food systems unchanged.

In circular production systems, specialised and centralised supply chains are replaced with resilient and decentralised webs of food and energy systems. Photo: Sophie Verhagen

An alternative to the conventional development model is to shift from linear systems to circular ones that mimic natural cycles. This can be done by adopting two ecological principles. The first is that nature is based on nested and interacting cycles – for example, carbon, nitrogen, phosphorus and water. The second is that 'waste' is converted into a useful form by natural processes and cycles, ensuring that waste from one species becomes food for other species in the ecosystem. In circular production systems, specialised and centralised supply chains are replaced with resilient and decentralised webs of food and energy systems that are integrated with sustainable water and waste management systems. Circular systems can be developed at different scales, from individual farm plots to entire cities.

Well-designed circular systems based on cooperative, communal and collective tenure over land, water, seeds, knowledge and other means of livelihood can: reduce fossil fuel use and emissions; increase food, water and energy security; create jobs; boost incomes; and, promote resilient and self-reliant communities that are inclusive of gender, race, class, disability, ethnicity and difference.

Rethinking economics, trade and markets

In sharp contrast to CSA and conventional development, a transformative agroecology and food sovereignty seeks to reduce dependence on corporate suppliers of external inputs and distant global commodity markets. This vision for the transformation of the dominant agri-food regime translates into an approach that emphasises forms of economic organisation and regeneration based on five changes:

- Re-embedding agriculture in nature, relying on functional biodiversity and internal resources for production of food, fibre and other benefits
- Farmers distancing themselves from markets supplying inputs (seeds, fertilizers, growth hormones, pesticides, credit, etc.)
- Farmers diversifying outputs and market outlets
- A rediscovery of forgotten resources
- Trade rules that protect local economies and ecologies

At a deeper level, it is also becoming clear that a fundamentally different kind of economics is needed for a widespread shift to agroecology and food sovereignty.

Deepening democracy

One of the clearest demands of the agroecology and food sovereignty movement is for citizens to exercise their fundamental human right to decide their own food and agricultural policies (Nyéléni, 2007). Food

One of the clearest demands of the agroecology and food sovereignty movement is for citizens to exercise their fundamental human right to decide their own food and agricultural policies (Nyéléni, 2007). Photo: Thiery Kesteloot

sovereignty is indeed perhaps best understood as a process that seeks to expand the realm of democracy and freedom by regenerating a diversity of locally autonomous food systems. Democratising food system governance means enabling farmers and other citizens, both men and women, to directly participate in the choice and design of policies and institutions, decide on strategic research priorities and investments, and assess the risks of new technologies. This can be best done through an expansion of direct democracy in decision making in order to complement, or replace, models of representative democracy that prevail in conventional development.

The struggle to democratise agricultural research for agroecology and food sovereignty is emblematic in this regard. Social movements and activist scholars acknowledge that technological fixes are not enough and view science as part of a bottom-up, participatory development process in which farmers and citizens take centre stage. In this approach, instead of being passive beneficiaries of 'trickle down' development or technology transfer, food producers and citizens participate as knowledgeable and active social agents, including in setting upstream strategic priorities for national research and its funding.

A truly transformative agroecology

CSA and agroecology are not interchangeable concepts nor practices that can easily coexist. They represent two fundamentally different visions of development and well-being. CSA is mainly designed to serve the interests of agribusiness and the financial industry. Its powerful supporters and lobby groups are committed to conventional development based on uniformity, centralisation, control and the expansion of global markets – including new carbon markets. In contrast, a truly transformative agroecology aims to rebuild a diversity of decentralised, just and sustainable food systems that enhance community and social-ecological resilience to climate change. Its supporters seek to deepen economic and political democracy while inventing a new modernity based on conviviality and plural definitions of well-being.

Climate-smart Agriculture and agroecology are not interchangeable concepts nor practices that can easily coexist

Michel Pimbert (michel.pimbert@coventry.ac.uk) is the executive director of the Centre for Agroecology, Water and Resilience at Coventry University, United Kingdom.

This article is based on the author's original article: Agroecology as an Alternative Vision to Conventional Development and Climate-smart Agriculture, Development (2015), 58(2-3): 286-298.

Movement building at the heart of Haitian peasants' response to climate change

Photo: Grassroots International

Social movements in the Haitian countryside are dealing with the politicised challenge of climate change through methods that reach back to a rich agrarian tradition and weave in contemporary grassroots solutions. Deep in the Central Plateau, the Peasant Movement of Papaye (MPP) is leading the way towards a new Haiti centred on food sovereignty and climate justice. These twin proposals are not only a way out of hunger and the climate crisis, but are political tools meant to contribute to systemic change in Haiti and beyond.

Mina Remy and Salena Tramel

Haitians are used to navigating the intersections that occur where nature meets politics, and the small Caribbean country's landscape shows the scars of that process. Bare mountains that were once green loom over makeshift, seaside cities where the rural majority once farmed and fished. Every now and then, Haiti, paradoxically isolated from and dependent on the rest of the world, makes the news: a state coup, a massive earthquake, or yet another hurricane. And today, while receiving a lesser degree of international attention than these monumental moments, the increasing impacts of climate change are threatening to break Haiti's already weakened agricultural backbone.

Climate disruptions

In October 2016, the country was hit by Hurricane Matthew, a category 4 storm which completely flooded large swaths of the country, and devastated Southern Haiti. Hurricane Matthew hit just weeks before harvest, and the country has not recovered since. As a matter of fact, farmers in Haiti are now dealing with periodic flooding. Without respite, they have gone from one extreme to another: in the 2014/15 season, the county's agricultural production fell by more than 80% due to drought.

Most of Haiti's trees have been cleared: between 1804 and 2015, forest cover plummeted from 80% to just 1.25% of the land surface. The resulting erosion has severely compromised soil fertility and access to drinking water. Degraded soil and water resources, combined with an extended drought, have left about 70% of the population without adequate food and water. When natural disasters hit the ground, the lack of forest causes severe amounts of runoff, exacerbating the effects of flooding associated with the hurricane season.

The Peasant Movement of Papaye (MPP) is the largest peasant movement in Haiti, located in the Central Plateau. The Central Plateau mirrors the interconnected trends of deforestation and climate disruptions observed elsewhere across Haiti. Gislaine St. Fleur, the coordinator of MPP's women's programmes sees climate change as one of the biggest challenges facing Haitian people. "The majority of families live off the land. With climate change, people can't produce enough food to feed themselves and take care of their children," she explains. The rainfall patterns in Haiti have become increasingly unreliable, with

MPP tire grardens are used to produce food.
Photo: Grassroots International

An MPP Eco-village where families live, farm and learn together. Photo: Grassroots International

more frequent droughts on the one hand, and more powerful hurricanes on the other. This situation has strengthened MPP's resolve to engage with soil and water conservation, as well as reforestation, to adapt and build resilience to climate change.

Grounded solutions

"Any meaningful solution to climate change starts from the ground," says Ginette Hilaire, a member of MPP. Depleted soil means less nitrogen is absorbed, more carbon is released into the air (producing more greenhouse gases), and the ground itself cannot handle the rainy season, let alone the storms and hurricanes that are occurring with more frequency. What's more, any real solution also starts from the grassroots. The best chance to protect, restore and promote sustainable use of ecosystems, combat desertification, maintain biodiversity and halt and reverse land degradation come from those most affected by land grabs, ecological disaster and deforestation.

With a clear analysis of the climate crisis and the consequences it brings for Haiti, which is already environmentally devastated, MPP works to recover the environment to a degree that peasant farmers can produce enough healthy food to feed the nation. Solutions to, and consequences of, this kind of climate disruption are tied to land rights, food sovereignty and ecological resilience. The same is true around the world. The United Nations agrees, agroecologists agree, small farmers agree, and even a growing number of economists and politicians agree.

The fight against climate change in Haiti is thus a political one. For Haitian social movements, agroecology fills the gaps left by a fragile state and aggressive external intervention. It is the point at which food sovereignty meets climate justice.

> The MPP has planted more than 30 million trees over the past 40 years

Building the movement for agroecology

The MPP is at the forefront of building alternatives that will make a real difference for people in Haiti. Formed in 1973, the movement has 61,000 members divided into 4,179 *gwoupman*, a traditional form of organising. Within the *gwoupmans* peasants share land, engage in economic projects, and save money through collective savings accounts and livestock. Public services have, for decades, failed those living in rural areas, with an increasingly centralised Haitian government. Agribusiness and other profit-driven activities in the countryside have only magnified the isolation of the peasantry. Social movements like the MPP have taken on the challenge of providing much needed services to rural working people, including education, health care, and maintenance of roads.

For the MPP, whether working for climate, economic, or other forms of justice, it all starts with securing natural resources, which in turn starts with agroecology. As Juslene Tyresias, an MPP leader explained, "We plant a lot of trees. We conserve water in the soil. We build cisterns and wells so that people can have water." The MPP has planted more than 30 million trees around Papaye over the past 40 years, while maintaining a wide variety of other services for those living there. But perhaps even more importantly, they are working to replicate their efforts across scales.

MPP recognises that bringing agroecology to the national dialogue would require sustained pressure from the grassroots, and that it would have to extend far beyond Papaye or the Central Plateau. The National Congress of the Papaye Peasant Movement

(MPNKP) was conceived by MPP in order to replicate agroecology and related projects in all ten Haitian departments. Their work is similarly rooted in popular education and organising. MPP and MPNKP are both members of the transnational agrarian movement La Vía Campesina that has worked with a variety of stakeholders – from national governments to international intergovernmental organisations – to incorporate food sovereignty, agroecology, and climate justice into regulatory frameworks.

In the Americas, MPP has hosted and participated in several key learning exchanges. At the invitation of Haitian social movements, and under the banner of La Vía Campesina, Brazilian social movements travelled to Haiti over multiple years to work with their Haitian counterparts in the field of agroecology. This was politically significant in that Brazil has been heavily involved in MINUSTAH, the UN stabilisation mission that Haitian social movements regard as an occupational force in their country. MPP activist, Juslene Tyresias, travelled to New Orleans as part of the Climate Justice Alliance delegation to commemorate the 10-year anniversary of Hurricane Katrina. The event was organised by Gulf South Rising, a movement created to highlight the impact of the global climate crisis on the Gulf South region of the US.

Visions for the future

The MPP has made great progress in planting trees and building infrastructure—as well as building a multi-level social and environmental justice movement. The group aims to intensify its outreach and educational capacity this year back home in Papaye. Specifically, that will include a training for women in agroecology and home gardening, a training for peasants in soil conservation techniques that will be replicated throughout the community by the trainees, a training on seed selection and conservation, and yet another training on production techniques and fertilizer application with natural insecticide. Even more specifically to climate change, MPP is conducting radio broadcasts to develop rural communities' awareness of early planting methods that are adapted to climate change. They will then hold a conference and climate change debate for some 100 people. In their network of nurseries, MPP is set to produce 100,000 fruit and forest seedlings. At the same time, they will expand alternative energy and solar panel production for electricity, including alternatives to charcoal for cooking. Water will continue to be a focus of the overall 2017 working plan, especially through the construction of cisterns and wells.

But the peasant movement continues to face many obstacles, from land grabs and climate change to the continued acceleration of deforestation. MPP recognises that these challenges are not unique to Haiti, and is therefore committed to working hand in hand with social justice networks at the national, regional, and transnational levels. For these social and environmental justice movements, agroecology is a response to the politicised and unequal impacts of climate change.

Mina Remy (mremy@grassrootsonline.org) is the Program Coordinator at Grassroots International, a partner and supporter of the Peasant Movement of Papaye (MPP). **Salena Tramel** (salentramel@gmail.com) is a Grassroots International consultant, journalist, and PhD researcher. www.grassrootsonline.org

Water will continue to be a focus for MPP, especially through construction of spigots, cisterns and wells. Photo: Grassroots International

Photo: Jordi Ruiz Cirera

We Feed the World

We Feed the World is a global photographic project that aims to showcase the success and diversity of small scale family farmers in providing 70 percent of the world's food.

Through a series of beautifully shot images and their accompanying stories, the project joins the dots between global issues and their impact on our food systems, from climate change, to the loss of biodiversity, to the devastating effect of the extractive industries.

Led by the Gaia Foundation, the project brings together an international team of over 40 world-renowned photographers, NGO's and civil society groups with the aim of reaching out to a mainstream audience and debunking the myth that we need an industrial food system or quick fix technologies like GM to feed a growing global population.

We Feed the World, has given Farming Matters a preview of the work, which will be launched in London in March 2018, before touring a number of international locations. The images capture 50 extraordinary communities, across six continents, who are using an array of agroecological methods to produce food. Here, we present four case studies, from four different continents, of climate-resilient food systems that are successful in finding creative solutions to deal with changing weather patterns and other social and political threats.

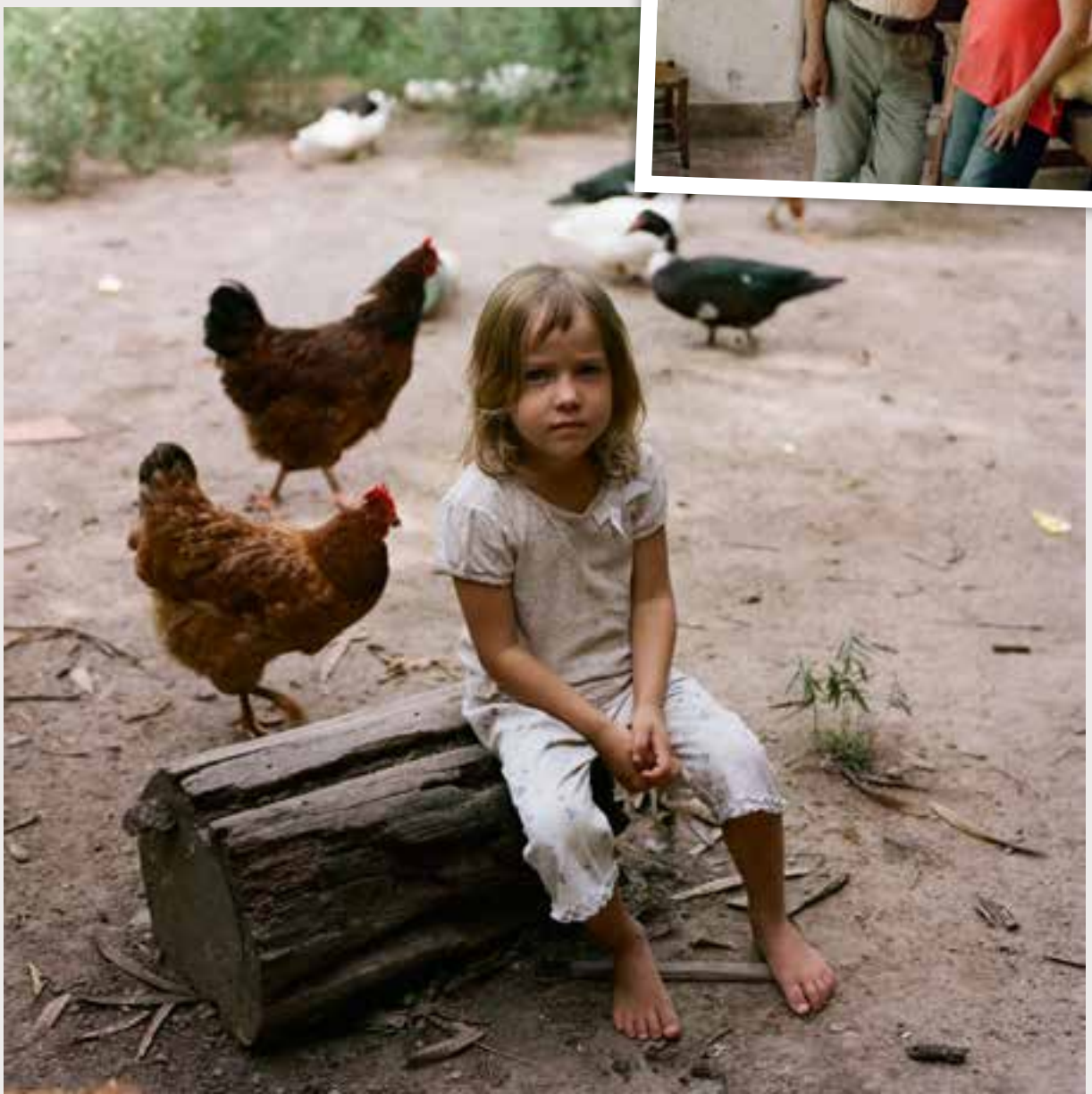
The Gaia Foundation is working with La Via Campesina, GRAIN, Groundswell International, Global Greengrants, Samdhana, the African Food Sovereignty Movement, the International Tree Foundation, Sahel Eco and communities around the world to produce the We Feed the World exhibition. They would welcome new partners and support from those working to promote agroecology.

ARGENTINA

Now in their seventies, Remo and Irmina Kleiner look like an unlikely pair of revolutionaries, but these now doting grandparents spent over ten years on the run and were forced to give birth to two of their four children in the jungle, after speaking out about the rights of peasants in a dictator-led Argentina. Today, surrounded by their extended family and a community of fifteen other families, they run a mixed agroecological, biodynamic farm in Argentina's North Eastern province – an area more commonly known for hectares of genetically modified Soybeans.

Remo knows the value of diversity in creating stable food systems. His farm produces a wide range of dairy and other processed products, grows several grains, fruit, pasture and raises beef cattle and other animals. As a testimony to its success in troubled times, the farm has recently won awards for its ability to withstand hurricanes, drought and months of heavy rainfall. However, Remi believes true resilience comes from social cohesion and collective action as well. Communities must work together if they want to survive the dramatic changes our planet now faces.

Photos: Jordi Ruiz Cirera



Photos:
Andrew Esiebo

BURKINA FASO

Tindano Pabadou leads a women's growing co-operative in the village of Bassieri, in the far east of Burkina Faso. The women here speak their minds and make decisions about how to share the harvest and spend the money it brings. Tindano has even paid for a new house for her family with the proceeds from her share of the co-operative.

This good fortune has been hard fought, however. Seven years ago, Tindano and the other women of her village were forced to skip meals due to a lack of food. In Burkina Faso short-sighted farming practices and drought had depleted soil fertility and degraded natural resources to the point that its population faced malnutrition.

In villages like Bassieri, new agroecological techniques such as 'half moons' or 'zai pits' (where manure is placed in small holes to absorb rain) have begun to revitalise the soil and enable the crops to hold onto the water, when it comes. Now, despite the increasing droughts, there is enough food to eat as well as surplus to sell at the markets.

Photos:
Carolyn Drake

USA

Some years ago, Californian farmer, Mas Masumoto faced a life changing decision – the heritage peach trees his father had planted were still producing beautiful, juicy peaches but they weren't the perfect looking red variety the supermarkets wanted. A bulldozer arrived to rip them out, but at the last moment, Mas had a change of heart and kept them.

Instead of going down the well-trodden commercial route of chemicals and uniformity, Mas embraced the food movement, converting his farm to organic and reaching out to farmers markets to showcase the age old flavour and quality of his peaches instead.

Today, the farm is not only known across California for the quality of its fruit but thanks to a variety of water saving techniques and clever pest control methods, Mas's farm was able to withstand the recent Californian drought better than most of his neighbours. "Organic farming is based on the ability to adapt, whereas industrial agriculture is based on control," he says.

Photos:
Martin Westlake

INDONESIA

It took community leader Maria Loretta quite a bit of searching to even find the first sorghum seeds that have turned this 30 hectares of land in Likotuden into one of the most productive growing areas in East Flores. This crop, that had once grown prolifically in Indonesia, all but died out after the government encouraged everyone to grow rice and corn – and gave them chemical fertilizer to apply to them. Maria travelled from village to village talking to the elders to see who remembered the crop and still had seeds to sow, until she found enough to plant.

Although Sorghum can be more labour intensive to harvest, it requires less water and can be grown on marginal or even rocky land, which makes it a key crop of the future in areas where rainfall is lessening due to climate change. It is also more nutritious than rice and maize and reduces the risk of obesity related illnesses. For the 62 families now involved in farming the area, Sorghum has become the route to independence, allowing them to break free from reliance on chemical fertilizers and pesticides, from the devastating impact of drought and a cycle of debt and poverty. Learning how to farm the crop of their ancestors has brought them the food sovereignty they need to create the future they want.

Photo: Leah Atwood

Advancing on-farm climate resilience with citizen science

Researchers and farmers across the USA are teaming up on science. The aim is to learn more about climate resilience on the farm by tracking and supporting farmers' experimentation and practice. First things first: building a network and finding out what to measure together.

Leah Atwood, Ana Cecilia Galvis, Natalia Pinzón Jiménez, Paul Roge

Elizabeth and Paul Kaiser are farmers in California, USA. They are two of many food producers across the globe who have a proven track record as innovators, researchers, and educators in their fields. As small scale farmers running a biodiverse and economically successful agricultural business, they are exploring meaningful solutions to the climate challenges currently threatening the future of their farm, and more broadly, our food systems.

Rainfall is highly variable in California and farmers are noticing more and more climate extremes as a result of climate change. Paul describes his experience: "The unique thing about California is that while they say we have an average rainfall, California almost never gets its average. We're in an unusual place in that we usually get double the average or half the average and that's been our 'normal' for hundreds of years." And yet, in terms of climate change, Paul notes that, "now, we are definitely seeing even worse conditions and more extremes."

Elizabeth and Paul have been experimenting with practices to manage their increasingly variable weather patterns. For instance, Paul describes their experience with straw mulching. Ten years ago they weren't mulching their soil during the summer but over the past couple of years, with hotter conditions, it's become a necessity to preserve soil moisture, keep the soil temperature down, and ultimately produce a crop.

Like Elizabeth and Paul, a growing number of

MESA's Farmer Network

MESA is a non-profit organisation that connects sustainable farming leaders through participatory education, intergenerational mentorship, and multicultural exchange. Our grassroots network is comprised of over 1450 farmers, researchers, activists, and innovators dedicated to social change in the food system. We combine hands-on applied learning with online education and work with hundreds of experienced farmers as well as with new farmers dedicated to advancing agroecology.

farmers and ranchers around the world are integrating agroecological principles onto their farms, including reducing dependence on fossil fuels, increasing crop and livestock diversity, building soil health, creating local markets, and providing stable living-wages. These farms have shown greater adaptive capacity to climate variability.

While Elizabeth and Paul have managed to adapt, some farmers have been harder hit. This is the case for María Inés, a third generation farmer from Guerrero, Mexico who came to California in the 1980's as a migrant farm worker and now manages an organic farm and restaurant with her family. In February 2017, she lost her entire crop due to massive flooding. "Everything was destroyed and I had to start over," María explained. She is also using agroecological principles to increase soil health, diversify her income, and build local markets, but lacks the resources to make high-cost investments and infrastructure improvements due to her lack of legal documentation in the US and land ownership. The overlapping and intersectional challenges faced by diverse farmers across the US, whether caused by immigration status, class, race, gender, or other factors, have very real ecological, social, political, and economic impacts. Recognising this is an essential step towards effectively addressing the root causes of farmers' vulnerability to climate change.

Capturing lessons learnt and challenges faced by these farmers through their experimentation across their many different contexts is highly valuable, and one reason why farmer-driven research is so important to deal with the climate crisis.

Citizen Science

Citizen science is often defined as the involvement of the public in scientific research. This can include localised, community-driven research or broader, global investigations. Together with the general public, citizen science integrates the experience and expertise of educators, scientists, data managers, and others to collect and analyse data relating to the natural world.

In a world increasingly dominated by big data, combined with the current United States administration promoting climate denial, it is more important than ever to amplify the living knowledge of small scale farmers. This is one of the motivations behind a participatory action research and farmer citizen science programme that MESA is driving. Moreover, with their programme, MESA aims to fill the large gap in appropriate technologies that support on-farm monitoring of climate change adaptation strategies for small scale farmers, and address some of the intersectional challenges that they face.

On-farm banana trials in Kona, Hawaii.
Photo: Hugo Guerrero

Farmer-centred learning

Over the past five years, MESA has begun engaging with farmers like Elizabeth, Paul and María to develop farmer-led participatory action research and citizen science across the United States. The programme is bringing together producers, scientists, researchers and educators. Participants include those who are part of a 18-member farmer advisory council, as well as a research and advisory team of scientists with experience in participatory research from UC Berkeley, UC Davis, UC Santa Cruz, University of Hawaii, University of Vermont, and Oregon State University.

One of the initiatives is the development of the open-source Farm-Centered Learning Network which gives farmers the chance to share knowledge, stories, celebrate successes, generate discourse and collect on-farm data through interactive, multimedia online courses. A first *On-Farm Climate Resilience* course with webinars, self-assessments, monitoring, and mapping will launch in 2017.

A toolbox

Research to develop a set of tools for farmers is running alongside the learning initiative. The tools aim to assess, map, and track on-farm indicators selected by the farmers such as species and variety diversity, soil fertility, carbon sequestration and to see how they are correlated with specific management practices on the farm, and track climate resilience. MESA's research and advisory teams are developing these together. Eventually, the information generated with the tools will be shared with the broader network of farmers, supporting collective decision making and amplifying awareness around climate-resilient practices.

We have received positive as well as constructive feedback from farmers and scientists on the process for developing the tools so far. Now that trust and commitment between farmers and scientists has been established, the next step is to further develop and test the climate resilience data tracking features. The climate resilience priorities of farmers across the MESA network will guide the selection of the most appropriate indicators, helping develop useful tools for farmers, by farmers.

Leah Atwood, Ana Cecilia Galvis, Natalia Pinzón Jiménez and **Paul Roge** are members of the MESA team. (mesa@mesaprogram.org)

Photo: Diana Quiroz

About climate, meat & markets:

high time to move towards agroecology and food sovereignty

As temperatures rise across the globe, meat and dairy have been found to be a major culprit. Still, the industrial meat industry actively facilitates the growth in consumption rates. We can only solve the climate crisis if we take meaningful steps towards agroecology and food sovereignty.

GRAIN

Our global food system is one of the biggest drivers of climate change. It accounts for over one third of all global greenhouse gas emissions, according to latest estimates from the Meridian Institute. Livestock represent the biggest portion of this. Research done by GRAIN shows that it is the *industrial* meat and dairy complex that produces this tremendous damage, not traditional livestock reared by smallholders. Deforestation, industrial feed crops, use of chemical fertilizers, manure lagoons, transport and refrigeration, and massive waste are all central elements of the industrial meat and dairy complex responsible for huge amounts of climate gases. The FAO calculated that, today, meat production alone – especially that of the industrial type – generates more greenhouse gas emissions than all the world's transport combined.

Yet, meat consumption is soaring in many places of the world. If current trends continue global meat consumption will grow a further 76% from current levels by 2050, according to the latest studies, pushing us deeper into the climate crisis. If, on the other hand, heavy eaters of industrial meat reduced their unhealthy levels of consumption to the World Health Organization's recommended amounts, the world could eliminate 40% of all current greenhouse gas emissions.

So, why is meat consumption increasing so much beyond sustainable and healthy levels? The most common narrative is that the growing middle class in many newly industrialising countries can now afford to eat more meat, and thus jump on the opportunity. Indeed, the projected growth of meat consumption is especially stark in countries like China, Brazil, India and other countries in their regions. But that is only part of the story.

The other side of the story is that the industrial meat industry actually facilitates the growth in consumption rates. It produces cheap meat surpluses which are traded as global commodities and pushed onto markets everywhere. As a consequence, industrial meat is the most rapidly growing segment of meat and dairy production, accounting for 80% of the global growth in recent years.

Propping up the corporate meat market

So, why can industrial meat be produced so cheaply and expand so fast across the globe? Confinement of animals at a high stocking density is one part of a systematic effort to produce the highest output at the lowest cost. Yet, at least three key structural factors are at play here: corporations are fighting off any regulation of their sector, industrial meat is highly subsidised, and trade deals are signed to get it to expand massively into markets across the globe.

Meat production alone generates more greenhouse gas emissions than all the world's transport combined

Attempts by governments to regulate meat consumption is met with resistance by the industry. When Germany drafted guidelines to reduce meat consumption, demonstrating that a 50% cut by 2030 would be "crucial to climate protection," the industry lobbied hard. By the November 2016 launch date, the country's climate change plan had been stripped of any reference at all to greenhouse gases in the agriculture sector. Similar stories can be told of the meat lobby in the United States (US), Brazil and other countries where industrial meat is strong.

Meat-free Thursdays

The city of Ghent, Belgium, became the first city in the world to officially stimulate its citizens to have a weekly vegetarian day. The structural government support and involvement in this initiative sets it apart from other campaigns promoting reduced meat consumption. In partnership with the NGO, EVA (Ethical Vegetarian Alternative), the city of Ghent launched 'Thursday Veggie Day' in 2009. Response among local citizens and local public institutions has generally been very positive. People's awareness of the issues concerning meat (and especially the global warming impact) is rising. Two years after its launch, 60,000 people indicated that they participate several times a month and, 94% of public school students were choosing the vegetarian meal on Thursdays. Beyond the city, from Cape Town to São Paulo, cities are launching similar campaigns that were inspired by Ghent.

Source: Leenaert, T (2016). Meat moderation: a challenge for government and civil society. In: Sustainable Food Planning: evolving theory and practice (Viljoen, A and Wiskerke, J. S. C Eds.).

A small scale dairy farmer in the Netherlands. Photo: Frederieke Bosch

Furthermore, the industry receives subsidies in many countries. For example, in 2013, the European Union paid US$ 731 million to its cattle industry alone. The same year, the US Department of Agriculture paid more than US 300 million US dollars to just six huge meat companies in order to get industrial meat and dairy on school meal trays, compared to just a fraction of that to fruit and vegetable suppliers.

But, the big guns in the industry's arsenal are 'free trade' agreements. These corporate trade deals artificially prop up production and consumption by promoting the dumping of cheap meat and dairy into low income countries. They include clauses that eliminate protection for local farmers from foreign competitors, that make it illegal to grant preference to local suppliers or products, and that allow foreign companies to sue governments that adopt social or environmental legislation that they think could undermine their profits.

Without permissive regulations, subsidies and 'free trade' agreements, industrial meat would simply be too expensive to buy. These structural factors give priority to profits for an elite few and dismiss the massive environmental and social costs incurred by the corporations.

> Small scale meat and dairy production is well tailored to local food systems that support the moderate meat and dairy consumption levels needed to mitigate climate change

Support smallholders, agroecology and local markets

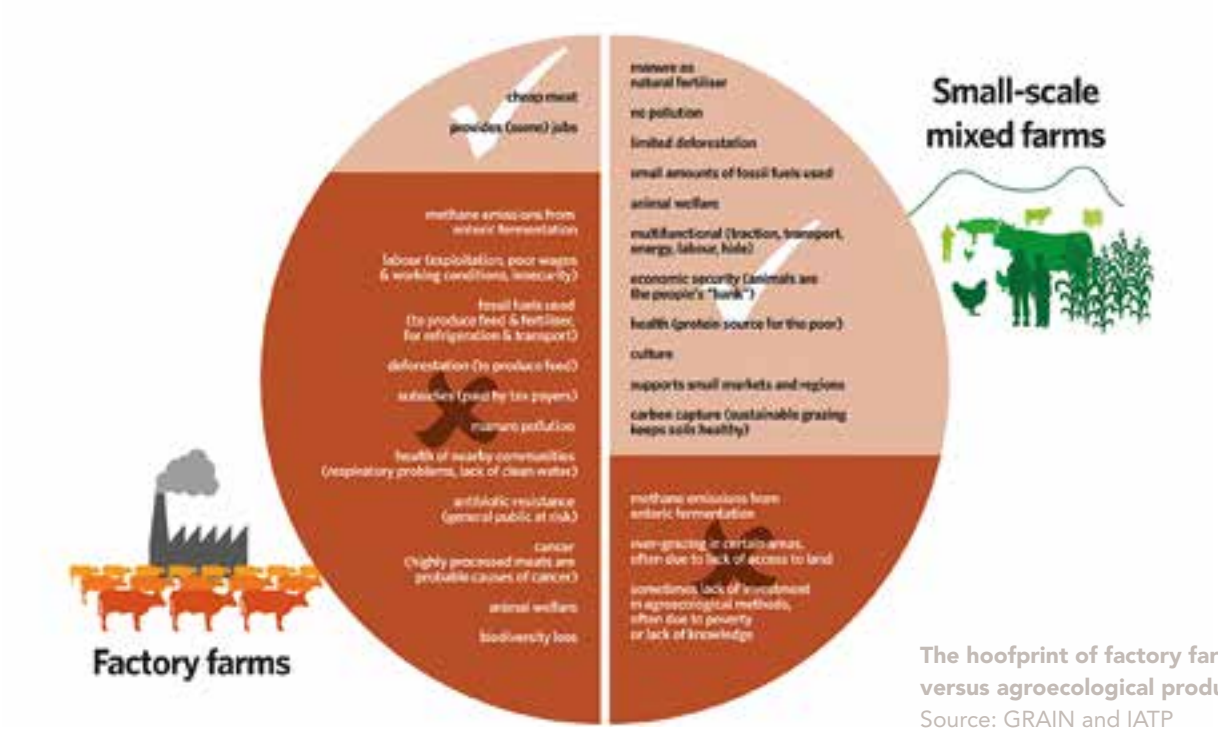
Corporate lobby groups, scientists and development agencies often paint small scale livestock holders in poor countries as the climate culprits because of their animals' low efficiency in converting calories to meat or milk on a per capita basis. Yet, a narrow focus on efficiency and emissions intensity ignores the multiple benefits of mixed, multi-functional and biodiverse small scale livestock production systems. These include providing local livelihoods, improving soil health, greater climatic resilience and other positive environmental and public health benefits. Small scale meat and dairy production is already well tailored to local food systems that support the moderate meat and

dairy consumption levels needed to mitigate climate change *(see figure)*.

We can only solve the climate crisis if we take meaningful steps towards agroecology and food sovereignty. To achieve this, we need bold moves to disincentivise the production and consumption of cheap industrial meat and dairy. We also need to stop trade deals that prop up the massive international trade in meat and dairy products. Instead, small scale, local and agroecological meat and dairy production and marketing should be supported.

In this process, livestock will once again become integrated into diversified farming systems, while meat and dairy regain their proper place in peoples' diets. This is the approach that is needed to keep the world liveable for future generations. The task is daunting, but the stakes have never been higher.

GRAIN (grain@grain.org) is an international non-profit organisation that works to support small farmers and social movements in their struggles for community-controlled and biodiversity-based food systems. This article is based on a series of publications produced by GRAIN. Full references and sources for the figures quoted in this article can be found at www.grain.org.



The hoofprint of factory farms versus agroecological production. Source: GRAIN and IATP

Shrinking the water and carbon footprint of school food

Oakland Unified School District (OUSD) in the state of California reduced animal protein on school menus by 30% while increasing fruit, vegetables, and legumes. When kids ate meat, it came from local organic producers. The result: a 14% reduction in the school's food carbon footprint. This translates into 600,000 kg of CO_2-equivalents saved per year – the same as driving 2.4 million kilometres less per year or covering all of OUSD's roofs with solar panels with *no* additional cost. They also reduced their water footprint by 6%, from 428 to 401 litres per meal served, saving a total of 159 million litres of water per school year and US$ 42,000 in the cost of the meals. Perhaps most remarkable: the children reported increased satisfaction with the healthy, regionally sourced meals.

Source: Hamerschlag, K. and Kraus-Polk, J. Shrinking the Carbon and Water Footprint of School Food. A recipe for combating climate change. 2017.

Photo: Sun Rida

"Small scale food producers are at the frontline"

Shalmali Guttal is the executive director at Focus on the Global South. She researches, writes and advocates for ecological and social justice in Asia. In this interview, Shalmali explains how the economic growth-obsessed model of development is worsening the climate crisis, particularly for small scale food producers. She highlights that, for advancing justice, the most powerful social movements are strengthening their own practice, but also reaching out to other movements and citizens.

Interview by Madeleine Florin

What does the term 'climate justice' actually mean? For us at Focus (Focus on the Global South) we see climate justice as intrinsically linked with other forms of justice – social justice, economic justice, political justice, justice between genders, and definitely environmental justice. So, climate justice is not about securing rights that are alienated or separated from other struggles for rights. The struggles of local communities against forced evictions, industrial agriculture, extractive industry and large dams, and to protect their lands, territories, seeds and breeds are all struggles for climate justice.

One of the most important tenets of climate justice is that those who have done the least to bring us to this point of the climate crisis continue to suffer the worst burdens of the crisis. And, they also have to take the most drastic actions in response to the crisis, with the fewest resources and the least amount of 'official' support. Ethically and morally this is one of the biggest failures of our society and economy. Any solution to the climate crisis must address these injustices appropriately.

In terms of climate justice, what is at stake for small scale food producers? Small scale food producers are literally at the frontline when the big waves come crashing down, during droughts and floods, when crops fail and fish and livestock die, and when prices of food are manipulated and there are shortages. They are tremendously vulnerable to both, environmental and economic shock. And the climate crisis, as we've seen, has created huge economic shocks. For example, natural disasters – floods, landslides earthquakes, droughts, tornadoes, cyclones, increased variability and unpredictability in weather, etc. – have huge economic impacts, including destruction of homes, entire communities, water supplies and other infrastructure, and destruction of the fields and crops that farmers earn their living from.

At the same time, the types of food production and the kinds of food provision that small scale food producers and providers are engaged in have the smallest climate footprint. From an environmental, economic and social perspective, this is some of the most sustainable food that's produced. It's seasonal and the food miles are few. Many small scale food producers provide food that directly supports communities in rural areas in terms of actually feeding them, as well as providing employment, purchasing goods and services, etc. This type of production is also extremely important in terms of preserving local food cultures and food systems that are resilient to shocks. Besides keeping the planet cool, small scale food producers make significant positive contributions to tackling hunger and malnutrition.

What is the role of today's development paradigm in exacerbating climate change and inequalities for small scale food producers? The development paradigm that's dominant across Asia is obsessed with economic growth. In this paradigm anything goes as long as it results in financial benefit for ruling elites. People's rights, nature, dignity, public health, employment, etc., do not matter; everything is sacrificed at the altar of economic growth. Over the past two decades, the main strategies to achieve this kind of development have been enabling large scale private investment, especially in physical infrastructure, and

Local farmers sell what they grow and gather from the forest in Ta-Oiyy district, Salavan Province, Lao PDR. Photo: Shalmali Guttal

> The types of food production that small scale food producers are engaged in have the smallest climate footprint

Many small scale food producers provide food that directly supports communities in rural areas in terms of feeding them as well as providing employment. Photo: Shalmali Guttal

privatisation of just about everything. Governments, international financial institutions and corporations have colluded in allowing corporations to gain control over different aspects of our lives, and nature.

Many communities across Asia say that that they do not want this type of development because whenever there is 'development', their resources are extracted, nature is destroyed, and they are displaced. Before this so-called 'development', their territories were managed through customary tenure and law. Communities of food producers and providers shared rights and responsibilities to use and to protect local land and water resources. They were able to find ways to adapt to environmental, social and economic changes. But 'development' brings the language of property rights, alienable titles and trading rights for elements of nature such as soil, land, water and carbon. As a result, almost anything is up for grabs and is put onto the market in order to generate profits for whoever is able to invest. In the end, there is no value left in the local area because it is extracted and sold in another market far away.

Look at the results. What benefits have the economic growth development model yielded for local communities? Forests, lands and water sources are sold to corporations that invest in industrial agriculture, mega infrastructure projects, build dams and extract natural resources. These corporations are supposed to provide, or at least contribute to jobs, social services and local infrastructure in rural areas. Where are those jobs and services? Inequalities and inequity are in fact deepening for small scale producers and rural peoples. They have no safety nets, they have nothing but the territories that they protect and that is what is being extracted and expropriated.

Inequalities and inequity are deepening for small scale producers

What are some of the tricky arguments you face when challenging this economic growth-obsessed development? Today, the role that industrialisation, deforestation and excessive use of fossil fuels plays in causing climate change is widely accepted. But in many parts of Asia now, there's a push to industrialise and 'modernise' in the same way, and to catch up with the west's high-consumption lifestyles. The fact that the planet just cannot bear any more of this doesn't hold as an argument because if the richer countries enjoy high-consumption lifestyles, why shouldn't Asian and African countries be able to? For us (i.e., Focus), this presents a huge dilemma because on one hand, there are huge global inequalities and inequities in the distribution of so-called benefits of development. Those most responsible for the climate crisis—wealthy, industrialised nations—must take proportionate responsibility for reparations. At the same time, at the national level in much of Asia, economic growth and development are not delivering benefits for the majority of the people. The elites and a small proportion of middle classes are getting richer at the cost of the working class, peasants, small scale producers and the poor.

Also, when small scale food producers say, "we cannot survive like this!" and demand fair prices which cover the costs of production, their efforts are countered with arguments from policy makers and corporations about the need for 'cheap food' for the poor. This is very unfortunate because, rural and urban 'poor', small scale producers and workers, are all being oppressed by the

same forces of capital. By dividing these people, their potential to organise and demand regulation that benefits urban and rural citizens, food producers and workers equally are weakened.

Why do activists from different movements need to work together when talking about food and climate change? We have no choice but to work together because the issues are too huge, too complex and they are interconnected. The case of the aftermath of the Super Typhoon Yolanda in the Philippines in January 2014 illustrates this well (see page 42). The typhoon itself is a climate issue. Yolanda victims had their land taken away from them in the post typhoon reconstruction – this is land grabbing. Those who had been displaced became refugees, creating a social protection issue. Many of the victims don't have access, even today, to adequate food and nutrition – this is a food and nutrition issue. Moreover, in Cambodia, large scale investment projects result in deforestation, destruction of water bodies and displacement of rural communities. The list of issues in one case include: food and nutrition, land grabbing, climate, environmental and social protection. On top of this, whether it's in the Philippines, Cambodia, Laos, Thailand or India, when small scale farming, fishing, herding and indigenous communities defend their lands and fight against predatory capital, the military and police are called in, they are beaten up, they are arrested and jailed. These are human rights and justice issues. So, with all these aspects coming up simultaneously, I can't actually see how we could not work together.

I think if we work separately from one another, we are dividing and weakening ourselves. This is a time for us to come together and pool our resources, strengths and capacities. Big companies and big capital always come together to get what they want. We should not give them additional power through our fragmentation. This doesn't mean that we don't focus on sectoral priorities, but that we must make connections across sectors, constituencies, spaces and levels.

Can you talk about a few heartening initiatives that are advancing climate justice? I think La Via Campesina is brilliant. I've known them for many years and when you've accompanied, worked and allied with a movement for 20 years you see a lot of change. I'm just so heartened when I see members from La Via Campesina hold their own in national policy debates and international policy spaces. They articulate the links between small scale food production, peasant agroecology, cooling down the planet and building food sovereignty so well. They do this through their own practice, through federating, through making alliances with other movements, and also reaching out to the public. So, for me this is a very inspirational movement.

Another movement that is becoming stronger, at least in Asia, is the World Forum of Fisher Peoples. The risks that they face, including their vulnerabilities because of climate change and the development model we talked about, are huge. And they also are holding their own by articulating the issues, doing their own research, and mobilising and reaching out to people.

Another movement that I see growing across Asia, especially in India, Thailand and the Philippines, is amongst small scale vendors who practice what they call a low circuit economy. They source food from marginal producers, either urban gardeners or peri-urban gardeners and local fish mongers. They process and sell this food locally. In this way, they are really building bridges between producers and consumers, and between producers and processors. These types of urban/rural movements are powerful because they bring people together, they reduce alienation in urban environments and they show how interconnected we are. The National Hawkers Federation in India is a very good example.

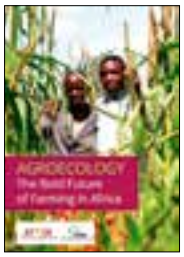
What I don't understand is why governments, financial institutions and large foundations aren't learning from these examples. This is a crucial question: why is the enormous potential of these and other similar movements in addressing climate change and related issues such as hunger, poverty, malnutrition, not being recognised? Instead, governments, financiers, multilateral institutions and many large NGOs continue to promote false solutions that are very dangerous because: a) they do not address the root causes of the climate crisis; b) they create opportunities for corporations and wealthy people to profit from the crisis; c) they undermine genuine resilience of communities to disasters/shocks and the potential to build such resilience; and d) they give the illusion that the climate crisis is being appropriately addressed when in fact it is not, and the crisis is actually worsening.

Forest lands and water sources are sold to corporations that invest in industrial agriculture such as this rubber plantation. Photo: Shalmali Guttal

Cooling the planet: Frontline communities lead the struggle – Voices from the Global Convergence of Land and Water Struggles

Various authors, 2016. Transnational Institute, 16 pages.

Small scale food producers and consumers, including peasants, indigenous peoples, hunters and gatherers, family farmers, rural workers, herders and pastoralists, fisherfolk and urban people – the frontline communities – are increasingly confronted by the grabbing of natural resources and systematic violations of human rights. Already pushed to the fringe, these communities additionally face the increasingly frequent natural disasters and impacts of climate destruction that are caused by climate change. The purpose of this report is to amplify the voices of frontline communities and to share the political messages of the 16 social movement leaders with the masses who form the base of social movements all over the world. More than twenty groups from across the globe have contributed to the writing of the report.



Agroecology: the bold future of farming in Africa

Michael Farrelly, G. Clare Westwood & Stephen Boustred (Eds.), 2016. AFSA & TOAM, 88 pages.

There is an avalanche of evidence coming from almost everywhere in the world that agroecology works; this is Africa's contribution. This compilation of successful stories of agroecology makes a strong statement demonstrating that Africa can feed itself through caring for its environment, using its rich cultural knowledge, and supported by relevant science and technology. The case studies address themes including: food for nutrition and health; increasing incomes, improving livelihoods; regeneration, restoration and biodiversity; valuing local knowledge and innovation; and tackling climate change and building resilience. Next to the case studies, the synthesis-style contributions from Million Belay, Elizabeth Mpofu and Lim Li Ching, to name a few, make a strong connection between local case studies and global impacts.

Comic book: Together we can cool the planet

La Via Campesina, Grain, 2016. 22 pages.

Based on the video, *Together we can cool the planet!*, co-produced by La Vía Campesina and GRAIN in 2015, they created a comic book to support training activities of social movements and civil society organisations around climate change. This comic book looks at how the industrial food system impacts our climate and also explains what we can do to change course and start cooling the planet. The refreshing combination of fun graphics with minimal text delivers a clear message: it is peasants and small farmers, along with consumers who choose agroecological products from local markets, who hold the solution to the climate crisis.

Climate change and food systems: Assessing impacts and opportunities

Meredith Niles, Jimena Esquivel, Richie Ahuja, Nelson Mango, et al., 2017. Meridian Institute, 83 pages.

This report was prepared to coincide with the Global Alliance for the Future of Food's second international dialogue. It reviews key literature about how food and agriculture affect climate change and how climate change is affecting food systems. It illustrates how a food systems approach to climate change adaptation and mitigation can drive positive changes and inform decision making to avoid unintended effects from narrowly targeted interventions. This report aims to offer practical steps for immediate action while new research, decision-support tools, governance mechanisms, and their efforts are pursued to support the broader transformation that is urgently needed for sustainable food systems and achieving the Sustainable Development Goals.

Planning and implementing climate change responses in the context of uncertainty

Susannah Fisher, Ben Garside, Marissa Van Epp et al., 2016. IIED, 44 pages.

Significant uncertainties around future climate change challenge the implementation of policies and programmes. Mobilising action that can respond to climate change and be flexible enough to learn from new experiences as well as adapt to unknowns is difficult, given traditional short-term timeframes, sector silos and the predominantly top-down nature of planning cycles. Process-driven approaches, such as social learning, offer a more flexible approach to tackling climate uncertainties. These approaches place the emphasis on building the capacity, knowledge, evidence and stakeholder relationships necessary to support first short-term and then longer-term decision making and action.

The Great Climate Robbery: How the food system drives climate change and what we can do about it

Henk Hobbelink (Ed.), 2015. Grain.

This book stems from the mounting data that shows how the industrial food system is a major driver of climate change and how food sovereignty is critical to any lasting and just solutions. With governments, particularly those from the main polluting countries, abdicating their responsibility to deal with the problem, it has become ever more critical for people to take action into their own hands. Changing the food system is perhaps the most important and effective place to start. The various articles on climate change selected for this book provide readers with solid information about how the industrial food system causes climate change, how food and agribusiness corporations are getting away with it and what can be done to turn things around. This book aims to help readers to better understand the ways in which corporations seek to increase their control over the food system so that this control can be more effectively challenged.

Photo: Faris Ahmed

Agroecological approaches to enhance resilience among small farmers

Many studies reveal that small farmers who follow agroecological practices cope with, and even prepare for, climate change. Through managing on-farm biodiversity and soil cover and by enhancing soil organic matter, agroecological farmers minimise crop failure under extreme climatic events.

Clara Nicholls and Miguel Altieri

Global agricultural production is already being affected by changes in rainfall and temperature thus compromising food security. Official statistics predict that small scale farmers in developing countries will be especially vulnerable to climate change because of their geographic exposure, low incomes, reliance on agriculture and limited capacity to seek alternative livelihoods.

Although it is true that extreme climatic events can severely impact small farmers, available data is just a gross approximation at understanding the heterogeneity of small scale agriculture, ignoring the myriad of strategies that thousands of small farmers have used, and still use, to deal with climatic variability.

Observations of agricultural performance after extreme climatic events reveal that resilience to climate disasters is closely linked to the level of on-farm biodiversity. Diversified farms with soils rich in organic matter reduce vulnerability and make farms more resilient in the long-term. Based on this evi-

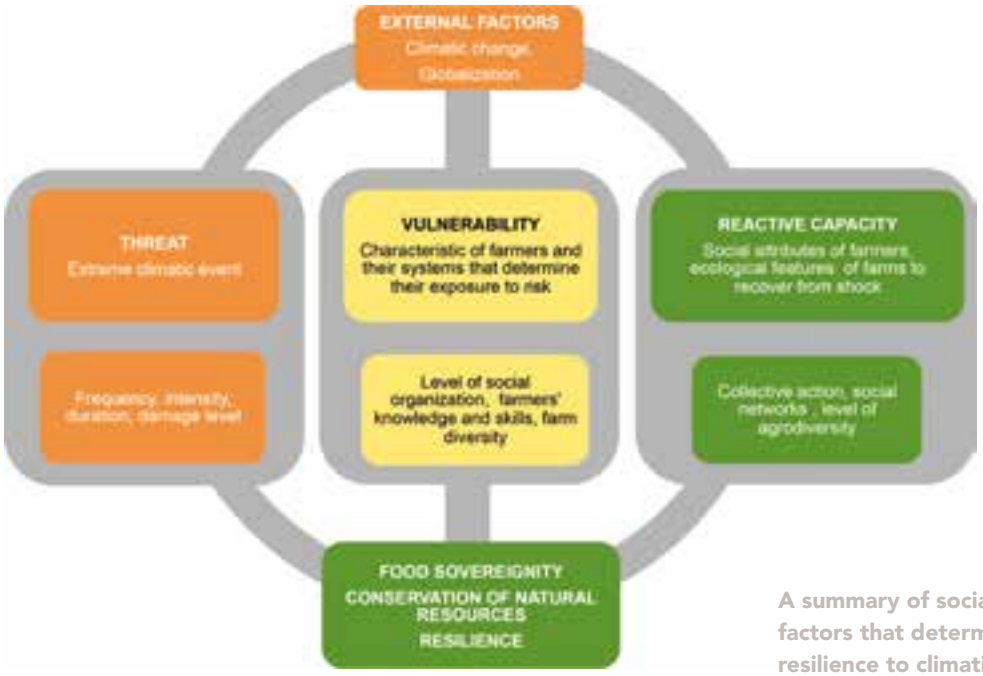
dence, various experts have suggested that reviving traditional management systems, combined with the use of agroecological principles, represents a robust path to enhancing the resilience of modern agricultural production.

Diverse farming systems A study conducted in Central American hillsides after Hurricane Mitch showed that farmers using diversification practices (such as cover crops, intercropping and agroforestry) suffered less damage than their conventional monoculture neighbours. A survey of more than 1800 neighbouring 'sustainable' and 'conventional' farms in Nicaragua, Honduras and Guatemala, found that the 'sustainable' plots had between 20 to 40% more topsoil, greater soil moisture and less erosion, and also experienced lower economic losses than their conventional neighbours. Similarly in Chiapas, coffee systems exhibiting high levels of diversity of vegetation suffered less damage from Hurricane Stan than more simplified coffee systems. In Cuba, 40 days after Hurricane Ike hit, researchers found that diversified farms exhibited losses of 50%, compared to 90 or 100% in neighbouring monocultures.

Agroforestry systems have been shown to buffer crops from large fluctuations in temperature, as more shaded systems protect crops from low rainfall periods maintaining soil water availability. This is because the tree canopies reduce soil evaporation and the roots increase soil water infiltration. Intercropping enables farmers to produce various annual crops simultaneously and minimise risk. Data from 94 experiments on intercropping of sorghum and pigeon pea showed that for a particular 'disaster' level quoted, sole pigeon pea crop would fail one year in five, sole sorghum crop would fail one year in eight, but intercropping would fail only one year in 36. Thus intercropping exhibits greater yield stability and less productivity decline during drought than monocultures.

At the El Hatico farm, in Cauca, Colombia, a five story intensive silvo-pastoral system composed of a layer of grasses, *Leucaena* shrubs, medium-sized trees and a canopy of large trees has, over the past 18 years, increased its stocking rates to 4.3 dairy cows per hectare and its milk production by 130%, as well as completely eliminating the use of chemical fertilizers. 2009 was the driest year in El Hatico's 40-year record, and the farmers saw a reduction of 25% in pasture biomass, yet the production of fodder remained constant throughout the year, neutralising the negative

Intercropping exhibits greater yield stability and less productivity decline during drought than monocultures



A summary of social and ecological factors that determine the degree of resilience to climatic, and other, shocks.

Intercropping enables farmers to produce various crops simultaneously and minimise risk in the process.
Photo: Frank van Schoubroeck

effects of drought on the whole system. Although the farm had to adjust its stocking rates, the farm's milk production for 2009 was the highest on record, with a surprising 10% increase compared to the previous four years. Meanwhile, farmers in other parts of the country reported severe animal weight loss and high mortality rates due to starvation and thirst.

Enhancing soil organic matter

Adding large quantities of organic materials to the soil on a regular basis is a key strategy used by many agoecological farmers, and is especially relevant under dryland conditions. Increasing soil organic matter (SOM) enhances resilience by improving the soil's water retention capacity, enhancing tolerance to drought, improving infiltration, and reducing the loss of soil particles through erosion after intense rains. In long-term trials measuring the relative water holding capacity of soils, diversified farming systems have shown a clear advantage over conventional farming systems. Studies show that as soil organic matter content increases from 0.5 to 3%, available water capacity can double.

> The challenge is to identify the responses that are sustainable, and to upscale them

At the same time, organically-rich soils usually contain symbiotic mycorrhizal fungi, such as vesicular arbuscular mycorrhizal (VAM) fungi, which are a key component of the soil microbiota, influencing plant growth and soil productivity. Of particular significance is the fact that plants colonised by VAM fungi usually exhibit significantly higher biomass and yields compared to non-mycorrhizal plants, under water stress conditions. Mechanisms that may explain VAM-induced drought tolerance, and increased water use efficiency involve both increased dehydration avoidance and dehydration tolerance.

Managing soil cover

Protecting the soil from erosion is also a fundamental strategy for enhancing resilience. Cover crop mulching, green manures and stubble mulching protects the soil surface with residues and inhibits drying of the soil. Mulching can also reduce wind speed by up to 99%, thereby significantly reducing losses due to evaporation. In addition, cover crop and weed residues can improve water penetration and decrease water runoff losses by two to six times.

Throughout Central America, many NGOs have promoted the use of grain legumes as green manures, an inexpensive source of organic fertilizer and a way of building up organic matter. Hundreds of farmers along the northern coast of Honduras are using velvet bean (*Mucuna pruriens*) with excellent results, including corn yields of about 3 tonne/ha, more than double the national average. These beans produce nearly 30 tonne/ha of biomass per year, adding about 90 to 100 kg of nitrogen per hectare per year to the soil. The system diminishes drought stress, because the mulch

layer left by *Mucuna* helps conserve water in the soil, making nutrients readily available in periods of major crop uptake.

Today, well over 125,000 farmers are using green manures and cover crops in Santa Catarina, Brazil. Hillside family farmers modified the conventional no-till system by leaving plant residues on the soil surface. They noticed a reduction in soil erosion levels, and also experienced lower fluctuations in soil moisture and temperature. These novel systems rely on mixtures for summer and winter cover cropping which leave a thick residue on which crops like corn, beans, wheat, onions or tomatoes are directly sown or planted, suffering very little weed interference during the growing season. During the 2008-2009 season, when there was a severe drought, conventional maize producers experienced an average yield loss of 50%, reaching productivity levels of 4.5 tonne/ha. However the producers who had switched to no-till agroecological practices experienced a loss of only 20%, confirming the greater resilience of these systems.

Building social resilience

Undoubtedly, crop diversification represents a viable long-term strategy for farmers experiencing erratic weather. More diverse agroecosystems are more resilient to extreme climatic events, thus significantly reducing farmers vulnerability. Adding copious amounts of organic matter into soils is particularly strategic when confronting droughts as SOM increases water holding capacity and biological activity which enhances water use efficiency. Managing cover crops and green manures protects soil from erosion but also adds biomass, which in turn contributes to increased levels of SOM.

Clearly, agroecological strategies that enhance the ecological resiliency of farming systems are a necessary, but not sufficient, condition to achieve sustainability. Social resilience, defined as the ability of groups or communities to adapt to environmental stresses, must go hand in hand with ecological resilience. To be resilient, rural societies must have the ability to buffer disturbance with agroecological methods adopted and disseminated through self-organisation and collective action. Reducing social vulnerability through the extension and consolidation of social networks, both locally and at regional scales, can further increase the resilience of agroecosystems. The vulnerability of farming communities depends on the development of the natural and social capital that gives farmers and their systems resilience against climatic (and other) shocks (see figure on page 39). This adaptive capacity resides in a set of social and agroecological conditions that influence the ability of individuals or groups, and their farms, to respond to climate change in a resilient manner. This capacity to respond to changes in environmental conditions exists to different degrees within communities but the responses are not always sustainable. The challenge is to identify the responses that are sustainable, and to upscale them, enhancing the reactive capacity of communities to deploy agroecological practices that allow farmers to resist and recover from climatic events. Social organisation strategies (solidarity networks, farmer to farmer exchanges, community food and seed saving, etc.) used by farmers to cope with the difficult circumstances imposed by such events, are key component of socio-ecological resilience.

Social organisation strategies are a key component of resilience. Photo: Clara Nicholls

Clara Ines Nicholls (nicholls@berkeley.edu) is the president of SOCLA, *Sociedad Científica Latino Americana de Agroecología* and Regional coordinator of REDAGRES, *Red IberoAmericana de Agroecología para el Desarrollo de Sistemas Agrícolas Resilientes al Cambio Climático*. **Miguel A. Altieri** (agroeco3@berkeley.edu) is Professor of Agroecology at University of California, Berkeley.

This is an updated version of the article that was first published in Farming Matters 28.2 in June 2012.

References

Altieri, M.A. and C.I. Nicholls 2013 The adaptation and mitigation potential of traditional agriculture in a changing climate. *Climatic Change*. DOI 10.1007/s10584-013-0909-y

Altieri, M.A., C.I. Nicholls, A Henao and M.Lana 2015 Agroecology and the design of climate change resilient farming systems. *Agronomy for Sustainable Development*. DOI 10.1007/s 13593-015-0285-2

Magdoff, F. and H. van Es. 2000. Bulding Soils for Better Crops. Sustainable Agriculture Network. Beltsville, M.A. 230 pp

Natarajan, M, and R.W. Willey, 1996. The effects of water stress on yields advantages of intercropping systems. *Field Crops Research* 13: 117-131

Photo: Mary Anne Manahan

Advancing justice after climate disaster in the Philippines

On Sicogon Island in the Philippines, farmers and fisher folk were displaced from their land and livelihoods after the Typhoon Yolanda. Opportunistic land grabbing after a climate disaster is yet another example in which those least responsible for climate change suffer its gravest consequences

Mary Anne Manahan

Super typhoon *Yolanda/Haiyan* hit the Philippines in November 2013. It was the fourth strongest typhoon in recorded history. On Sicogon Island, Iloilo Province, one of the areas hardest hit by the typhoon, around 1000 farmers' and fishers' homes were damaged or destroyed by Yolanda. The devastation that prevailed was aggravated by internal displacement and loss of livelihoods due to land grabbing permitted by the government's pro-business approach to reconstruction. Private companies laid claim to the land previously occupied by farmers and fisher people to develop tourism infrastructure along the coast. As the residents of the island began to rebuild their lives, they had to first reclaim their land rights.

Tourism trumps farmers After the typhoon, President Aquino declared a 40-meter-no-build-zone policy along the coastal zones of the country, including where people used to live. This created confusion and outrage among local governments, civil society groups, and communities affected by Yolanda who wanted to move back onto their land. On the other hand, it was the moment that Sicogon Development Corporation (SIDECO) had been

waiting for, to turn Sicogon into a tourism destination.

In 2014, SIDECO entered into a joint venture partnership with the private company Ayala Land to undertake a 'Sicogon Island Redevelopment Project'. The project was a long-standing initiative that had been accompanied by an equally long-standing land struggle for the local communities – spanning almost four decades. Before the typhoon hit, the communities' campaign for land brought them national and international allies, including national senators, NGOs and church and human rights advocates. The Department of Agrarian Reform's confirmation that 335 hectares of land on the island would be placed under the Comprehensive Agrarian Reform Program (CARP) was a huge feat for the communities. But the typhoon changed the balance of power in this struggle once more.

Amelia dela Cruz, a farmer leader from Sicogon Island explained how the owner of SIDECO made an opportunistic move to permanently displace people from their lands and their livelihoods. Amelia said: "SIDECO took advantage of this tragedy. Yolanda has been their ally. They gave us three options: first, they would give us Php 150,000 (approximately US$ 3000) if we would leave; second, they would relocate us to another island with free housing, water, and electricity; third, if we wouldn't agree with any of the options, they would demolish our communities." Some families were relocated but Amelia is amongst those who decided to stay.

Farmers and fishers stand their ground Five months after being left homeless by Yolanda, on April 12, 2014, members of the Federation of Sicogon Island Farmers and Fisherfolk Association (FESIFFA) protested the living conditions on Sicogon Island through a camp-out in front of the Department of Environment and Natural Resources. More than 200 Sicogon families had settled in a portion of a 282-hectare public forest land area in Buaya, Sicogon as a last ditch effort to rebuild their homes and lives. FESIFFA President Raul Ramos explained: "With no options left to rebuild our communities, we were being forced by the government and by SIDECO to occupy public forest lands as a resettlement site, even without support and approval from official authorities." Both SIDECO and its allied officials in the local Department of Environment and Natural Resources filed cases against FESIFFA farmers for their occupation of the public forest lands.

On Sicogon Island around 1000 farmers' and fishers' homes were damaged or destroyed by Typhoon Yolanda. Photo: Mary Anne Manahan

Climate justice and land grabs

The case described in this article is, unfortunately, not an unusual one. Stories of land dispossession and displacement have been repeated in the wake of many disasters caused by extreme weather events, geophysical hazards, and man-made conflicts: many New Orleans residents were displaced after Hurricane Katrina and Rita; extensive drought in Northern Sudan in the mid-1980s was the excuse to force the Hawaweer nomadic group off of their lands; after an earthquake in Pakistan and India in 2005, tenants in rural and urban areas were prohibited by landowners from re-establishing their rental rights.

These are cases of injustice in which disaster capitalism dispossesses the people living on the land. Social movements such as the one described here are crucial for reclaiming rights and livelihoods.

Source: Uson, Maria Angelina. Natural disasters and land grabs: the politics of their intersection in the Philippines following super typhoon Haiyan. 2017. Canadian Journal of Development Studies.

Five months after being left homeless by Yolanda, members of the Federation of Sicogon Island Farmers and Fisherfolk Association (FESIFFA) protested their living conditions on the island. Photo: Mary Anne Manahan

Seeking support The residents engaged in dialogues with government agencies and gathered significant public, media, and social movement support for their cause. The National Anti-Poverty Commission (NAPC), in particular, stepped in to assist in the dialogues, and provided housing for the residents. International groups, such as ICCO Cooperation, a Dutch NGO, also provided support to FESIFFA members for rebuilding their livelihoods.

Months after their camp-out, threats against them still lingered in various forms: orders to vacate the island, prohibition to repair and rebuild their houses, legal cases against them by the Department of Environment and Natural Resources for forest occupation, and legal cases against their leaders. At some point, Ayala Land stepped in and offered various packages that were unacceptable to FESIFFA.

One year after Yolanda, FESIFFA members were 'put on the spot' to sign an alleged 'win-win' solution. FESIFFA, the residents of Sicogon, SIDECO, and Ayala Land signed a compromise agreement, which would allow the development of Sicogon into an eco-tourism area, on one hand, and on the other, would allow the farmers and fisher folk to continue living on the island without further harassments and intimidations by the developers. The compromise stated that FESIFFA members would be granted 'collective titles' to land upon forming a homeowners association. The land would be donated by SIDECO and Ayala, which meant that, in practice, the farmers with claims under the agrarian reform programme would have to withdraw them.

This compromise was perceived to be an unjust resolution by many and divided FESIFFA. It was perceived that SIDECO and Ayala Land ended up with most of the land that they wanted. And, those who had to withdraw their land claims under the agrarian reform programme would lose the rights that they had previously fought for.

> This is not a story of defeat; Sicogon's farmers have stayed on the island to rebuild their livelihoods

Resisting and rebuilding Nevertheless, this is not a story of defeat. Sicogon's farmers have stayed on the island to rebuild their fishing and farming livelihoods, albeit in a limited way. None of the land reforms favouring the farmers that were agreed on in the compromise have been delivered yet, and this has motivated FESIFFA to resume its advocacy work for their land rights. In April 2017, yet again leaders went to the capital and organised a camp-out and protest in front of the Department of Environment and Natural Resources. They plan to intensify their campaign this year with renewed resolve to seek justice and secure rights to land and resources for their farming and fishing livelihoods.

Mary Ann Manahan (mbmanahan@focusweb.org) is a Senior Program Officer at Focus on the Global South.

How trade deals hurt the climate

Ben Lilliston (BLilliston@iatp.org) is the director of corporate strategies and climate change at the Institute for Agriculture and Trade Policy. Photo: IATP

As the United Nations Paris Climate Agreement comes into force, national governments are discovering that policies to reduce greenhouse gas emissions (GHGs) are conflicting with trade agreements. The success or failure of the Paris agreement will largely depend on which international commitments will take precedent: trade or climate?

Nearly 80% of countries' plans to reduce GHGs under the Paris agreement include actions on agriculture. Most agricultural emissions are associated with an industrial model of agriculture designed to compete in global markets. Trade rules reinforce high GHG-emitting industrial production in many ways:

- They harmonise and weaken food safety rules between countries, including rules governing energy intensive pesticides and synthetic fertilizers, and veterinary drugs needed for confined animal production;
- Intellectual property rights provisions limit farmers and breeders from exchanging seeds, hindering seed breeding efforts for climate adaptation;
- They place restrictions on how governments can support farmers as part of strengthening national and local food systems that are more climate resilient and less energy intensive;
- They place restrictions on countries' tariffs to protect their own farmers from cheap imports;
- Trade and investment rules are increasingly linked to 'land grabs' of agricultural or forest land for large scale industrial farming.

Regional free trade agreements often include provisions that allow foreign corporations to sue governments if the companies feel new regulations led to unfair treatment and undercut profits. Using such powerful provisions, corporations have challenged government policies that restrict oil pipelines, offshore drilling, and fracking.

Trade rules also limit governments' ability to enact and expand energy policies that address climate change. Last year, the World Trade Organization ruled that India's solar programme discriminated against foreign (in this case U.S.) solar panel producers. The WTO determined that India's climate obligations did not protect it from trade rules.

As opposition to free trade agreements rises, a new approach is badly needed. This is particularly critical for agriculture, which is especially vulnerable to climate change. Trade agreements should not be given legal priority over other global agreements. Our climate challenge demands trade rules that support international cooperation towards sustainability, starting with the urgent need to curb GHGs and support climate adaptation.

Family farmers living with climate change

Edith van Walsum (e.van.walsum@ileia.org) is the director of ILEIA.

Even though the current president of the USA, Donald Trump, denies climate change, for hundreds of millions of small scale family farmers it has become a daily reality. "We are living with climate change," say farmers in the Sahel. "We just have to deal with it." People have always lived with unpredictable circumstances but due to climate change these have become more violent and more unpredictable.

Agroecology is about climate resilient family farming. What makes the strategies of agroecological farmers unique and resilient? In the December issue of Farming Matters in 2013, Jan Douwe van der Ploeg wrote an insightful article about ten qualities of family farming. With the help of his 'ten qualities' flower I will attempt a basic answer to this question.

Knowledge about agriculture and biodiversity: The family is a place for knowledge building. Family farmers share and build knowledge about crops, animals, trees, weather signals, seeds, insects, soils, risk management, and the landscape wherein they live. Men and women farmers hold different complementary knowledge. This knowledge does not exist in a vacuum, it is there because family farms exist. This knowledge is unfolding every day and is crucial for climate resilient farming.

Power balance: In the farm family there is cooperation and sometimes conflict. The aim of the farm family is to provide continuity over the generations. However, there may be a skewed division of labour, or unequal access to and control over resources between men and women, and between generations. Climate change can worsen imbalances and thus contribute to 'resilience deficits', i.e. farm families struggle to deal with crisis after crisis and land in downward spirals. It is crucial to invest in the resilience of family farmers as a core strategy in development, and to look for upward spirals to restore power balances within farm families.

Nexus between family, farm and agroecology: As Jan Douwe van der Ploeg says, the farm-family nexus is at the core of many decisions about the development of the farm. There is yet another connection here. The farm-family nexus provides an ideal setting for agroecological practices to be developed, tested and shared. Family farming and agroecology go well together. This does not mean that all family farms are agroecological or vice versa. But many stories published in Farming Matters over the years show that the ten qualities of family farming are coherent with the logic of agroecology.

The last Farming Matters

This is the final issue of Farming Matters. We believe in resilience, so we are confident that the ideas and knowledge being shared through Farming Matters will live on in diverse ways.

ILEIA is in the process of handing over the Secretariat of the AgriCultures Network to our partner organisation, IED Afrique, in Senegal. Together with network partners in Peru, Brazil, Ethiopia and India, they will continue to build and share knowledge on agroecology and family farming.

Thank you to all our readers and authors for your ongoing support and contributions to ILEIA and Farming Matters.

ILEIA's first newsletter was published in 1984. Over the past 30 years, the LEISA newsletter evolved to become the LEISA magazine, and then Farming Matters, as you know it today.

COLOPHON

Farming Matters
Experiences in family farming and agroecology

Farming Matters is published quarterly by ILEIA

www.ileia.org

ileia
Centre for learning on sustainable agriculture

Address
P.O. Box 90, 6700 AB, Wageningen, the Netherlands

Visitors' address
Lawickse Allee 11, 6701 AN Wageningen, the Netherlands
Tel: +31 (0)317 760 010
E-mail: ileia@ileia.org
www.ileia.org

Editorial team
This issue has been compiled by Madeleine Florin, Jessica Milgroom and Edith van Walsum.

The AgriCultures Network
ILEIA is a member of the AgriCultures Network; five organisations that provide information on agroecology and family farming worldwide, and that publish: LEISA revista de agroecología (Latin America in Spanish), LEISA India (in English, Hindi, Kannada, Marathi, Oriya, Punjabi, Tamil, Telugu), AGRIDAPE (West Africa, in French), Agriculturas, Experiências em Agroecologia (Brazil, in Portuguese) and Wegel (Ethiopia, in Amharic).

Layout
Twin Media bv, Culemborg, the Netherlands

Printing
Koninklijke BDU Grafisch Bedrijf B.V., Barneveld, the Netherlands.

Funding
ILEIA is grateful for the support of Sida, the Swedish International Development Cooperation Agency.

Cover photo
Alisson Gontijo

Volume 33.2
ISSN: 2210-6499

AGROECOLOGY IS RADICALLY DIFFERENT FROM THE VISION OF CLIMATE-SMART AGRICULTURE AND CONVENTIONAL DEVELOPMENT

Michel Pimbert, page 9

Complex agroecosystems are able to adapt and resist the effects of climate change

Clara Nicholls and Miguel Altieri, page 38

BESIDES KEEPING THE PLANET COOL, SMALL SCALE FOOD PRODUCERS MAKE SIGNIFICANT POSITIVE CONTRIBUTIONS TO TACKLING HUNGER AND MALNUTRITION

Shalmali Guttal, page 32

Meat production alone generates more greenhouse gas emissions than all the world's transport combined

GRAIN, page 28

agri cultures NETWORK

Farming Matters is published by ILEIA, the centre for learning on sustainable agriculture. ILEIA is a member of the AgriCultures Network, a global network of organisations that shares knowledge on agroecology and family farming.
www.ileia.org

ileia
Centre for learning on sustainable agriculture