

FARMING MATTERS

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Revaluing traditional plants

Suan Nguen Mee Ma social enterprise together with the Towards Organic Asia (TOA) program and partners organize the first

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Finger on the pulse of new local markets

My name is André Jurrius and I am an organic farmer. For the past decade I have been farming in the Netherlands, a stones throw from the Rhine River, on the same alluvial soil upon which I was born. On my farm, *Eko boerderij de Lingehof*, we have 100 hectares of arable land. Stable income from my main cash crops – potatoes, onions, carrots, pumpkin, cereals and clover – provides the space I need to experiment with new species of annual legumes. I wanted to introduce legumes into my rotation to improve soil fertility on the flood plain and also to participate in emerging local markets. Decreasing meat consumption in the near future will be met with more plant-based proteins and people want locally-grown food.

I have always incorporated legumes into my double cropping system, starting with grass and clover. In 2008, I started growing lupins and have not looked back. Two years ago I started growing chickpeas and soybeans and this year I am intercropping with lentils and wheat. I'm also experimenting with heirloom

varieties of dry edible beans. Lupin is well adapted to our climate as it can handle a lot of moisture in the soil. However, with the other legumes, wet periods during flowering and harvest, and the relatively cool summers are constraints to be overcome. The climate is changing so perhaps working with legumes will be an advantage in the future.

Many consumers have little experience with different legume crops, making them expensive and risky for now. However, I am not alone in my pursuit of growing legumes and creating new markets for these crops. I collaborate with people who are developing innovative ways of processing legumes and reaching consumers. For example, I work with Jacqueline Castelijns who is developing different recipes and products with lupin. I also work with other farmers and researchers passionate about overcoming the challenges of growing more legumes in the Netherlands.

Interview by **Jesse Roberts**, an intern at ILEIA.
Photo: **Bert Beelen**

CONTENTS



10

Making millets matter in Madhya Pradesh

Ashis Mondal, Israel Oliver King, Somnath Roy, Shambhavi Priyam, Gennifer Meldrum, Stefano Padulosi, and Sharad Mishra



17

“Real solutions are in the diversity of food and farming”

Mariam Mayet
Interview by Diana Quiroz and Madeleine Florin



20

Lupin regains ground in Central Ecuador

Nelson Mazón, Eduardo Peralta, Elena Villacrés, and Ángel Murillo



32

Farmers' firm grip on diversity

Leah Samberg

- 3 Farmers in focus: André Jurrius
- 6 **Editorial:** Traditional plants build resilience and resistance
Madeleine Florin, Diana Quiroz and Janneke Bruil
- 9 **Opinion:** Elizabeth Mpofu
- 10 Making millets matter in Madhya Pradesh
Ashis Mondal, Israel Oliver King, Somnath Roy, Shambhavi Priyam, Gennifer Meldrum, Stefano, Padulosi, and Sharad Mishra
- 14 Heritage grains: digging our roots, planting our seeds
Kristen Spruit
- 17 **Interview:** “Real solutions are in the diversity of food and farming”
Mariam Mayet
- 20 Lupin regains ground in Central Ecuador
Nelson Mazón, Eduardo Peralta, Elena Villacrés, and Ángel Murillo
- 24 Linking food choice with biodiversity
Jens Herbold
- 26 **Locally rooted:** Ideas and initiatives from the field
- 28 Planting roots with non-timber forest products
Rick Burnette and Abram Bicksler
- 31 **Opinion:** Kylie Lingard
- 32 Farmers’ firm grip on diversity
Leah Samberg
- 35 **Youth and agriculture:** Frederik van Oudenhoven
- 36 **Perspectives:** Fair and sustainable expansion of traditional crops – lessons from quinoa
Didier Bazile
- 40 **Mind!** New books on knowledge and agroecology
- 42 Advocating for sustainable pastoralism together
RBG project team
- 44 FAO’s Regional meetings on agroecology: A reflection
Janneke Bruil and Diana Quiroz
- 47 Call for articles



Traditional plants build resilience & resistance

This issue of Farming Matters looks at the growing number of initiatives worldwide that aim to harness the potential of traditional plants. Cultivating traditional plants builds resilience and nutrition, strengthens cultural practices and enhances food sovereignty. From the experiences presented here we learn that for the successful revival of traditional plants, farmers' knowledge on agricultural biodiversity, nutrition and culture must also be valued and protected. And this works best through a holistic approach – from field to fork to politics.

Madeleine Florin, Diana Quiroz and Janneke Bruil

Underutilised, orphan, forgotten, minor, neglected, indigenous, traditional plant species. These are but a few of the names for the plant species that are ignored in mainstream policy and research. Out of 7000 plant species that have been used for human food consumption since the beginning of agriculture, just three crops (rice, maize and wheat) provide 60 % of the world's plant-based calories and proteins today (FAO). Going against the grain, farmers and others around the world are embarking on initiatives that revalue the nutritional, ecological and cultural values of plants which, from here on will be referred to as 'traditional'. This issue of Farming Matters presents a kaleidoscope of such experiences.

Why are so few plant species valued?

In colonial times, traditional plants and foods were often associated with notions of 'primitive', and left to marginalised sectors of society. A second wave of undervaluation came from the 1960s onwards with the Green Revolution. A food and farming system based on intensifying the cultivation of only a few crops – rice, wheat and maize, bred for routine application of fertilizers, pesticides and irrigation – was promoted. Diversity in traditional crops, farming techniques and diets was replaced with monoculture and monotony.

Today the marginalisation of the majority of plant species in science, policy, education, development, pro-

Traditional plants are a central element in the agro-ecological transition. Photo: Ndabezinhle Nyoni



duction and consumption is evident. For instance, most research, food aid and public procurement programmes focus exclusively on the dominant crops, creating situations where farmers are convinced or coerced into cultivating them. In turn, and often via global food chains, where power is concentrated in the hands of just a few retailers who invest heavily in marketing campaigns, these are the crops that end up on the plates of consumers. And so we are witnessing the loss of the knowledge and cultural heritage associated with cultivating, processing and preparing many plant species.

Traditional plants and agroecology So what makes people revalue traditional crops? For one, because of the great richness and diversity that can be found among the plant species that do not dominate the global food system, but do provide at least a quarter of the world's plant-based food. And due to their many positive contributions, these plants are a central element in the agroecological transition.

Diversification is a major motivation for a return to traditional crops. The negative consequences of intensive use of (often expensive) external inputs such as pesticides and fertilizers provide an incentive for growing a variety of different species to manage pests, diseases and soil fertility. Traditional crops are a key component of such diversification strategies. In the absence of external inputs, traditional varieties often outperform improved varieties and with climate change, traditional drought-resistant crops, sometimes improved through careful farmer selection, offer resilience and stability. Moreover, this strategy supports farmers' autonomy as they can circumvent the industrial seed and chemical industries.

Importantly, a range of traditional crops such as millet are more nutritious than the major crops such as maize. Finally, the cultivation, preparation and consumption of traditional plants is a way of reinforcing cultural identity and is an important survival strategy amongst migrant communities (page 28) and those building peace in the aftermath of war (page 35).

For all these reasons farmers worldwide actively manage and maintain their diverse traditional plants and crops, and both rural and urban citizens are discovering and appreciating their uses. Likewise, scientists are seeking alternatives to the green revolution technology package and are revaluing traditional species, while policy makers such as governments and the FAO are recognising the value of such species for food and nutrition security.

But revaluing traditional crops is not easy, as it requires vision, creativity and stamina to go against the mainstream. Moreover, traditional crops also have their disadvantages. For instance, millets take a longer time to cook than rice and post-harvest processing of lupin is water and labour intensive. The processes of production and preparation of some 'forgotten' crops also have been forgotten, while 'modern tastes' often favour so called 'modern foods', usually containing wheat, rice or maize. And not everybody is able to make the transition. Some Indian farmers, who have been monocropping groundnuts since the 70s, are facing big problems because of climate change. Some have quit groundnut cultivation and returned to millet-based diverse systems, whereas others quit farming altogether, and others decided to quit life as they could not stand the idea of lifelong indebtedness to the bank.

Underutilised by whom?

The trend to revalue traditional crops merits a word of caution. Does the hyperdominance of a few crops mean that the rest are truly undervalued? For example, the pulse crop lupin is undergoing a worldwide revival, but for small scale farmers in the highlands of Ecuador, this crop has always been an essential part of their diets. The label 'underutilised' should be regarded in its geographical, social, historical, and economic context. Recognising this and questioning the narrative of 'underutilised plant species' is a way of challenging the politics of oblivion, as argued by Mariam Mayet on pages 17-19.

Moreover, the promotion of traditional plant species might actually accelerate or create

problems. A few decades ago quinoa was considered the 'lost crop of the Incas'. Recent campaigns that promoted its integration into global value chains have been successful in popularising the crop. But dramatic changes in quinoa producing regions raise questions about the impact of bringing traditional crops into global food systems. As Didier Bazile points out on page 36, these changes can negatively impact crop diversity, soil conservation, community cohesion and local food and nutrition security. Similarly, the commercial promotion of traditional non-timber forest products can be dangerous when governance mechanisms, such as land tenure, are not in place to curb exploitation of the species.



Promoting traditional plants goes hand in hand with respecting food producers' knowledge. (see article on page 32) Photo: Leah Samberg

Farmers' knowledge As the value of traditional plants gains greater recognition, so must the knowledge, culture and expertise on growing and preparing these. This knowledge can take many forms. For example, in the Gamo Highlands of Ethiopia (page 32), farmers use song, dance and food to hand over knowledge about their crops. Hence, promoting traditional plants must go hand in hand with respecting the custodians of this knowledge – the food producers themselves. Kylie Lingard (page 31) points this out with the case of an expanding indigenous 'bush foods' industry in Australia which does not yet fairly acknowledge the indigenous peoples.

Moreover, exchange between farmers and with others is a way to generate old and new knowledge about these foods. This is seen in India (page 10), where farmers participate in exchanges across the country to share their experiences with reviving minor millets. An initiative to revitalise lupin in Ecuador owes part of its success to the equal partnership between technicians and farmers (page 20). The protection of farmers' knowledge and their farming models remains a key point of attention, as learnt from the quinoa experience.

A holistic approach is needed As neglect of traditional crops has occurred at several levels, within seed systems, on farmers' fields, along market chains, on people's plates and in research, education and policy, a holistic approach is needed to turn the tide. Initiatives that build alliances between actors at these different levels are particularly successful as they enable coordinated efforts to make fundamental changes to the whole food system. For instance, recognising the link between traditional crops and foods calls for collaborations between farmers and people who process, prepare, package, distribute and eat food. In Canada, new links between farmers and chefs have increased awareness and popularity of heritage grains (page 14). Likewise food festivals in India and Ethiopia that celebrate food cultures, garner citizen support for traditional foods in both urban and rural areas. Furthermore, as illustrated with an example from Germany on page 24, there are increasing numbers of citizen-led initiatives that strengthen their relationships with farmers around traditional crops.

Support for emerging initiatives to revalue traditional plants must also come from policy. For instance through national research programmes that value farmers' knowledge on these crops and through public procurement programmes that source traditional foods from family farmers. Changes to the Public Distribution System in India, to include minor millets next to rice, wheat and maize, are a good example of how traditional crops can be supported (page 10). On page 17 Mariam Mayet argues for policy change that supports farmer-managed seed systems and likewise Didier Bazile explains that changes to international seed regulations is needed to promote farmers' access to diverse and high quality seeds (page 36).

Resilience and resistance This issue of Farming Matters shows that traditional plant species are part and parcel of family farming rooted in agroecology, and that there are many ways to revalue them. It is clear that this always goes together with the revival of traditional dishes, food cultures, and with greater diversity. It is imperative that markets be created specifically for traditional plants and foods that are produced in an agroecological way by family farmers. This can lead to more diverse, nutritious food and healthier people that feel more connected to their food. Traditional crops build resilience and resistance – for farmers, and for anyone who eats.

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In the whole of Africa and especially in my country, Zimbabwe, our elders cultivated crops not just for the sake of growing food but also for many other purposes, including for health, their relationship with nature, and their cultural and spiritual practices that are important to identity and belonging. Moreover, after many decades of unsuccessful experience with the green revolution, we have seen that traditional crops are easier to grow. Thus, where I come from, many smallholder farmers are now abandoning hybrid crops grown with a lot of fertilizers and other chemicals, and are replacing them with a wide variety of traditional ones.

In the cities of Zimbabwe, I have witnessed an increasing demand for foods based on traditional crops. Medical practitioners are recommending such foods to their patients suffering from various ailments. Herbal pharmacies and food outlets that serve organic dishes based on traditional crops are now common and popular among urban dwellers. The link between traditional crops and local culture is direct. Some crops have meaningful local names related to our culture, some of which reflect their relation with women. For example, some traditional maize varieties are called *mbuya usafe*, meaning grandmother do not die; and *mukadzi usaende*, meaning my wife do not run away. Small grains such as *rapoko* (finger millet) and *mapfunde* (sorghum) and *mhunga* (pearl millet) are used in traditional ceremonies. And pulses such as cowpeas and beans have always been present on our farms, enriching our diets and also the soils. They are easily intercropped, and you can dry the leaves and have vegetables all year round.

To keep cultural eating habits and practices alive, as women, we play a big role. We are well aware of different crops and varieties, and their importance to the health of the family. Preserving seeds and the various ways of processing them are also women's roles. I take advantage of the many meetings and conferences I attend to talk about the importance of these traditional crops and their relation with women. My own experiences with these traditional crops while growing up in a community and family has given me strength to speak out and I encourage other women to raise their voices as well.

Our messages are clear: we want our governments to protect our traditional crops and not to introduce costly new varieties which require agrochemicals which damage nature and our health. We cannot let our culture die. We need resources to raise awareness of the benefits of traditional crops, particularly among the new generation that is being seduced by unhealthy food.

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Traditional crops keep our culture alive

REVALUING TRADITIONAL PLANTS > HOLISTIC VALUE CHAINS



Making millets matter in Madhya Pradesh

Photo: Oliver King

A decline in minor millet cultivation rings true across much of India. Yet a country wide revival of this cereal crop is in motion. Farmers are again recognising and asserting the value of minor millets, a cereal crop that was once central to their culture. A group of farmers in Madhya Pradesh have taken strength from farmers in Tamil Nadu who have successfully brought millet back into their fields, their homes and onto plates across their region. This is a story of how learning exchanges and partnerships support amplification of successful initiatives.

Ashis Mondal, Israel Oliver King, Somnath Roy, Shambhavi Priyam, Gennifer Meldrum, Stefano Padulosi, and Sharad Mishra

Millet cultivation started to fall out of favour in India during the green revolution when input intensive farming systems dominated by wheat, rice and maize were systematically promoted. During the past decades, the public distribution system, a scheme where the Indian government provides rice and wheat at subsidised rates to low income households, has further discouraged the use of millets. But, from the ground up, farmers, NGOs and scientists have started a millet revival that has even reached national policy. Several farming communities have succeeded in reviving their lost tradition of cultivating millets and two years ago millet was added to the public distribution system. A relatively new experience amongst the indigenous Gond and Baiga farmers in Mandla and Dindori districts in Madhya Pradesh gives insight into how the millet revival is unfolding across India.

Climate resilience Traditionally minor millets were the major staple for farmers in Mandla and Dindori districts. They were cultivated and consumed in abundance – central to the rain fed farming systems, an important source of sustenance, and featuring in traditional songs. These cereals can produce a reliable harvest under the harsh conditions of this region that is characterised by rocky, thin topsoil and limited irrigation facilities. Since the 1970s, millet cultivation has been pushed into ever more marginal areas to make way for rice and maize. Paddy was once grown in more limited quantities and was considered a delicacy. Now, farmers in this region tend to focus their effort on wage labor and cultivation of paddy and

maize. In the monsoon season, paddy is grown in the lowest elevations where moisture is greatest, maize is cultivated on gentle slopes, while *kodo* (*Paspalum scrobiculatum*) and *kutki* millets (*Panicum sumatrense*) are grown only in the steepest and highest areas.

But, Gond and Baiga farmers recognise that their traditional millets are more reliable under increasingly drought-prone conditions. “Our crops depend on whatever falls from the sky. Paddy requires more water but *kutki* will grow even in the absence of heavy rainfall,” said a farmer from Mandla district. In 2015, eastern Madhya Pradesh received just 30 % of the usual amount of rainfall which led to crop failures and serious rural distress. The steady progression of climate change means that cultivating climate-hardy millet is an ever more important strategy.

Constraints Despite their benefits, low productivity, weak market opportunity, difficult processing, and low consumer interest are constraints to continue millet cultivation. These constraints for millet use are not unique to Madhya Pradesh however, and they can be overcome. In Kolli Hills, Tamil Nadu, 15 years of collaboration between farmers, the M.S. Swaminathan Foundation and Bioversity International has resulted in a so called ‘holistic value chain approach’ which addresses issues of production, processing and consumption at the same time. Action for Social Advancement (ASA), an NGO based in Central India, with a longstanding relationship with farmers in Mandla and Dindori districts, is applying this holistic approach in Madhya Pradesh to address challenges for millet use as part of a global initiative to promote climate hardy and nutritious underutilised species. The initiative is supported by the International Fund for Agricultural

Development, the European Union and the CGIAR Research Programme on Climate Change Agriculture and Food Security.

Success in Kolli Hills In Kolli Hills from 2014-2016, an estimated 56 tonnes of millet was produced by 759 local farm families across 45 settlements. It was used for home consumption, stored as seed, or sold. The backbone of Kolli Hill's success is the Agrobiodiversity Conservers' Federation (KHAB-CoFED), a registered society involved in managing minor millets from the farm to fork. The current membership stands at 1,511 members from 47 self-help groups and 62 farmers' clubs that specialise in different roles – from production, processing, value-adding to distribution. The initiative was built over time; it started in 1997 with 10 self-help groups and was institutionalised in 2009.

An approach which addresses production, processing, and consumption at the same time

Their success with collective processing, value-adding and marketing have proven that millets can play an important role in rural livelihoods again. Mechanised mills have reduced the drudgery of processing millet grains. Women used to spend up to an hour manually processing one kilogram of grain and now it takes just five minutes. Food fairs, innovative recipes and successful marketing of value-added millet products have increased the amount of millet consumed across the region. And, the 15 farmer-run seed banks containing 21 landraces from five millet species are enabling farmers to conserve local seeds and nurture their seed exchange practices.

A lesson in collective organisation The way farmers in Kolli Hills are organised has proven very successful. ASA is taking steps to support farmers in Mandla and Dindori districts in a similar way. In 2011, ASA supported the formation of more than 200 self-help groups amongst farmers in about 50 villages. Members from these groups formed the basis of three farmer producer companies that were established in 2013 and 2014. The farmer producer companies have storefronts, warehouse facilities and infrastructure needed to process and distribute the grain. All profits are distributed equitably among the farmers who collectively own the company, the majority of whom are women.

A success to date has been that, through the production companies, farmers are receiving a better price for their grain. The companies carry out primary cleaning, grading and colour sorting and as a result farmers share

Locally adapted minor millets

Owing to their nutritional value, hardiness and cultural relevance, minor millets are all but minor. The green revolution put them aside but today their rediscovery is opening up huge opportunities for unleashing their benefits. Traditionally considered as a separate group from the other 'major' millets (sorghum and pearl millet), minor millets in India include six species: foxtail millet (*Setaria italica*), finger millet (*Eleusine coracana*), proso millet (*Panicum miliaceum*), kodo millet (*Paspalum scrobiculatum*), little or kutki millet (*Panicum sumatrense*) and barnyard millet (*Echinochloa colona*). These crops play an important role in food and farming systems in both

sub-Saharan Africa and India. Their short growing season makes them well suited to rainfed farming conditions. Compared to rice and wheat, they require relatively few inputs. Millets offer a wide variety of flavours, excellent taste, crispy or fluffy textures that can make our food experience both healthier and more attractive. They are nutritionally superior to wheat and rice in many aspects. For instance, finger millet has the highest calcium content among all cereals. Their starch composition and low glycemic index (which make them ideal for diabetic patients) are also accompanied by gluten free status of the flour.

Photo: Shambhavi Priyam





Storefront of the Mandla Tribal Farmer Producer Company selling high quality millet seed to local farmers. Photo: Gennifer Meldrum

in the value-added price. On top of this, aggregation of grain enables bulk sale to reduce the number of middlemen between the farmers and consumers. The companies are also working to make available high quality *kodo*, *kutki* and finger millet seeds. This has involved participatory variety selection with several farmers specialising in seed production. Looking further afield, the farmer producer companies have joined a consortium made up of 51 farmer producer companies from across the state to facilitate larger scale transactions.

Farmer to farmer knowledge exchange Since seeing is believing, farmers from Madhya Pradesh and Kolli Hills have been involved in a number of knowledge and cultural exchanges. Last year farmers from Kolli Hills visited Mandla to share recipes and methods for preparing millets. This was such a success that when community members from Mandla participated in the Indigenous Terra Madre event in northeast India they prepared a *kodo ladoo*, a traditional sweet recipe, that they learnt from the Kolli Hills farmers. In January 2016 seventeen custodian farmers from Mandla and Dindori visited Kolli Hills, where they saw community seed banks, village-based mills, and the storefront where packaged final products are sold and distributed. They also had the opportunity to taste several millet dishes.

These exchanges are beneficial from both a learning point of view and for the unique experience of meeting people who share similar lifestyles, challenges and aspirations. “These people are our people,” said Khantibai, a female farmer from Mandla district. The visiting farmers were excited to find similarities between their native language, Gondi, and Tamil. Moreover, the cottage-scale machinery for millet processing in the vil-

“These people are our people”

lages that the farmers saw in Kolli Hills, could be strategic in increasing the use of millets in Madhya Pradesh. This would be particularly beneficial for women who traditionally spend hours grinding and separating stones from the small grains. All of the farmers were enthused to take their knowledge back to their villages and share it with the members of their self-help groups.

Millet on the menu Another lesson from Kolli Hills is that awareness campaigns amongst rural and urban populations are key to getting these climate hardy crops back on their plates. ASA has organised a number of millet festivals in the district centres that provide a platform for producers to showcase their millet. Prizes for ‘the tastiest dish’ and ‘the most popular stall’ and the presence of government officials has proven a successful way of boosting self-esteem amongst producers and revalidating this traditional crop and food.

The path towards a full millet revival in Mandla and Dindori districts continues and increasing demand for the crop is an important priority. Staff from ASA recently visited three local primary schools to discuss climate change and the role of climate resilient crops such as millet for adaptation. At the same time the self-help groups are negotiating with these schools to provide lunches and, without a doubt, millet will be on the menu.

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The custodians of the community seed bank and millet pulveriser in Kolli Hills mingle with women from Mandla and Dindori. Photo: Shambhavi Priyam





Heritage grains: digging our roots, planting our seeds

Two years ago Shelley and Tony Spruit started Against the Grain, an initiative that is reviving heritage grains in Ontario, Canada, from field to fork. Their experience demonstrates how family farmers build seed sovereignty and educate consumers on their power to make change. In this article, their daughter Kristen writes their story. She explains how Shelley and Tony overcame various challenges on the farm and are forging innovative relationships to create new markets and enhance food sovereignty for farmers and consumers alike.

Kristen Spruit

REVALUING TRADITIONAL PLANTS > SEED SOVEREIGNTY

"As farmers we have been entrusted with the seed for thousands of years. If we – the small farmers – do not continue to grow diverse, unique crops that are open pollinated and adaptable to the climate, we lose control of our food source," said my mum Shelley, expanding on the importance of seed sovereignty, not only for Canadian food sovereignty, but also for farmers and consumers.

My parents, Shelley and Tony, have been farming for more than 28 years. They own and operate 97 hectares not far from Ottawa. Two years ago, in 2014, they decided to use about 16 hectares of their land to grow heritage grains for local markets. These are old varieties or species of grains that have not been hybridised or genetically modified to fit mainstream farming practices and have, as a result, been largely forgotten or neglected. This is important in a country where the diversity of grains has been dwindled down to almost nothing with the majority of farmers growing only a few varieties of maize, wheat and barley. Developing new and alternative production models and markets is therefore at the heart of Shelley and Tony's efforts to revive heritage grains.

Growing Against the Grain They aptly named their new venture 'Against the Grain' and started experimenting with a range of wheat and barley varieties – Purple Ethiopian Barley, Scottish Bere Barley, Tibetan Barley, Blue Utrecht Wheat, Einkorn Wheat, Black Emmer Wheat, Brazilian Laurus Wheat, Kamut and White Sonoma Wheat– amongst others. Although wheat and barley were not domesticated in Canada, generations of selection and breeding by

Canadian farmers has resulted in locally-adapted heritage varieties. For instance, beta-glucan barley, which Tony and Shelley grow and sell, directly from the farm and, online. This variety was researched and developed specifically for the Canadian food market.

The rarity of these grains created practical challenges, from difficulties to source enough seeds to acquiring suitable equipment to harvest, thrash, clean and store the grains. On top of this, finding other farmers who've grown these crops and can share information on the history and provide tips and tricks of the trade has been difficult. Overcoming these challenges has been a lesson in persistence. Each year Shelley and Tony learn more about the grains' growing characteristics – planting time, row spacing, favoured soil type, resistance to wind and fungus and time to maturity. For instance, last spring it became evident that a number of these older varieties needed an additional step in the cleaning process to remove the hard outer shell of the grain and the long bracts. While it was not easy to find them, they have also been able to connect with other farmers who have, for instance, helped them with the equipment needed for harvest. Shelley and Tony are members of the Ontario Ecological Farmers Association. The organisation helps to connect farmers across Ontario looking to grow alternative grains, create seed banks and who are interested in small farm ownership. The membership has enabled them to connect with other like minded farmers along the way.

New partnerships, new markets

Beyond the farm gate, the challenge of this adventure continues as markets still need to be created for non-GMO, open pollinated and non-patented seeds in

Heritage grains

'Heritage' and 'ancient' are often used interchangeably. Heritage grains are an alternative to so called mass-market grains and are seen as a part of the resistance against the consolidated seed industry. Three quarters of the world's seed market is controlled by ten companies who concentrate on only a few crops and varieties. For example, in Canada, 95 % of seeds used to grow major

crops are bred for uniformity and performance under routine use of synthetic inputs. Heritage grains are also becoming more popular amongst consumers where their superior nutritional properties are recognised and marketed. For example, purple corn has between 15 and 20 % more of the eight essential amino acids found in yellow corn.

Photo: Susan Sloane



There is increasing awareness amongst chefs and consumers about the importance of how grains are grown



Shelley and Tony. Photo: Susan Sloane

Canada. This is where the connection between seeds and food comes in, and the role of building relationships between farmers and consumers. Shelley has invested in creating new partnerships with bakers, artisans, chefs and businesses across southern Ontario. As a result, several chefs and bakers in the Ottawa area now use Against the Grain products. For instance, one chef is substituting imported rice with Against the Grain barley berries. And a bakery in Ottawa sells various pastries and pies made with their barley flour and purple corn meal. Moreover, Against the Grain is currently working together with an enterprise that supplies food to 1200 schools to develop a healthy cookie made from barley flour.

There is increasing awareness amongst chefs and consumers about the importance of how grains are grown, and the correlation between non-GMO products and health. The response from customers has been overwhelming, particularly when consumers understand the health benefits of whole grains. “Seeing people interested and wanting to know more about heritage and Canadian

grains is proof that there’s power to create change within the food and agriculture system,” said Shelley. A challenge in this arena has been to meet all the regulations for the processing of the grains, such as getting approval and meeting food processing and health standards for the millers that Against the Grain works with.

Keeping seed diversity alive

Shelley continues to work with new partners to build and broaden the movement to keep the seed genetic diversity alive in Canada. Against the Grain is working with scientists from the University of Manitoba to trial different varieties of grains to determine the suitability and productivity of these grains in various Canadian climates. Currently, three varieties of hullless oats – which are crosses of different heritage grains – are being tested.

Wanting to maintain and expand seed diversity, Against the Grain donates their heritage seeds to organisations such as Seeds of Diversity and USC Canada, who have created seed banks with more than a thousand rare Canadian-adapted seed varieties. This project is organised through the Canadian Bauta Initiative, which works with various organisations to preserve rare varieties of seeds for future generations. And this spring, Shelley and Tony initiated a ‘Grow a Row’ project on their farm – a community initiative where gardeners and farmers share their excess produce with local soup kitchens and food banks. As part of this effort, high school students will be growing heirloom tomatoes on Shelley and Tony’s farm and donate the produce to a local food bank.

While it’s never easy to take a different course than society dictates, Shelley has always been a believer in the notion that small steps can have big impacts: “We have the power to create change, one seed at a time.”

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Students planting onions on Shelley and Tony’s farm for the ‘Grow a row’ project. Photo: Kristen Spruit

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Photo: Alex Garland

"Real solutions are in the diversity of food and farming"

Mariam Mayet is the director of the African Centre for Biodiversity (ACB). In a recent report, ACB turns their attention towards genetic modification of non-commercial 'orphan crops' and the way this technology is replacing farmer-managed food systems. In this interview Mariam explains what is wrong with genetic modification of these crops and where the real solutions lie.

Interview: Diana Quiroz and Madeleine Florin

GM crops simply cannot address multiple nutritional challenges

What is meant by non-commercial 'orphan crops'?

Traditional crops such as cowpea, sorghum, millet, pigeon pea, cassava and sweet potato are referred to as non-commercial 'orphan crops', as part of a particular narrative that values crops that are produced commercially and traded on international markets, while everything else, like traditional or indigenous crops, are considered 'orphan'. But on the ground, these crops form the basis of our food and farming systems. The value of these crops is not recognised. They've been neglected in regional, national and international policy, and in research and development spaces.

But we do not agree with the use of the term 'orphan crops'. In the same way that we changed the discourse around 'informal seed systems' to 'farmer-managed seed systems' we have to question whether crops are really orphan or underutilised. Terms like 'orphan crops' are derogatory and I regret that we used it in our recent report, but it's out there now and it's a learning curve for us. The more we work with farmers on the ground the

more we are humbled and we go back to the drawing board to rethink our strategy and way forward.

What is your concern with genetic modification of these crops?

First, we are very critical of genetically modified (GM) crops in Africa and have been opposing GM in Africa for almost 20 years. We are fundamentally opposed to reductionist solutions imposed upon Africa by powerful external forces that are based on replacing existing farmer-managed food and farming systems with a model that is ecologically unsustainable and inherently socially unjust.

Claims that GM addresses vitamin and nutrient deficiencies through biofortification is turning the attention and resources of politicians and researchers towards new technologies such as gene editing and gene silencing. There has been a spate of articles and discussion around this, yet very little attention goes to the biosafety risks nor the past failures associated with GM crops. It is surprising that biofortification receives so much attention when GM crops simply cannot address multiple nutritional challenges arising from, amongst others, environmental degradation and lack of access to public health and sanitation. Our main objection is that this diverts resources and the policy making trajectory away from real solutions which can be found in the diversity of food and farming.

New report: For your own good The chicanery behind non-commercial 'orphan crops' and rice for Africa

The African Centre for Biodiversity released this report in April 2016 outlining the GMO industry's expansion across Africa. The report focuses on non-commercial crops – cassava, sorghum, sweet potato, pigeon pea and millet, as well as rice – revealing that a great deal of research and development is currently underway into the genetic modification of these crops. Most of the ongoing trials are focused on drought and salt tolerance, nitrogen use efficiency, resistance to tropical pests and diseases and nutritional enhancement (biofortification). The key countries that have been targeted include Burkina Faso, Egypt, Ghana, Nigeria, Kenya, Uganda and Malawi. The current wave of GM research is not enabling smallholders in Africa to choose their means of production and survival and is shifting control over the future of farming in Africa from farmers to those who will benefit from profits to be made from GM.

Moreover GM crops threaten genetic diversity that exists amongst traditional plant varieties. The report concludes that "the GM industry appears to be expanding its grasp over traditional subsistence crops. [...] By focusing research on traits that are meant to 'benefit' farmers and malnourished populations, the industry is bent on winning the hearts and minds of Africans regarding genetically modified crops." This work complements work already produced on GM banana (Schnurr, 2014) and GM cowpea (ACB, 2015).





ACB's Malawian research team. Photo: Enock Chikale

In some parts of Southern Africa, and in the USA, Canada and Latin America, farmers can't even imagine agriculture without GM. At the same time, smallholder farmers in Africa produce 80 % of our food largely based on their own seed systems. So in our recent report (see box), we look at what the GM industry is doing with farmers' traditional seeds and crops, and where public research funding is going. Now at least groups have, in one document, an outline of who are the companies donating technology, which traits in crops are being researched, which crops are being targeted, and how much money is going into these projects. The report reveals that there are whole host of agendas at play. For instance much of the research is on new GM traits and is in the stage of either greenhouse containment or confined field trials. The prospects of commercialisation are unclear as approval of new traits takes a long time and depends on the evolution of biosafety regulations and new or existing moratoriums. It is not clear when, or whether or not, any of these GM crops will reach the commercialisation stage.

But in general, we are very concerned about the GM industry and multinational companies further prying open Africa's food and farming system through its expansion into non-commercial crops, while there is clearly an opportunity for governments and a host of actors to embrace an alternative transformation agenda based on agroecology.

Can you elaborate some of these real solutions? It is important to support the right of farmers to choose their means of production and survival. And this means starting with where farmers are and emboldening and strengthening their systems. Moreover, the protection of farmer-managed seed systems is needed. In these systems you find diversity and resilience. We need to shift away from the idea that seeds within farmer-managed seed systems

are sub standard or of poor quality. Within these seeds, you may have drought resistant or nutritional properties and characteristics with cultural importance.

What steps can be taken towards these solutions? We are pushing for big policy change towards recognition and protection of these systems and supporting local campaigns. For us information is key and ACB tries to put current information and knowledge in the public domain, complemented by other activities and events. Earlier this year we organised a course where we brought together activists from across Africa and spoke at length about GM of non-commercial, indigenous crops.

I think the revaluation of traditional crops will increasingly become part of the resistance campaigns against GM. There is a conference coming up in Nigeria where church groups will discuss the rise of GM cowpea. Nigeria is the world's largest producer of cowpea and field trials with Bt cowpea are in quite an advanced stage so we expect a lot of resistance there. Our previous report on cowpea was translated into French and is being used by our friends in Burkina Faso, where there is a growing resistance to GM from the grassroots, for example through an event to coincide with the international march against Monsanto in May 2016. When our colleagues in Africa integrate information from our reports into their local campaigns that way, it's a big victory for us.

There is clearly an opportunity to embrace an alternative transformation agenda based on agroecology

Photo: Nelson Mazón

Lupin regains ground in Central Ecuador

This story shows the power of farmers' leadership and self-organisation to revitalise neglected crops. A successful partnership between farmers and socially committed researchers, provided the scaffolding farmers needed to take matters into their own hands. A group of farmers set up a producers' corporation to tackle the constraints to lupin production collectively. Amongst other achievements, thanks to an innovative participatory quality assurance system, they are now recognised as important local seed producers in Ecuador.

Nelson Mazón, Eduardo Peralta, Elena Villacrés, and Ángel Murillo

The Andean Region is one of the world's centres of plant domestication. Globally important crops such as quinoa (*Chenopodium quinoa*), amaranth (*Amaranthus* spp.) and lupin (*Lupinus mutabilis*) were domesticated there.

Before the Spanish conquest, these and many other crops played an important role in the diets of high-Andean populations. However, during the colonial and republican periods, the consumption of traditional crops was discouraged to the point that they disappeared from many agricultural systems.

In the case of lupin, its bitter flavour further contributed to its exclusion from diets, placing it at a disadvantage against the foreign pulses that had been introduced by the Spaniards. Although farmers have traditionally processed lupin in order to make its taste less pungent, processing requires intensive use of water. Furthermore, lupin productivity is low in Ecuador due to factors such as cultivation in marginal areas, minimal public and private investment, and lack of rural succession strategies. These factors have resulted in the further neglect of this and other Andean traditional crops, which make up for a considerable part of the region's basic food basket. A group of farmers have taken steps to reverse this situation.

Taking matters into their own hands

In 2008, a farmer leader of Guamote Canton (central Ecuador) visited a field office of the National Institute of Agricultural Research (INIAP) near Quito to ask for information to improve their lupin production and the de-bittering process. The farmer's request was most welcome as it coincided with the institute's interest to expand the activities of their National Programme of

Andean Legumes and Grains (PRONALEG-GA). A year later, extensionists and several farmer leaders joined forces to set up four farmer field schools in four communities interested in revitalising their lupin production. The research team from PRONALEG-GA provided technical and material support for this initiative.

The field schools led to an unexpected outcome

In the field schools, lupin seeds from various varieties and origin were compared under different planting densities. Farmer leaders and technicians facilitated training on seed quality, pest management and using machinery for threshing. Besides taking lessons from the field schools back to their farms, the experience led to an unexpected outcome. The participants saw the potential value of working together to obtain support from governmental and development organisations and decided to form a producers' corporation.

Working together 62 farmers from the four communities set up the Corporation of Producers of Andean Legumes and Grains of the Puruwa Chimborazo Village (CORPOPURUWA), which was legally recognised by the Ministry of Agriculture in July 2010. All of the members, one quarter of whom are women, have equal rights to decision making and sharing in the profits. The corporation is governed by



Farmers meet amongst flowering lupin in Mushuk Pacari, Guamote. Photo: Nelson Mazón

a members' assembly, a board and an ethics committee that ensures the achievement of the corporation's social objectives, such as improving household income. With this new way of organising, the revaluing of lupin took on a new lease of life.

Accessing good quality lupin seed emerged as a key constraint to further cultivation of the crop and so they set out to include seed production as one of their main activities. For seed production, they are focusing on a variety of lupin, *INIAP 450 Andino* (Andean variety), developed in the region with germplasm from Peru. It is valued for its relatively short time to maturity (seven versus 12 months) and is used to complement the local varieties which farmers continue to grow. Combining varieties helps to maintain diversity and yield stability on the farm as well as achieving year-round food security. Two farmers from each community, represented in the corporation, started to specialise in seed production and to supply four corresponding seed banks. Other farmers began to specialise in machinery operation and focusing on value addition (de-bittering and developing products such as flour and ice cream).

The partnership between farmers and researchers from PRONALEG-GA continued after CORPOPU-RUWA was setup. For instance, researchers facilitated

the farmers' access to greater institutional support for their initiatives. They nowadays receive training and financial resources from the Ministry of Agriculture, the provincial government, and FAO.

Seed specialists The seed banks, supplied by the farmers specialising in seed production, complement existing farmer-managed seed systems. So far, the seed banks serve as local reserves of good quality seeds. A limitation is that the seed banks only house a few varieties of lupin, quinoa and barley. But the corporation contemplates the inclusion of lentil and rye to overcome this limitation. Traditional practices of reciprocity and solidarity are respected, meaning that farmers can still obtain seeds as a loan, through exchange and also as gifts.

The farmers decided to implement a participatory seed certification system

The issue of quality assurance became problematic when the corporation decided to expand seed production. Selling lupin seeds requires a sanitary certification that most farmers cannot afford. Inspired by experiences of ‘participatory guarantee systems’ for certification of organic and agroecological production, the farmers decided to implement a participatory seed certification system, overseen by the ethics committee. Each seed bank has a certification committee, made up of farmers trusted within their community and with knowledge on seed production. The committee works with the seed producers and in turn advises the ethics committee which authorises the use of the corporation’s ‘desert seed’ label.

This is a work in progress and the corporation currently distributes seed via both participatory and ‘official’ certification approaches. They currently sell their seeds, both in Chimborazo Province, as well as in other provinces in the central and northern highlands. As the only local producer of high quality seed, the corporation can take credit for the increasing number of farmers growing lupin with locally-produced seed.

Lupin crops in the village of Pull San Pedro, Guamote.
Photo: Nelson Mazón



Gaining ground, growing confident

Overcoming challenges on their fields is not the end of the story. Several obstacles existed for revaluing lupin as a food source, particularly amongst urban citizens. Improving the de-bittering process was seen as a fundamental step – both to improve water use efficiency and to ensure the taste and appeal of the grain. Researchers from INIAP developed a pilot processing plant. Subsequently, a family business, *Lverde*, adopted and improved the process. *Lverde* was one of the first businesses to sell lupin to supermarkets, school cafeterias, and restaurants. Such businesses play an important role connecting rural producers and urban consumers. Moreover, researchers from INIAP and CORPOURUWA also promoted lupin consumption through workshops with chefs, nutritionists, students and citizens, the production of a recipe book and radio advertisements promoting its nutritional benefits. These efforts resulted in increased consumption, both by producing households and buyers, and adoption of new recipes.

Their experience has become a reference for other farmers

By rescuing their local knowledge and using their skills, organised lupin farmers of CORPOURUWA have gained autonomy in addressing their own needs. They have improved and increased lupin production and contributed to more local consumption with benefits to their families’ income and diets. In the process, they have gained confidence, and their experience has become a reference for other farmers in neighbouring communities as well as for similar projects promoted by both the public and private sectors. For instance, a similar government programme to revitalise lupin production in Bolivia has been launched.

The farmers’ success can be partly attributed to the way they work together. The successful cooperation, supported through various partnerships and institutions, enabled innovative solutions to be born and also to focus broadly on the different issues that were constraining lupin production – from the seeds to the market.

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Linking food choice with biodiversity

Berlin is the German city with the largest number of organic food stores, but dominant distributors and organic supermarkets exclude small scale farmers from the market. By dropping fences between producers and customers, a retailers' cooperative is raising public awareness about the relationship between food choices, food sovereignty, and the conservation of agrobiodiversity.

Jens Herbold

In 2009, three friends and I subrented a warehouse in Kreuzberg, one of Berlin's central neighborhoods. For organics, just as with conventional food chains, the control of the large retail groups is growing. This leaves almost no space for small producers. We wanted to shorten distribution chains and engage in trade with independent producers and production cooperatives and to start collective action towards food sovereignty.

This is how Schnittstelle, our retail cooperative, was born. The principle is simple. Schnittstelle aims to distribute cooperatively produced foods, seeds and beverages to consumers interested in supporting alternative forms of economy and agriculture. The producers we work with, many of them located in the vicinities of Berlin, are usually part of a Community Supported Ag-

riculture scheme or related networks of solidarity, and seek to increase their retailing opportunities. A number of the producers are agricultural cooperatives, for instance, we source pasta from the Iris Collective, a community that has been farming since the 1970s. Upon delivering their own goods many producers buy food from other collectives right away. Other customers are members of food or housing cooperatives.

When we start working with producers, together we assess our ideological compatibility. For example, we check if we share the same idea of 'organic'. Afterwards we discuss selling prices to find an 'economically correct' price – one that is affordable for those who pay, and is also fair for producers and distributors. It is a lot of work to make this is possible and we are always seeking new producers, consumers and volunteers.

An interface *Schnittstelle* means interface – the purpose of this initiative. As well as a food distributor, Schnittstelle is a platform for exchange of information between rural and urban areas and producers and consumers. On our blog and in our newsletter we discuss and showcase alternatives to the dominant capitalist, agricultural system. We used to organise film events but now other groups in Berlin, with similar interests, continue this activity.

A box full of biodiversity A recurring theme on our blog is agrobiodiversity, which is closely related to food sovereignty. In Germany, as in most parts



Ringed beetroot produced by the Commune Gustritz.



Schnittstelle sells products from traditional crops grown by small scale farmers.

The best way to achieve agrobiodiversity conservation is by eating it

of Europe, a considerable portion of the food we eat comes from abroad. People do not choose what they eat, they choose from the range of products presented to them. As well as talking about agrobiodiversity, the best way to achieve its conservation is by eating it.

Therefore, in 2012 we started a box scheme with crops that had long become rare in supermarkets and food outlets. We called it the 'Biodiversity box scheme'. This box is delivered monthly to 50 subscribers. It is made up of unusual products, for example open pollinated vegetables, kamut (*Triticum turanicum*) pasta, fruit juice from old varieties, or rare seeds we obtain from small plant breeders. The boxes also include recipes and background information on these products so that people can learn about them. According to many subscribers this information is a highly valued part of the box.

Consumption for food sovereignty The Biodiversity box scheme seeks to raise awareness of how our food choices greatly influence agrobiodiversity. For example, in the 19th century there were about 1000 wheat varieties in Germany, which were adapted to our regional climate and soil. Now, only 30 remain. According to the Federal Varieties Office, as of April 2013, 734 cereal varieties are

approved for cultivation in Germany. That does not mean, however, that these all are cultivated. We wanted to focus people's attention on this issue and welcomed the opportunity to support a small brewery in Lower Bavaria, the Riedenburger Brauhaus. They produce beers from neglected cereals: millet, einkorn wheat (*Triticum monococcum*), spelt and farro (*Triticum dicoccon*). Their beers are regularly included in the biodiversity boxes, and so is the bread made from 'historical' cereals produced by the bakers collective Backstube. The bread is so popular that this bakery has now included it in their regular product line.

Moreover, through our business model, we also want to make consumers aware of their power to bring *people* back to the centre of agriculture and to act on that power. In industrial agriculture, farmers are often relegated to pure commodity producers. The cultivation of diverse varieties, on the other hand, is less monotonous and the labour involved should be remunerated accordingly. But producers, who practice small scale, diverse agriculture, have little chance to assert themselves against companies and retailers who dictate low prices. Cooperatives like Schnittstelle, by shortening the chain and building a network, make it possible for these producers to be paid fairly. By directly supporting small scale producers who preserve our biodiversity, we exercise our right to define our own fair and diverse food system.

Jens Herbold (schnittstelle@jpberlin.de) is an activist in the fields of solidarity economy, agriculture, food sovereignty, climate change, and (anti-)nuclear power.

Just as plants, humans will not survive without their roots. The experiences here highlight initiatives in which farmers, peasants, and educators have successfully organised themselves to rescue their traditional crops and revive their culinary traditions, thereby strengthening their cultural identity.

Crop diversity makes school kids proud

Chandan's grandmother is surprised to find her 10 year old grandson carefully taking down the recipe of *jhungre ki kheer*, a pudding made with barnyard millet, that she has not tasted in the past 30 years. Chandan is one of the children from Odhla High School, Govindpur participating in a traditional recipe competition conducted in their school by the Smallholder Innovation for Resilience (SIFOR) team. The programme has been working in five villages in the Kumaon Himalayas since 2012 to assess aspects of traditional agriculture, its climate preparedness and

to support a revival of traditional crops. The effects of climate change, amongst other factors, have played a major role in many farmers' decisions to give up farming and opt for regular wages, often in urban areas. This has taken its toll on many traditional grains and pulses, with some having completely disappeared. But, the past four years have seen progress, with some traditional crops regaining popularity, on farmers' fields and in the newly setup community seedbank. Measures to ensure the long term success of this biodiversity revival include the involvement of existing institutions such as schools, as well as creating new ones like women's self help groups and crop-protection committees. The recipe competition engages kids to not only learn about his agricultural heritage but also become a successful farmer who is proud of the diversity of crops on his farm.

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Photo: Prakriti Mukerjee

Bambara groundnut gets the attention it deserves

Bambara groundnut (*Vigna subterranea*), a legume crop indigenous to sub-Saharan Africa, is widespread amongst smallholders in Zambia. Farmers adapt cultivation techniques depending on their soil and climate. For instance, in drier regions it is planted next to termite mounds and in wetter regions on top of ridges. However, it is often outcompeted by crops such as maize and cassava. This prompted farmers to start experimenting three years ago. Concern Worldwide, an international NGO, facilitated the farmers' experiments which also included cowpeas, soybeans and peanuts. One result was the high density at which Bambara groundnut can be successfully planted and that it is great for intercropping due to its drought

tolerance. Beatrice Sepiso, a farmer from Kaoma district explains: "We would have to cultivate one *lima* (0.25 hectares) of *lituu* (Bambara groundnuts) the old way to achieve what was managed in two lines!" Access to enough seed and reducing the labour required to process the groundnut are two remaining challenges. As well, the cultural, nutritional and agronomic value of such indigenous foods needs to be celebrated in the national discourse around food sovereignty.

For more information contact Paul Wagstaff (Paul.Wagstaff@concern.net).



Photo: Kkibumba, via Wikimedia Commons

Palestine

Seeds of resistance

Climate change, urban expansion of the Israeli settlement, and the dominance of hybrid seeds are putting many farmers' traditional varieties and Palestine's farming heritage at risk. This prompted Vivien Sansour to return home to the West Bank city of Beit Jala to start the 'Palestinian Heirloom Seed Library'. While there is a seed bank in Palestine, established by the Union of Agricultural Work Committees in 2008, the library, sponsored by the Walid and Helen Kattan Science and Education Program and A.M. Qattan Foundation, combines science education and art. In the lead up to the library's launch in June this year, Sansour conducted workshops with school teachers to find new ways to engage students in the process of retrieving, "their agri-cultural heritage." Sansour: "We want to bring back the true meaning of *talib* (student in Arabic) to the classroom. We want our young generations to question and search for what is rightly

theirs, an ancient ancestral heritage represented in seed and story that has kept us alive and well for millennia." Sansour hopes that by building cultural links to their past and reversing the disappearance of their traditional plants, young Palestinians will strengthen the resistance of the occupation. At the launch, in Battir, guests were able to view the seed collection, the work of the students and teachers, as well as heirloom plant varieties growing on one of Battir's world heritage site terraces.

For more information contact Vivien Sansour (<https://www.facebook.com/palestineheirloomseeds/>)



Photo: Ayed Arafah and Vivien Sansour

Peru

A chef-peasant alliance

In 2007, the Peruvian Gastronomy Society started promoting alliances between small scale farmers and chefs to bridge biodiversity and the culinary use of traditional Peruvian foods. This initiative, coined 'the Chef and Peasant Alliance', seeks to support small producers, artisanal fishermen, and peasant producers to link with Peru's gastronomic sector. The main objective was to take action against

the loss of agrobiodiversity and social inequality. Through the alliance's promotion of local produce, farmers avoid intermediaries and obtain better prices for their products through direct commercialisation at weekly markets and food fairs. Cooks, chefs, and restaurateurs, on the other hand, profit from this business opportunity as they depend on agricultural products and the enormous diversity of traditional crops, tubers, and fruits. The alliance, moreover, serves as a platform for knowledge sharing where chefs and peasants learn from each other's realities, needs, and aspirations and innovate new dishes and ways of producing. In this process, farmers gain awareness of how valuable their products are to their fellow Peruvians: during food fairs, farmers and their products receive a lot of attention from the media, the public, research organisations and NGOs. The fairs are not only a means of empowerment for farmers, but also a celebration of Andean agrobiodiversity.

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Photo: Guillermo Yupanqui



Planting roots with non-timber forest products

In recent decades, resource challenged hill tribe farmers and gardeners in northern Thailand have recognised the importance of various threatened species that yield non-timber forest products. Conserving these species in agroforests has not only secured farmers' access to valued types of food, fibre, and construction materials, but also improved fallows and the integration of displaced communities from Myanmar.

Rick Burnette and Abram Bicksler

While chickens forage in the undergrowth, Jawa Jalo tends a productive forest-like garden at his home in northern Thailand. About 0.16 ha in size, he established the plot in 2003 on degraded land adjoining his home. It contains 27 different crop varieties, the majority being indigenous non-timber forest product (NTFP) species. The dense, multi-storey planting of trees, vines, and shrubs provide Jawa (a resident of the Red Lahu community of Huai Pong) with a constant supply of food and fibre, both for household consumption and the market.

The Red Lahu, Palaung, Akha, Lisu, and Karen are amongst many ethnic groups residing in the Sri Lanna National Park, in Chiang Mai province. Originally rooted in neighbouring Myanmar, many of these communities fled armed conflict more than three decades ago and sought refuge in Thailand. Migrant communities in Thailand are routinely marginalised by the local population and suffer limited and uncertain access to farmland.

Innovation born out of need

Before the establishment of the National Park in 1989, local farmers practiced shifting cultivation, with fallow cycles of up to nine years, growing mainly upland rice and other crops, such as sesame, chillies, cowpea and pigeon pea. Access to forests enables this traditional form of farming and helps to supplement household nutrition, as well as provide medicines, construction materials, and other products. However, environmental degradation and legal restrictions progressively weakened traditional forest-based livelihoods. With ever greater restrictions on shifting cultivation in northern Thailand, existing forest-fallow periods are increasingly brief, often only a few years. And households are now restricted to small plots of untitled land that was cleared decades ago.

To cope with diminishing access to forest resources, other hill tribe communities outside of the Sri Lanna Park began family agroforestry plots for the production of NTFPs. For instance, while cultivating traditional field crops, some farmers have integrated forest species as another source of edibles in their fallowed fields. These NTFPs often include rattan (*Calamus* and *Daemonorops* spp.), valued for fibre and edible shoots, as well as prickly ash (*Zanthoxylum rhetsa*) which produces a marketable spice.

But indigenous NTFP species were not only integrated into fallowed fields, people also started to grow them in their home gardens. The migrant Palaung communities are among the most recent arrivals and face particularly limited access to farmland and forest products. As a result, many families began planting

indigenous species around their homes. These included perennial vegetables such as snowflake tree (*Trevesia palmata*), rattan, cluster fig (*Ficus racemosa*), red shoot fig (*Ficus virens*), and climbing acacia (*Acacia pennata*).

Access to forest resources helps supplement household nutrition

Farmer-to-farmer learning Inspired by these locally developed approaches, the Upland Holistic Development Project has been promoting community driven NTFP agroforestry in northern Thailand since 1999. The project supports farmer-to-farmer exchange where households already practicing some form of agroforestry offer models for other farmers to learn from. These households provide inspiration and offer assistance to newly established communities. For example, they provide planting materials, practical information and encouragement. Some of the farmers also host demonstration plots. As a result, the newcomer communities, which often settle in environmentally degraded areas, have begun to explore and experiment with indigenous forest species in their home gardens.



NTFP species are almost always included in home gardens. Photo: Rick Burnette



NTFP species play a significant role in the regional economy. Photo: Rick Burnette

A fine line NTFPs are often managed and harvested at a subsistence level and are not usually considered to be important crops, particularly in comparison to major regional commodities such as rice and maize. But the hill tribe farmers in northern Thailand prove the opposite. NTFPs, which play a significant role in the regional economy and in household food and nutritional security, are often long-domesticated crops derived from the forests of the region – for example, longan (*Dimocarpus longan*), bael fruit (*Aegle marmelos*), and prickly ash. These domesticated species also help to preserve local cuisines and culture, while contributing to regional biodiversity and forest preservation. Almost always included in backyard home gardens, NTFPs are not only for household consumption, but sold in markets. These may include annual and perennial vegetables and fruits such as climbing acacia leaves, salae flower buds (*Broussonetia kurzii*), rattan shoots, ivy gourd shoots (*Coccinia grandis*), fronds of vegetable fern (*Diplazium esculentum*), spiny lasia leaves (*Lasia spinosa*), cassod tree leaves, bael fruit and Burmese grape (*Baccaurea ramiflora*).

Moreover, NTFPs are often established on permanent upland fields among fruit trees, with density and variety needed to create a multi-storied structure. Larger trees form the canopy and smaller NTFP species grow in between or underneath the canopy and use the larger trees for support. In more remote locations where short-cultivation, long-fallow swidden cycles still exist, the opportunity to improve fallows with useful NTFP species – such as tea (*Camellia sinensis*), rattan, prickly ash, fan palm (*Livistona* sp.), black sugar palm (*Arenga westerhoutii*), and leguminous species such as the cassod tree (*Senna siamea*), lablab (*Lablab purpureus*), and rice bean (*Vigna umbellata*) – increases the value of the fallow by maximising and diversifying agroforestry production and improving soils.

Factors of success Indigenous and naturalised forest species are valued for inclusion in agroforestry systems because they require few, if any, external inputs. Next to the Sri Lanna National Park, cultivation of NTFPs is successful where, for most communities, shifting cultivation is no longer an option. Depending on the diversity of plantings and the seasonal productivity of each crop, NTFPs are also able to offer year-round production, which gives them an advantage over annual crops. They are, moreover, products that are suited to local tastes and needs, some of which are readily marketable. Amongst these communities, cultivation of NTFPs has also been widely adopted thanks to the sustained support for farmer-to-farmer exchanges from local and international NGOs and civil society.

NTFPs offer year-round production

A growing forest Although Jawo Jalo has not kept accurate records of establishment or maintenance costs of his garden, his income has increased substantially since 2008 from sales of NTFPs – primarily rattan and fishtail-palm shoots, as well as vegetables. Nearby farmers report increased income from NTFPs as well. One of these farmers is Mr. Namsaeng Loongmuang from Pang Daeng Nai, a nearby migrant community. He cultivates a 0.64 ha agroforestry plot similar to Mr. Jalo's. He also promotes agroforestry, hosting an average of 10 groups per year with visitors coming from more than six countries.

In the meantime, approximately 190 families have established NTFPs in their home gardens, diversified permanent upland fields, or mixed orchards. Another 88 households have adopted and maintained backyard gardens with NTFP crops. NTFP-focused agroforestry is proving to be a viable option amongst migrant communities in northern Thailand struggling to sustain upland cultivation and access to land. At this rate, it can be expected that this option will continue to spread, in northern Thailand and to neighbouring countries where groups face similar landuse pressures.

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The commercial potential of native plant foods in Australia ('bush foods') has boomed over the past 50 years. Markets are growing for around 15-20 species, including macadamia, lemon myrtle and Quandong. There is room for everyone involved, including researchers, traders, manufacturers and consumers, to better recognise and respect the role of Aboriginal peoples as custodians of their traditional resources and associated knowledge.

For Aboriginal peoples, the remote desert represents a cultural, nutritional and medicinal lifeline. Native plant and animal species feature in important songs, stories, ceremonies and trade. Wild harvesting of native plants is a way to practice and pass on knowledge that has sustained species and peoples for millennia. Customary laws regulate the use of, and the knowledge associated with, these plants. Compliance with these is core to Aboriginal culture and wellbeing.

The emerging industry relies on Aboriginal knowledge, documented by researchers since colonisation. Valuable knowledge includes plants that are safe to eat, preferred growing conditions, and harvest and post-harvest techniques. This knowledge, often published without consent, would otherwise take years to obtain.

Mainstream commercial interest creates an economic opportunity for Aboriginal peoples, but their capacity to realise these is constrained by the impact of desert weather on wild harvest yields, and limited access to land, water, technology, training, buyers, finance, transport, and business advice. On top of these practical challenges is limited legal support. Key issues include the prioritisation of horticultural production over wild harvest, which may exclude women harvesters, and the lack of requirement for people to obtain traditional custodian consent prior to development and share profits with the peoples whose knowledge is being used.

'Business as usual' approaches to the development of new species are likely to prolong these inequities. This underpins the call by a group of remote Aboriginal women for a set of commercial principles based on respect and support for Aboriginal interests. Complementary legal measures might help level the commercial playing field. They could include a time-limited right for Aboriginal peoples to exclusively develop species not yet commercialised, and mechanisms to ensure Aboriginal peoples with a cultural connection to a species receive royalties from its commercialisation. An ongoing conversation amongst people involved in the industry would likely generate more ideas to help markets for new species develop in a fair and equitable way – one that fairly acknowledges, respects and remunerates Aboriginal peoples' relationships and contributions to bush food.

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Making 'bush food' markets fair

Farmers' firm grip on diversity



Photo: Leah Samberg

REVALUING TRADITIONAL PLANTS > FARMERS' SEEDS

Over 50 crop species grow on farms in the Gamo Highlands. Farmers use this diversity to meet nutritional, cultural and production needs under variable conditions. In the face of population growth, increased access to improved seed, and cultural and political pressures, maintenance of crop diversity requires more attention than ever before. To this end, farmers and other actors are working to celebrate the region's traditional crops and management strategies with the hope of preserving both the diversity and culture that depends on it.

Leah Samberg

The Gamo Highlands rise from the Ethiopian Rift Valley to elevations of up to 4000 metres. The heterogeneous mountain landscape and 10,000 years of cultivation have resulted in a diversified agroecosystem that includes annual and perennial cropping, agroforestry, and livestock. Agriculture revolves around enset (*Ensete ventricosum*), a perennial tree crop that serves as a staple food for seven to ten million people.

A traditional Gamo homestead is ringed by an enset plantation, a mixture of agroforestry trees, vegetable, and root crops. Beyond this ring are crop fields, parts of which are left fallow for use as private grazing land. Lowland crops, such as coffee, sugar cane, cassava, sweet potato, and yam extend to elevations of 2400 m or more. Mid-altitude crops such as taro, squash, wheat, peppers, and beans are present in all but the highest communities (above 2800 m), where enset, barley, cabbage, potato, and *gade dono* (*Plectranthus edulis*) dominate. Wild species are also tolerated on fallow fields and intercropped with cultivated species.

Farmers cultivate dozens of barley varieties

The Ethiopian highlands are a global centre of crop genetic diversity. Rich pools of genetic material help protect crops against pest and disease outbreaks, provide insurance in the face of variable conditions, and allow crops to adapt to a changing climate. Fur-

thermore, this diversity helps maximise productivity, and allows farmers to meet a range of dietary and cultural needs. For example, farmers cultivate dozens of barley varieties, selected for their taste, colour, and texture and also to match specific soil types, elevation, moisture levels, and topography. Enset diversity is also very high, with more than 100 documented varieties in Ethiopia, and up to 60 varieties found in each Gamo community.

Traditional crops under threat In the past decades, land shortages have worsened, forcing farmers to abandon traditional barley varieties, indigenous root crops, sorghum, and other staples. As farms shrink, government extension has increased promotion of improved seed and fertilizer packages, as well as fruit and vegetable crops for market. These packages are often components of larger programmes tied to development aid and combined with other incentives. Yet many farmers experience crop failure or cannot acquire necessary inputs in the years following initial adoption. In some cases farmers purchase these inputs on credit, and are unable to pay off their loans when crops fail, forcing them to sell livestock or drain savings.

In addition, several government and church interventions have damaged social institutions that allow farmers to manage and maintain crop diversity. For instance, enforced participation in work-for-food programmes along with new religious obligations have caused the breakdown of many traditional communal labour institutions. In addition to these social changes, enset crops are increasingly threatened by disease, likely related to rising temperatures and changes in rainfall patterns. In several lower elevation communities, bacteria that cause wilt disease (*Xanthomonas campestris*) have decimated enset plots.



Homestead ringed by enset plantation. Photo: Leah Samberg

Combining new and old “We grow everything here but salt,” said a group of farmers from the mid-altitude community of Bele. In the Gamo, the highest on-farm crop diversity is found in mid-altitude regions, which provide a diverse source of products for lowland and highland farmers. Strong ties between communities at different altitudes underpin traditional systems of seed sourcing and exchange. Farmers travel long distances to acquire seed at local and regional markets, often at different elevations. Farmers who visit a greater number of markets are more likely to have higher crop diversity on their farms.

Although farmer managed seed systems are under pressure, farmers have found ways to augment, rather than replace, their traditional seeds. In addition to visiting local and regional markets, they also source seeds from government extension offices through aid programmes, trials, and credit packages. Farmers with more access to land and resources are more easily able to combine both traditionally- and formally-sourced seed. These farmers are often a source of seeds for their neighbours and family, in addition to selling surplus at local markets. Diversified options for sourcing seed allow farmers to experiment with new varieties. For example, one farmer may obtain maize varieties from lowland markets, barley varieties from high elevation markets, wheat from government extension, and fruits and vegetables from an aid programme.

Celebrating knowledge By strengthening social institutions and drawing on their rich knowledge base, farmers and other actors counteract the threats to their traditional crops. “We already know how to farm,” said one farmer, reflecting the sentiments of many others who maintain traditional crops and view with scepticism the changes brought about from the top down. Cultural associations, such as CASE (the Culture and Arts Society of Ethiopia), educational institutions, and external organisations such as the Christensen Fund, host symposia, conferences, traditional festivals, and art and music exhibitions. These activities promote traditional

crops and foods. However, the country’s political climate can impede the ability of these organisations to operate freely, or expand their reach.

Scientific and academic institutions also recognise the importance of Gamo farmers’ traditional agricultural knowledge. For example, Arba Minch University, in the valley below the Gamo Highlands, recently hosted an international symposium celebrating enset uses and diversity as part of the ongoing Enset Park project. The idea behind the Enset Park is to promote and conserve enset diversity through research, teaching and outreach. A similar initiative, from Dilla University, has focused on community outreach by creating a food festival, ‘enset on wheels’. These activities are resonating within local government offices, which are becoming increasingly aligned with farmers’ needs by propagating enset and other traditional crops in nurseries. An expanding enset nursery in the regional town of Chencha is one example.

Nationally, the Ethiopian Biodiversity Institute has collected more than 80,000 accessions of indigenous species, including crop varieties. These are valuable for global and local crop breeding efforts, as varieties that are resilient to changing climate, pest, and disease conditions may be used to develop more robust and productive crops. However, for these seeds to benefit Gamo farmers, crops must be appropriate to variable highland conditions and seasonally available for an affordable price.

There is no single pathway toward sustainable and productive agriculture in the Gamo Highlands. For these changing systems to reach a new balance, farmers and communities will need access to all available options – old and new – through local and regional markets, government extension, and new combinations of formal and farmer managed seed networks. Adapting to the changes facing Ethiopia requires diversity – of approaches, institutions, stakeholders, crops, and genes.

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Youth find hope in crops of their elders

I saw a film recently about the leftovers of war in Afghanistan's northern province of Badakhshan. It is a beautiful film that shows the resourcefulness and strength of youth. But like most media and the stories we read about the region, its focus is on violence, the undeniable, under-the-skin truth of something that has been etched into the collective soul of a people. There is hope, but it is difficult to see where hope might cling to and how it will transform itself into something tangible in the lives of these young people.

I wrote a book about Badakhshan, together with my friend Jamila Haider. We didn't mention war as much – our book is about food and agriculture, and the culture and identity that spring from them. The war is now largely absent in the Pamir Mountains, the part of Badakhshan where we worked. When we began to write about Pamiri food, we wanted simply to document elders' recipes. That way, we hoped their crops and unique varieties of fruit and grains would continue to be used in the future. But as we began to cook together and hear the old people's stories, food revealed a quiet power: "look around," a grandfather told us over a bowl of soup, "everything you see, the fields, the canals, the soil, the seeds, the stones of the mills... we made it ourselves. With our own hands. No help." Where war and peacebuilding, and generally the efforts of development agencies, are external forces far beyond the reach of ordinary farmers, the making of local, traditional food, rooted in traditional crops and agricultural practices, is a source of strength, ability and culture – something to channel the energy of young Pamiris that is very different from war.

Seen in this broader way, food is a powerful tool for young farmers to make sense of the present, to explain drastic changes in landscape, trade, and social relations, and so to imagine a future of their own, unmarred by the unyielding presence of corruption, violence, and foreign markets.



Photo: Judith Quax

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In the past two decades, as the role of markets increased, over two thirds of young Pamiri men have left their mountains in search of money. Farming is not an easy source of income. However, the Russian ruble crisis is now forcing many of them back to their land. Many have forgotten or never learnt how to farm. The knowledge they need is not in the hands of development agencies, it is with their elders within their communities. The coming years are crucial for young farmers to reconnect not only to their land, but also to the knowledge and crops of their elders.



Fair & sustainable expansion of traditional crops – lessons from quinoa

The recent boom in quinoa cultivation provides many lessons for an agroecological transition that enhances agricultural biodiversity. Looking at the effects of quinoa expansion, this article analyses how to protect peasant varieties, support free and fair flow of germplasm and engage in new ways of doing research.

Didier Bazile

Quinoa (*Chenopodium quinoa* Willd.) is a cultivated grain crop that originates in the Andes. Thanks to its high genetic diversity, the crop grows under extreme climate and soil conditions and is tolerant to frost, drought, and salinity. Its popularity worldwide is the result of a combination of its hardiness and nutritional content. After centuries of neglect, the potential of quinoa was rediscovered during the second

half of the 20th century. Since then, the number of countries importing quinoa increased, and quinoa is cultivated in countries outside the Andes. The United Nations declared 2013 International Year of Quinoa as recognition of the role of the Andean peoples in maintaining quinoa biodiversity and of the grain's high nutritional value. The rapid expansion of this crop, which is still classified by some as a neglected and underutilised species, is defying the belief that it only grows at altitude on the banks of Lake Titicaca, between

Peru and Bolivia. Today, nearly 100 countries around the world are growing or testing quinoa. This boom is bringing about great changes to the way quinoa is produced, to the networks that test it, to distribution and to the way it is perceived and incorporated into our diet.

Among the numerous challenges related to expansion of quinoa, this article focuses on the maintenance and valorisation of quinoa diversity. Is the way in which we cultivate, trade and eat quinoa contributing to maintaining and increasing its genetic diversity? Is this benefiting peasant producers? Some ways forward for quinoa are proposed, providing general insights for other, so called, neglected and underutilised species.

Genetic evolution Since its domestication over 7000 years ago, quinoa seed exchange has allowed the initial genetic diversity of the species to increase, resulting in five major ecotypes in the Andes today. As far back as the 19th century, seeds were already being exchanged with India, later with Kenya and Tibet, and from the 1980s-90s with the whole of Europe. Presently, quinoa is seen as an interesting alternative crop in semi-arid environments in the Mediterranean, Middle East and Asia, in soils that have often been abandoned due to high salinity levels.

Diversity and communities under pressure A clear majority of Andean communities grow quinoa using so called 'traditional' practices, based on principles of agroecology, using three components of biodiversity: genetic diversity, species diversity and ecosystem diversity.

intensified and expanded cultivation of quinoa is a source of potential conflicts around access to land, practice standardisation, market competitiveness, etc. The rapid shift from a subsistence economy to a market economy has also accelerated the breakdown of some community organisations, which previously managed land and collective access to resources. For example, conflicts have emerged when farmers wishing to mechanise quinoa production attempted to move into the plains that had until then been used for llama and alpaca breeding; when former migrants asserted their ancestral rights to land; or when families decided to extend their cultivated areas and shorten fallow periods. Since the 1990s organic certification, and more recently fairtrade networks, have supported better remuneration for producers and a commitment to support authentic production. But can these standards support cultivation and conservation of quinoa diversity?

Protecting peasant varieties

Agrobiodiversity exists solely because it has been created and maintained by human practices that preserve local varieties. Local varieties are also known as peasant varieties or, in scientific terms, as variety populations. This refers to groups of genetically unique individual plant species that share certain characteristics which distinguishes them from other peasant varieties. The large genetic diversity within peasant varieties, as opposed to the uniformity within improved varieties, enables farmers to reduce risk and achieve a stable average yield. Access to a broad range of varieties is

Farmers and researchers only have access to a few varieties

However, the spread of cultivation of quinoa to all continents and the increasing regional and global demand for the crop takes place through the introduction of so called 'conventional' or industrial agricultural models employing chemical fertilizers, pesticides and improved varieties. This is causing several problems. As a result of the globalised quinoa value chains, and in particular due to international seed regulations, farmers and researchers outside the Andes only have access to a few improved varieties of quinoa that are suitable for mechanised cultivation and post-harvest processing. At the same time, Andean peasant systems are at risk of destabilisation as

Quinoa's broad uses

While today the global general public knows quinoa for its edible grains, other uses exist in the Andean countries: the consumption of the young leaves and sometimes also the tender panicles in the same way as *huauzontle* (*Chenopodium berlandieri*), and also as animal fodder (fresh or as silage). Additionally, quinoa is used in traditional medicine, and the use of its leaves, stems and grains is currently being studied for their abortive, healing, anti-inflammatory, analgesic and disinfectant properties. Similarly, the saponin, which previously caused the crop's rejection, is currently under investigation for its natural insecticide and antifungal properties. These broad uses of quinoa contribute to its great genetic diversity, as is often the case for traditional plants.

essential for being able to make cropping decisions in response to climate and soil conditions, technical constraints, personal preferences, or market demands.

Genetic diversity loss is typical within conventional plant improvement processes that seek to move away from heterogeneity within variety populations and towards emphasising characteristics that are deemed important. In the case of drought resistance or better soil salinity tolerance, varietal selection favours characteristics that have nothing to do with nutritional properties or other characteristics that would allow the species to adapt to a new environment. Similarly, current quinoa selection and improvement focussed on several nutritional criteria runs the risk of a drift towards biofortification. However, it is actually *the overall balance* of quinoa's composition that must be preserved. This will allow farmers to have production stability through active conservation of the species. The implementation of multi-criteria plant breeding linking yield, disease resistance and nutritional value hinges on making compromises between these different factors in order to drive varietal improvement. And in fact, this is what peasants have always done.

Farmers in the Andes use genetic, species and ecosystem diversity. Photo: Didier Bazile



Knowledge cross-pollination

Participatory breeding initiatives, and in particular Evolutionary Plant Breeding, allow knowledge cross-pollination by placing trust, from the outset, in peasant farmers to integrate a new species or variety into their farming system. This type of plant breeding also considers the development of new variety populations, capable of evolving and adapting to their environment, which simultaneously guarantees production stability and active conservation of the species' genetic resources.

While moving away from standardisation of crop varieties, their protection must also be questioned as it impedes the pursuit of biodiversity creation. In this sense, current regulations pertaining to germplasm flow and plant variety rights are problematic for the evolution of quinoa diversity.

Free flow of germplasm

The combination of international regulations governing the spread of quinoa germplasm does not promote easy and fair access to quinoa's genetic resources. Further, it creates a situation where most researchers outside of the Andes are experimenting with a very narrow genetic base.

Real tracking of the spread of quinoa germplasm would enable the origin of the seeds for quinoa experiments to be ascertained, and demonstrate the importance of individuals and networks of research institutions in genetic material exchange outside of any legal framework. More transparency in these flows may provide greater recognition of peasants' breeding efforts and generate questions about the efficiency of the current regulations.

Undoubtedly, free circulation of genetic resources for biodiversity development would help to overcome the complex discussions regarding their intellectual property. When we think inside a system it is always difficult to imagine that another system could exist. However, models of free access to seeds by a group of users united under a common charter could transform how we think about seed regulation. Alternative models would allow us to put forward a single conceptual framework for the different seed users, but all committed to crop development through processes that preserve, if not increase, biodiversity. The Open Seed Source License is one example and the Global Collaborative Network on Quinoa, which I am currently developing, both have the goal to unite a community of practice, including farmers, researchers and private selectors, around preserving and creating more biodiversity while using it.

New ways of doing science

Analysing the changes in progress, whilst simultaneously being an actor, requires specific methodologies related to oversight and multidisciplinary if we truly wish to promote quinoa within a global agroecological



International seed regulations are problematic for evolution of quinoa diversity. Photos: Didier Bazile



shift that considers agricultural biodiversity in all its dimensions. Role-play games and participatory modelling are helpful tools for facilitating dialogue and accompanying the process of innovation.

Treating quinoa cultivation in the Andes as not only a localised system, but as an agroecological model, can connect our thinking to a geographic process and generate new knowledge that is useful for other species, such as amaranth, chia, fonio or teff. These are following a similar development pattern, albeit one that is less reported by the media.

The evolution of quinoa is happening before our eyes

History in the making for the agroecological transition Conflicts related to decreased access to and on-farm management of quinoa genetic diversity questions the viability of the coexistence of agroecological and industrial models of farming and food systems. Certain countries are reflecting on the possible coexistence of these two models and such distinction in public policies already exists in several countries, including Peru. In summary, because the evolution of quinoa is happening before our eyes, it provides a unique opportunity to analyse whether these two competing production models

should, or even can co-exist. Unlike the development of other cultivated species, we do not have to rely on reconstructions. With quinoa, we have the opportunity to act and to test various agricultural theories. It is possible to measure the effects of different policies and standards – ecological, economic and social – on biodiversity dynamics and reflect on the implication for agricultural models (conventional versus agroecology). In this sense we can take the study of the dynamics of quinoa's genetic diversity as a model for studying those of other neglected or underutilised species. We can use this opportunity to push for an agroecological transition rooted in agricultural biodiversity.

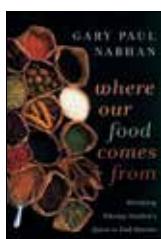
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Bread, wine, chocolate: The slow loss of foods we love

Simran Sethi. 2015. HarperOne 352 pages. ISBN: 9780061581076

"The following is about food, but it's really about love." Over the past few decades, our diets have changed drastically. 95 % of the world's calories now come from only thirty species of crops. Naturally, this has vast implications for biodiversity worldwide. In her book, award-winning author Simran Sethi draws on interviews with multiple food experts and practitioners to explain how we got to this point in our food system and, equally important, how we can take action. The author challenges the reader to learn more about what kinds of different foods are available. That is why this book is also about love; it is a journey into the extraordinary flavours and aromas of rich biodiversity. It helps us re-appreciate what is on our plates, what it is made of and where it comes from. Through awareness raising, Sethi aims to start a revolution and to increase biodiversity of the world's agricultural system.



Where our food comes from – Retracing Nikolay Vavilov's quest to end famine

Gary Paul Nabhan. 2008. Island Press 264 pages. ISBN: 9781610910033

Gary Paul Nabhan takes us on a journey to recognise the work of Nikolay Vavilov's quest to solve the Russian famines in the 1940s amidst a Communist state. He travels to five continents, where Vavilov collected thousands of seeds and documented more than just the plants that our domesticated foods of today originated from. Nabhan retraces Vavilov's footsteps, documenting the irreversible genetic erosion in these agrobiodiversity hotspots. He also speaks with the local farmers and scientists working to prevent the loss of our remaining plant genetic resources. Comparing the notes made by Vavilov over half a century ago, reveals how much diversity has already been lost. Shifts in agricultural practices and traditions are explored by Nabhan from an international political ecology context; these findings are valuable for the health and survival of humanity.



Restoring heritage grains: The culture, biodiversity, resilience, and cuisine of ancient wheats

Eli Rogosa. Available July, 2016. Chelsea Green Publishing 272 pages. ISBN: 9781603586702

Author Eli Rogosa found her passion in the Middle East, working with farmers in the Fertile Crescent to preserve the treasure of ancient landrace wheat. Newly introduced with this forgotten source of biodiversity in grains, she began dedicating her work towards valorising these ancient grains such as Indian wheat, or shot, a drought-tolerant and high-protein grain. Backed with years of knowledge and experience working with these grains from her biodiverse farm to her artisan bakery, Eli's story inspires one to explore our co-evolution with ancient grains and how these ancient grains offer a solution to enjoying high quality breads once again. Her compelling story will inspire the readers to reconnect the importance of these endangered species from the fields to our diets and provide the tools to help us participate in finding our connection with the first crop humans domesticated.



Pulse of life, the rich biodiversity of edible legumes

Vandana Shiva. 2016. Navdanya. ISBN: 9788181582720

This book is an offering to the International Year of the Pulses and to commemorate the 30th anniversary year of Navdanya. The book draws our attention to the negative effects of the industrial farming systems that have developed in the last few decades by referencing to the rise of monocultures and high external input farming. As a response to those negative effects, the authors celebrate pulses and the characteristics of pulses that contribute to a more sustainable, just and healthy food system. They aim to reconnect the reader not only to the diversity in pulses and legumes, but also to the rich diversity in processing, cooking methods and ecological uses of these crops.



West African women defending traditional palm oil

GRAIN. 2016. 13:50 min. <https://www.grain.org/e/5467>

This video by GRAIN portrays artisanal palm oil production in West Africa, an agroecological practice threatened by industrial oil palm plantations. In recent times, industrial palm oil production has been moving rapidly into Africa. This has brought monocultures and disrupted the livelihoods of people who rely on healthy ecosystems. This video shows the fight for the traditions behind palm oil in West and Central Africa, where small peasants are resisting conformity thanks to the women-led traditional processing. From their community-based food system, the end product is a bright red oil; a cultural keystone opposed to what the world market has accustomed us to, a colourless, odourless oil from which the industry makes large profit.

More on traditional plants

In this box, we have included a few web resources and a publication offering simple actions to bring the conservation of agrobiodiversity into our own hands.

Ark of taste (Slow Food) The ark of taste is an online catalogue encompassing over 3200 foods and food processing techniques at risk of disappearing that are a part of the world's cultural heritage. The catalogue includes suggestions to save these endangered foods. <http://www.fondazione Slow Food.com/en/category/ark-of-taste/>

Recipe catalogue (World Vegetable Center) The World Vegetable

Center offers a collection of downloadable recipes to prepare and enjoy traditional recipes for East Asian and African vegetables. <http://avrdc.org/publications/recipes/>

Valuing crop diversity (LEISA Magazine 20.1, 2004).

This past issue of Farming Matters discusses how the continuously narrowing base for global food security limits the options available to farmers, and threatens agrobiodiversity. <http://www.agriculturesnetwork.org/magazines/global/valuing-crop-diversity>



Advocating for sustainable pastoralism together

In all countries of the Middle East, pastoralist communities, and Bedouins in particular, are some of the most vulnerable and disadvantaged groups in society. A new initiative, funded by the European Union, is helping to strengthen their voices through trainings on policy influencing, networking, documentation and communication for advocacy.

Regional Bedouin Governance project team



Bedouins and herders, like this Palestinian family in the Jordan Valley, depend on adequate access to resources, including land and water, to support their traditional livelihoods. Photo: David Levine/Oxfam



A group of Palestinian Bedouins in the Southern West Bank attending a meeting with the project team to discuss their communities' needs and priorities. Photo: Mia Marzotto/Oxfam

Pastoralist communities have no or limited access to critical resources such as land, water, central markets and veterinary services to sustain their traditional livelihoods. Their livelihoods are further at risk from the ever hotter, drier and less predictable weather due to strong indications of climate change in the region.

Although these groups have traditionally been able to cope with scarce natural resources, they now face intensifying threats to food security and sustainable growth in the midst of a particularly weak institutional environment.

Currently, local and national institutions lack adequate policies and legislation that supports the agricultural and livestock sectors. By increasing the engagement on policy issues of pastoralist communities their voices could be heard in mainstream socio-economic life and their traditional ways of life become more sustainable.

In 2012, Oxfam, the Regional Office for West Asia (ROWA) of IUCN (International Union for Conservation of Nature) and ILEIA, joined forces with local partners in the Occupied Palestinian Territory (OPT), Jordan and Egypt to promote participation of pastoralist groups in policy decision processes that affect them.

Working together Accessing quality services, land and water, credit and central markets are key needs and lack of organisation and advocacy knowledge are critical constraints that prevent needs from being met and pastoralists' rights respected. Therefore, Oxfam, IUCN ROWA and ILEIA are supporting these communities to strengthen their communications, organisational and networking capacities to encourage dialogue with policy makers and other key government agencies, NGOs and private sector stakeholders.

This work is made possible through strong collaboration with local partners and institutions that are formed by practitioners and representatives from the pastoralist population. In Jordan and Egypt, the project team is working towards consolidating platforms of Bedouin and herders' communities at the local and national levels. In the OPT, the creation of national platforms for mobile pastoralists is premature due to greater social and politi-

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cal fragmentation and the protracted Israeli occupation. Because of this, partners in the OPT, the Palestinian Agricultural Cooperatives Union (PACU), the Palestinian Livestock Development Centre (PLDC), and the Union for Agricultural Work Committees (UAWC), are focused on the establishment of a future national platform. Their approach is two-fold: promoting the role of Palestinian partner organisations as bearers of mobile pastoralists' interests and engaging these organisations in sub-national meetings with other stakeholders. The result will be a network of practitioners, a critical first step towards the creation of a representative platform.

The number of people benefiting from the project makes up a significant portion of the total pastoralist population across the three countries. 1500 families in the OPT, 200 in Jordan and 17,500 in Egypt are being supported to build and share knowledge, and to make their voices heard in policy making.

Not only are people at the grassroots level benefiting from the project, local authorities, NGOs and government agencies are also gain from their involvement in the knowledge building and policy influencing processes. They gain a better understanding of the issues pastoralists face and the changes needed for sector-wide improvements.

Participants are learning to jointly identify common problems and needs, develop collaborative strategies for addressing challenges through policy dialogue and effectively reach out to other local, national and international partners.

In an environment of high uncertainty, improved connection and collaboration among different groups as well as the relevant authorities increases the prospect of traditional ways of life being sustained for mobile pastoralists. The project team is currently supporting local organisations (12 in the OPT, two in Jordan and one in Egypt) to implement tangible and innovative initiatives to concretely link planning to advocacy, to create more engaged communities and raise and strengthen their voices to help solve the daily problems they face.

Sharing lessons learnt More insights and lessons learnt on food security governance of mobile pastoralist groups in the OPT, Jordan and Egypt can be expected in the coming months. ILEIA, Oxfam and the World Initiative for Sustainable Pastoralism (WISP) of IUCN will continue to share information on this initiative's progress.

This article is part of the visibility and communications work being carried out under the framework of the Food Security Governance of Bedouin Pastoralist Groups in the Mashreq project, funded by the European Union. The contents of this publication are the sole responsibility of Oxfam, IUCN and ILEIA and can in no way be taken to reflect the views of the European Union.

FAO's regional meetings on agroecology: a reflection

In 2015, a series of unique meetings on agroecology were organised on three continents. Hundreds of civil society representatives, academics and policy makers attended. What have the meetings achieved so far and what next?

Janneke Bruil and Diana Quiroz

"Agroecology (...) is an approach that will help to address the challenge of ending hunger and malnutrition in all its forms" said José Graziano da Silva in 2014. The Food and Agriculture Organization of the United Nations (FAO), which he leads, had just organised the International Symposium on Agroecology for Food Security and Nutrition. Indeed, agroecology is gaining momentum for its potential to increase food and nutrition security, address climate change, enhance biodiversity and build food sovereignty. The FAO decided to continue discussing agroecology via regional meetings in Africa, Asia and the Pacific, and Latin America and the Caribbean throughout 2015. This article reflects on the outcomes around four key themes of these discussions.

Agroecology as a path towards food and nutrition security

Agroecology can be a key strategy to improve food and nutrition security, argued Roberto Ugas (National Agrarian University La Molina, Peru) at the regional meeting for Latin America and the Caribbean: "Andean farmers who keep at least 70 % of their productive area under agroecological management have better food availability, access, use and stability." In all meetings, the need to enable biodiverse, agroecological farming was voiced. One fundamental step is securing producers' access (especially women, youth, family farmers, and indigenous peoples) to land, water, and seeds. A lack of knowledge and awareness about the contribution of agroecology to diverse diets was highlighted as a major barrier. To tackle this, participants suggested integrating agroecology into education for youth and adults, as well as

farmer field schools and other farmer-to-farmer methodologies, with special attention for traditional knowledge. It was made clear that a holistic, transdisciplinary approach based on new relationships between farmers, academia and other knowledge holders will be crucial. In all regions, producers presented agroecology as a way of life and a path towards food sovereignty for rural *and* urban citizens. In this respect, participants emphasised the importance of recognising the right of peoples, communities, and countries to define their own agricultural, labour, fishing, and food and land policies.

Agroecology and natural resources in a changing climate

Various agroecological practices promote carbon storage through increasing organic matter in the soils, and reintroducing trees to the landscape. The great climate adaptation potential of traditional management practices with local varieties of traditional food crops, and particularly drought resistant species, was also emphasised. Therefore, it was stated that more resources need to be devoted to research on the link between agroecology and climate change, an on farmers' selection of varieties and species. Massa Koné (CMAT, Malian Convergence against Land Grabbing) said: "agroecology is the only answer to climate change and farmers hold answers that must be valued." Indeed, agroecology not only helps to cool the planet and to adapt to the impact of climate change, participants emphasised, but also brings social benefits, expressed in stronger social security networks that are essential to resilience. In keeping with their Nyéléni Declaration on Agroecology (2015), civil society representatives rejected attempts to reduce the concept of agroecology to a set of technologies

designed to alleviate the harmful impacts of industrial agriculture.

Learning processes in agroecology

There was general consensus that farmers and other food producers should be at the forefront of knowledge co-creation in agroecology. Farmer-led, bottom-up, local innovation systems and practices are especially important. As a result, the way knowledge is built and shared needs to be fundamentally different from conventional technology transfer. In the words of Clara Nicholls (SOCLA, Latin American Scientific Society for Agroecology): “Agroecology is not only a scientific approach, it is a way of life that values science, but is also aware that knowledge comes from the ancient traditions of people.” In all regions, participants discussed how to strengthen and increase the recognition of peasant and indigenous knowledge, farmer-led research and farmer-to-farmer learning. Participants reflected on the role of scientists in interactions with farmers, and discussed how to transform these into processes that are truly driven by farmers.

Public policies to promote agroecology

Discussions in all regional meetings made it clear that fundamental change in policy is needed for agroecology to reach its full potential. The cross-sectoral nature of effective policies was highlighted, as agroecology not only touches on production and consumption, but also on issues such as health, education, and the environment. The first policy priority in agroecology would be to put control of seeds, biodiversity, land and territories, waters and knowledge in the hands of producers. Without access to these resources the

transition to agroecology is impossible. The role of new markets for agroecological products was considered a pertinent issue. Sophia Ogutu (farmer from Kenya) emphasised: “The focus of policies needs to be on crops that are consumed locally, and on giving farmers, especially women, control over their natural resources.” Experience has shown that the most effective policies have a local character and promote the further development of proven successes such as community seed banks, farmer field schools, agroecology schools, demonstration farms and farmer-to-farmer exchanges. Therefore calls were made to collect and better disseminate data from existing experiences with agroecology to enable evidence-based decision making. Throughout all seminars, civil society recommended that policies on agroecology must be developed within a food sovereignty framework. Finally, the importance of participatory policy development processes was highlighted, that respect the needs of both farmers and governments.

Reflection In many ways, the regional meetings boosted the official recognition of agroecology as a relevant and time tested approach, and strong recommendations were made in all regions (see box). While this is welcome progress, the meetings could have addressed the inherent contradictions between agroecology and the current neoliberal approach to modernising agriculture in a more systematic way. More specifically, they could have explored how to achieve a shift away from a productivist mindset, with its focus on aggregate supply and increases in yields, towards a more multi-functional agricultural model that pursues improved nutrition, resilience, food sovereignty and the sustainable use of resources.

Several important issues were not on the table during the meetings. For example, how to overcome the strong influence of agribusinesses on policy making processes. In the future, this issue should be dealt with in more detail and with more time. It is also notable that confusion exists around FAO’s support for agroecology on the one hand and their engagement with the Global Alliance for Climate Smart Agriculture on the other.

Inadequate discussions about the above issues seemed to imply that ‘business as usual’ can continue, instead of making it clear that a fundamental shift towards agroecology is needed. As social movements stated in the Nyéléni Declaration of the International Forum on Agroecology (2015), “*the real solutions to the crises of the climate, malnutrition, etc., will not come from conforming to the industrial model. We must transform it and build our own local food systems that create new rural-urban links, based on truly agroecological food production by peasants, artisanal fishers, pastoralists, indigenous peoples, urban farmers, etc.*”



Outcomes regional agroecology meetings – by theme			
	Latin America and Caribbean	Africa	Asia Pacific
Food and nutrition security	Raise awareness about the nutritional value of agroecological products and promote healthy, adequate food production.		
Natural resources in a changing climate	Ensure producers' access to natural resources, notably land, water and biodiversity. Implement the "Voluntary Guidelines on the Responsible Governance of Tenure of Land, Fisheries and Forests".		
	Recognize the role of communities, as guardians of biodiversity. Create a program of exchange for agroecology and seeds.	Promote the development of seeds systems that address availability, access and ownership issues.	Support and revive traditional management practices, local varieties and neglected and underutilised as well as drought-resistant crops.
	Set resources aside for the development of agroecology, as part of climate policies that guarantee food sovereignty for the people.	Identify species that are adapted to climate change; and invest more in applied agroecological research. Develop agroecology independently of Climate Smart Agriculture.	Devote more means to research on agroecology and climate change.
	Create conditions which restrict the practice of monoculture, the use of agro chemicals, and the concentration of land.	Formulate responsive national plans that will strengthen land use systems that promote and sustain agroecology.	
Learning processes	Respect and value traditional knowledge, promoting a knowledge dialogue in participatory research programs.	Strengthen existing local knowledge, farmer-led research as well as farmers research networks with a focus on the co-creation of knowledge and participative research.	Recognize, support and document producers' knowledge. Create a new research and extension paradigm.
	Foster territorial dynamics of social innovation and technology. Create a regional network in Latin America for the exchange of best practices	Launch pilot projects at territorial level such as the creation of agroecological territories. Create platforms to exchange agroecological experiences and innovations	Create platforms for the exchange of agroecological experiences and innovations. Build a regional network of agroecology researchers, CSOs and small-scale food producers.
	Integrate agroecology in the curricula of both formal and nonformal primary and higher education institutions, and in vocational training centers for producers.		
Policies and markets	Promote public policies which boost agroecology and food sovereignty; defined, implemented and monitored with active participation of social movements and civil society groups		Planning, design and formulation of policy for agroecology should be increasingly carried out inclusively in a collaboration between policy makers, scientists, educators, UN, development partners, CSOs.
		Develop and implement public procurement policies that favour agroecological and local food production.	Create dedicated certificates and degrees on Agroecology to enhance the skills of farmers to better understand and use markets.

Source: ILEIA, based on final recommendations of FAO's regional meetings on agroecology (2016)

In the 2nd half of 2016, FAO will organise two more regional meetings on agroecology, one in China and one in Hungary. FAO can potentially play an important role in connecting various actors around agroecology and in catalysing a shift towards an enabling policy environment for agroecology worldwide. While we appreciate the start of the conversation on how to strengthen agroecology in the regions, and the majority of the recommendations are worthy of implementation, bolder steps are now needed. We must emphasise the need to transform dominant approaches to food and agriculture, and put farmer-led agroecology

firmly at the centre of policy, practice and research. Then, agroecology can play a major role in creating fair and sustainable future food systems, food sovereignty and healthy societies.

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A detailed report by FAO and ILEIA that synthesises the outcomes of the regional meetings will be published in the course of 2016 and made available at www.ileia.org.

Strengthening pastoralist societies through improved governance

Pastoralist communities provide meat, hide, dairy, and manure fuel, supporting about 200 million households in places of the globe where rain-fed agriculture is not possible. For millennia, pastoralists have managed rangelands in the planet's harshest environments: from the highlands of Asia and South America to the drylands of Africa and the Arabian Peninsula. However, in spite of their importance as stewards of nature, ancient cultures and livestock-based production, pastoralists are often marginalised in policy and development practice.

As they rely on livestock mobility and communal land for their livelihoods, pastoralists become increasingly affected by mounting conflict and violence, which block their access to and use of natural resources. Moreover, increased commoditisation, the loss of grazing land due to climate change, and the expansion of farming into the best grazing areas, further jeopardise pastoral societies. To add insult to injury, social and political support for pastoralism is often weak in terms of capacity, policy and legislation, and at best inappropriate to the realities of pastoralist communities. It is not possible to generalise the needs of pastoralists, which differ not just from community to community, but even from household to household. However, in quite general terms we can safely say that the failure of past development efforts has stemmed from a poor understanding of pastoralism as a multiple land use system that is deeply rooted in a culture that relies directly on nature. As a result, pastoralists have been excluded from local and national planning processes.

Produced through a collaboration between ILEIA, Oxfam Italia and IUCN (International Union for Conservation of Nature), this issue of Farming Matters will explore different modes of action that are conducive to improved participation and representation of pastoralist communities in policy dialogues globally, and particularly in the Middle East and North Africa. This issue of Farming Matters is part of these organisations' joint work to place governance and rights at the centre of pastoralist development by empowering communities to make their voices heard at policy and decision-making levels. This is being carried out under the framework of the *Food Security Governance of Bedouin Pastoralist Groups in the Mashreq* project, funded by the European Union.

We are particularly interested in hearing of grassroots level practices and experiences where pastoralist communities have strengthened their ties and improved their organisation, and of their participation in designing policies that respect their socio-economic rights. The role of women and youth in these processes is of special interest.

The purpose of this issue of Farming Matters will be to inform pastoralist communities, practitioners, researchers, civil society, policy makers and others about the practices and policies best fitted to strengthen pastoralist societies.

Articles for the December issue of Farming Matters should be submitted before September 1 at www.farmingmatters.org

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The AgriCultures Network

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**15 YEARS OF
COLLABORATION
BETWEEN FARMERS, THE
M.S. SWAMINATHAN
FOUNDATION
AND BIOVERSITY
INTERNATIONAL HAS
RESULTED IN A SO
CALLED 'HOLISTIC VALUE
CHAIN APPROACH'**

Ashis Mondal and others, page 10

**This diverts resources
and the policy making
trajectory away from
real solutions which
can be found in the
diversity of food and
farming.**

Mariam Mayet, page 17

**BY DIRECTLY SUPPORTING SMALL SCALE
PRODUCERS WHO PRESERVE OUR
BIODIVERSITY WE EXERCISE OUR RIGHT TO
DEFINE OUR OWN FAIR AND DIVERSE FOOD
SYSTEM**

Jens Herbold, page 24

**“If we – the small farmers
– do not continue to grow
diverse, unique crops that
are open pollinated and
adaptable to the climate,
we lose control of our food
source”**

Shelley Spruit, page 14