Celebrating African Rural Women:
Custodians of Seed, Food and Traditional Knowledge for Climate Change Resilience

Researched, written and produced by:
African Biodiversity Network and The Gaia Foundation

in collaboration with the African Women's Development Fund

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The **African Biodiversity Network** (ABN) was founded in 2002 to ignite and nurture a growing African network of individuals and organisations - working passionately from local to global level - with capacity to resist harmful developments, and to influence and implement policies and practices that promote recognition and respect for people and nature. The vision of the ABN is for vibrant and resilient African communities rooted in their own biological, cultural and spiritual diversity, governing their own lives and livelihoods, in harmony with healthy ecosystems. Through its Secretariat in Kenya, the network of ABN members are working to strengthen: the revival of indigenous seed and associated knowledge, contributing to food sovereignty; traditional ecological governance systems, protecting areas of ecological, socio-cultural and spiritual importance; and proactive youth movements, celebrating culture and biodiversity, across Africa.

The Gaia Foundation (Gaia) has worked for 30 years together with long-term partners in Africa, South America, Asia and Europe, enabling indigenous and local communities to secure land, seed, food and water sovereignty; to revive their indigenous knowledge and protect sacred natural sites; and to strengthen community ecological governance, for climate change resilience. We support and collaborate with national coalitions, regional and international movements, so that they are better able to assist communities to assert their rights and responsibilities, protect their heritage for generations to come, and effect policy changes. Gaia recognises that given the growing threats from corporate control of land, seeds, water – the very elements of life - social movements have a critical role to play in building resilience and resistance. We foster critical connections, offer strategic and legal support and analysis, and facilitate transformative learning processes - through which new ideas, practices and commitment can emerge to catalyse systemic change. Our holistic approach enables women and men farmers to revive and access locally adapted indigenous seed varieties, free from corporate control and debt into the future; and strengthens community governance systems to protect ancestral lands and to defend them from mining, extractivism and other forms of land-grabbing.

The **African Women's Development Fund** (AWDF) is a grantmaking foundation that supports local, national and regional women's organisations working towards the empowerment of African women and the promotion and realisation of their rights. The vision of the AWDF is for women to live in a world where there is social justice, equality and respect for women's human rights. The organisation believes that if women and women's organisations are empowered with skills, information, sustainable livelihoods, opportunities to fulfill their potential, plus the capacity and space to make transformatory choices, then we will have vibrant, healthy and inclusive communities. AWDF amplifies and celebrates African women's voices and achievements, supports efforts that combat harmful stereotypes, and promotes African women as active agents of change.

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And finally, a very special thanks to the African Women's Development Fund (AWDF), especially Theo Sowa, for recognising the need for such a report and for supporting its long fruition.

Contents

"We as women from various continents and cultures, with common histories and struggles for life, our emancipation and that of our peoples, coupled with the ethical and political imperative of protecting the right to food, defending peasant agriculture, biodiversity, our natural wealth and the struggling to end violence in every form, sharpened before the patriarchal economic system... We women play a key role in fighting day by day for the defence of Mother Earth"

Extract from Women of Via Campesina International Manifesto, 2013

Foreword - by Theo Sowa

When the African Biodiversity Network and the Gaia Foundation came to AWDF with the idea of a report on African women and seed, our team was intrigued and delighted. As African women, many of us had seen our grandmothers, mothers, aunts and others at work or at home, in rural or in urban settings, growing foods, cultivating plants, exchanging seed, ideas and knowledge about farming and nutrition. We had also seen how much of this knowledge had been steadily undermined, as new views of 'modernity' and the pushing of our social understandings of 'knowledge' led many to value academic study above lived experience that was shared in different ways. One of the lessons from this report was the discovery of how little research and documentation has been done on African women's knowledge and use of seed.

In its documentation of the roles and achievements of rural African women, this report spotlights their remarkable relationship with seed - in economic and food security, in taking care of household nutrition, in spiritual practice, and in developing the resilience in crops for coping with our changing climate.

At the heart of this relationship between Africa's women farmers and seed is a legacy of traditional knowledge that we cannot afford to lose. It is a legacy that has been and continues to be undermined by issues including land grabbing and disempowering seed 'harmonisation' laws. This report highlights the violations of women's rights and the distortion and shrinking of women's roles and decision-making access as one result of such losses.

As is so often the case, the voices and views of African women featured in this report chart a way forward through the challenges presented, while the innovative strategies being pioneered by organisations like the African Biodiversity Network and the Gaia Foundation give hope that this knowledge of seed, agriculture and nutrition can be revived, documented and once again celebrated. The Women's Voices from the Fields section provides personal accounts of steps that women are taking to revive their traditional seed and knowledge, within a framework of peaceful community-building.

We hope that this document will ignite debates and discussions, will inspire greater documentation (academic and other) of African women's knowledge and roles, will influence and lead to positive and just legislative and policy frameworks in agriculture, and for vibrant, healthy and inclusive communities that promote and protect women's rights.

This report is dedicated to the women farmers of Africa, feeding more than families, more than a continent - and who still work tirelessly to protect their traditional seed and knowledge.

Theo Sowa
Chief Executive Officer, AWDF

Woman seed custodian, Ethiopia. Jess Phillimore for The Gaia Foundation.

About this Report

We need to recognise the central role that rural women play in most traditions, maintaining and enhancing both crop diversity and wild biodiversity across the African continent, together with their associated knowledge systems.

A vast wealth of knowledge about crops, nutrition, medicines, biodiversity, ecosystems, climate change and more, is on the verge of being lost to Africa forever, just when it is most needed.

Over millennia, women in most African traditions have played a central role in selecting, storing, and enhancing the diversity of their seeds. To produce food for their families in varying conditions, they developed a sophisticated capacity to understand their ecosystem and the climate, making very accurate calculations as to what to plant in the coming season. The complexity of this knowledge system, the intimate relationship that rural women tend to have with land and seed, and their understanding of the range of needs of the family and the community cannot be underestimated. It has been evolved over generations. This knowledge lies at the heart of women's continuing role in building resilience and in their status in the community.

In Chapter 1, **Women as Custodians of Seed & Food Diversity**, we are reminded of the tremendous natural and cultural wealth, which has evolved over generations across Africa, including the enormous diversity of seed and foods. This chapter highlights women as cultivators of diversity, protectors of wild areas and medicinal plants, and their critical role in the food systems of the continent under changing climatic conditions. It looks also at the sacredness of seed, and women as custodians of customary law.

Chapter 2, **Undermining Women's Role in Agriculture & the Community**, looks at how women have been systematically undermined throughout the colonial, post-colonial and globalisation processes. Rural women are at the forefront of the latest scramble for land by financial investors, real estate speculators, industrial agriculture, biofuels and the mining and extractive industries. It highlights how aggressive corporate-driven policies in seed and agriculture, embraced by most African governments, are pushing women and their families further to the edge. The shocking truth about the push to harmonise seed laws in Africa is revealed; how a handful of corporations threaten to control the continent's entire seed and food system - directly usurping the right and responsibility of women as custodians of seed, land and livelihoods, and undermining their capacity to deal with climate change.

Despite these aggressions, small farmers – mainly women - still produce 80% of the food in Africa on just 14.7% of the agricultural land, and control 80% of the seeds produced and exchanged on small farms.

Chapter 3, **Restoring Women's Traditional Knowledge & Leadership for Resilience**, demonstrates how women are able to rebuild resilience through reviving and enhancing their seed and food diversity and their knowledge systems. As confidence in their own traditional knowledge grows, so too does the respect within family and the community. They are able to restore complementary relationships with men, and their leadership roles in the community and local governance systems. Through exchanges, they are inspired to reach out to other women and communities. Across the continent they become part of the growing food sovereignty movement in Africa, demonstrating that resilient, diversity based farming systems play a central role in adapting to climate change and regenerating local economies, in socially just and ecologically sane ways.

Woman seed custodian, Kivaa, Kenya. Jess Phillimore for The Gaia Foundation

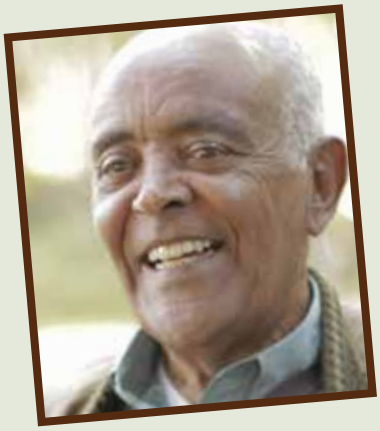
In Chapter 4, **Women's Voices from the Fields**, rural women share, in their own words, the stories of how they are actively working with their local communities, reviving seed diversity, and regaining their leadership role. Women from Ethiopia, Kenya, South Africa, Uganda and Benin reflect passionately about how seed is a symbol of life, sacred, and at the heart of their rites of passage, seasonal ceremonies, governance and leadership, as well as the basis of nutrition, medicine and building climate change resilience. These are the custodians of seed, food and life. They see their work as a fundamental duty to their ancestors and to future generations - a responsibility that brings with it much joy.

The **Conclusion** suggests practical ways to support rural women, their communities and their social movements, to reclaim their leadership role in agriculture and in their communities and to exercise their rights – to revive their traditional knowledge and practices, to enhance seed diversity, to secure food sovereignty, and to regenerate their land and its biodiversity.[1] It calls for recognising the role of rural women and their profound and complex knowledge systems, critical in the face of climate change.

Reclaiming and honouring Africa's rich heritage is a responsibility this generation has to the next, to restore healthy farming systems and the ecosystems they depend on and thereby taking back control of their lives. This report also appeals for urgent action to support women community leaders to link into social movements - to resist corporate monopoly laws and policies which undermine land, seed and food sovereignty and directly violate the critical role of rural women in agriculture and in the governance of their communities.

1 Lambrou, Y., Laub, R. (2006), Research Paper No.2006/69: Gender, Local Knowledge, and Lessons Learnt in Documenting and Conserving Agrobiodiversity (Rome: Gender and Development Division, Food and Agriculture Organisation of the United Nations). Available at: http://www.fao.org/fileadmin/templates/esw/esw_new/documents/Links/publications_other/1_unuwiderreport.pdf

GUEST INTERVIEW



Dr. Melaku Worede from Ethiopia is celebrated for establishing the first gene bank for seeds and plant materials in Africa, and for his pioneering work bringing together traditional farmers and scientists. In 1989 he was awarded the prestigious Right Livelihood Award, for his efforts in *"...preserving Ethiopia's genetic wealth by building one of the finest seed conservation centres in the world."* Many in Ethiopia and elsewhere in the world are following his approach. He explains the vital role that traditional farmers have played and can play, especially women, in cultivating the seed diversity which exists across Africa.

"The rich genetic diversity that we see across the planet didn't just occur by chance. Farmers have played a key role in creating and maintaining this diversity by domesticating and breeding plants to adapt to the conditions under which they were farming. They breed within the context of varying landscapes and seasons, and with a multitude of characteristics and criteria to meet the needs of the family and the community. Traditional farmers know exactly what they are doing.

When I say 'farmer', I refer especially to women, although men also have their crops in most cultures. It is generally overlooked, but it is the women who carry out most of the seed selecting, breeding, storing and protecting. In my experience it is the women farmers who cross the varieties, and they do so very consciously. They look for specific characteristics of interest, such as how it will cook, how it tastes, its storability and colour.

Women are excellent observers and they have many reasons in mind when they select - from taste to nutrition, to ceremonial and medicinal uses, to marketability. In addition to their responsibility in the selection process of staple domesticated crops, women are far more intimately connected with the numerous species of edible wild plants than their male counterparts. They are also more skilled at breeding and observing those plants which are similar to the so-called weed varieties. They often deliberately leave the 'weeds' as a method of intercropping and dealing with pests attracted to the main crop, as well as a vital source of nutritious greens. Their knowledge of complementary planting is extensive and passed on orally from mother to daughter. These are the subtleties of the traditional roles and responsibilities on the farm, which are completely ignored and undermined by modern agriculture, tending to both favour and target men.

A common myth amongst scientists and exponents of industrial agriculture is that farmers are solely interested in yield, and this is simply not true. The extent to which a farmer selects for high yield is relatively modest, because they are interested in so many characteristics. Farmers' needs are diverse and so their selection criteria is correspondingly high. They will be selecting and breeding for taste, for cooking qualities, for the short and longer term growing periods, for animal fodder, building materials, medicines and ceremonies. The list is endless.

The challenge is to increase productivity without jeopardising the gene pool of all of these other characteristics. Diversity is crucial for sustaining productivity, enriching the nutritional value of our foods, and meeting the other less explicit needs of the household and the community. Essentially, there must be a diverse range of seeds to meet all of these needs. This is ever more critical now with climate change.

There is no doubt that a wealth of genetic diversity lies here in Africa. What has become so apparent in my work over the last 50 years, is that this is thanks to the rich knowledge and skills of traditional small farmers in breeding and selecting to meet their diverse needs, across diverse conditions, working with nature. And the role of women in this is central.

Right now Africa is facing a huge threat to its rich and diverse seed, food and farming systems as commercial interests see our seed as an untapped market. We cannot let this happen. This report shows us why and how it will impact on women especially."

Photo: Dr Melaku Worede, Ethiopia.

Woman farmer, Ethiopia, picking tomatoes. Jess Phillimore for The Gaia Foundation.

1. Women as Custodians of Seed & Food Diversity

Africa's Rich Biocultural Diversity

The vast African continent boasts a staggering variety of ecosystems and is home to eight of the world's 34 biodiversity 'hotspots' (areas rich in species, but threatened). Its deserts, forests, savannas, mountains and coastline, harbour a quarter of the world's mammal species, one fifth of global bird species, thousands of amphibian, reptile and insect species, and between 40-60,000 species of plants.[2]

The South African National Biodiversity Institute recognises 24,000 species of plants growing in Southern Africa alone,[3] and the Plant Resources of Tropical Africa database has collected information on about 7,000 plants – indigenous and exotic, domestic and wild - that are used by people on the continent for food, medicine, fuel, timber and fodder.[4]

Despite social upheaval, species and habitat loss, the remarkable biodiversity of Africa persists - as does its cultural diversity.

Africa is recognised as the birth place of the human species, *Homo sapiens*, where we have spent the largest part of our collective history. Evolving with the land, the human population of this continent is considered the most genetically, linguistically and culturally diverse in the world.[5] At least 2,000 languages are spoken across thousands of cultural groups, each with distinct religions, music, art forms, belief systems and ways of life.

The inextricable link between biological and cultural diversity creates a rich biocultural diversity in Africa - where cultures have had long, intimate connections with their landscapes, reflected within languages and traditional ecological knowledge systems, and manifest in beautiful ways through cultural and artistic expression.[6]

Africa's diverse ecosystems and landscapes each have their own kinds of plants and animals, to which different local cultures have adapted. This ecological diversity is dynamic, changing in response to the activities of the people who live there, while they in turn adapt their lives to the changes in the landscape and climate. For example, the African savannas have been maintained for thousands of years by the pastoralists who migrate across the lands with their cattle and herds of wildlife, periodically setting fires to encourage new growth and clear old bushes. When people and their herds and wildlife are absent, the condition of the savanna can change quickly as trees and bushes grow back and different animals are attracted.[7]

Different landscapes have fostered distinct ways of life, and diverse cultural expressions have emerged - spiritual, musical and creative traditions, legends and histories, ceremonies and celebrations. Embedded in these cultural expressions and traditions is a deep understanding of the ecosystems that local peoples and communities depend on - a sophisticated knowledge and ecological governance systems which have enabled them to maintain the resilience of their landscapes over generations.

2 UNEP (2008), Africa: Atlas of Our Changing Environment (Nairobi: Division of Early Warning and Assessment, United Nations Environment Programme), pp.XI, 42. Available at: http://www.unep.org/dewa/africa/AfricaAtlas/PDF/en/Africa_Atlas_Full_en.pdf

3 Driver, A., Sink, K.J., Nel, J.N., Holness, S., Van Niekerk, L., Daniels, F., Jonas, Z., Majiedt, P.A., Harris, L & Maze, K. (2012), National Biodiversity Assessment 2011: An Assessment of South Africa's Biodiversity and Ecosystems, Synthesis Report (Pretoria: South African National Biodiversity Institute and Department of Environmental Affairs). Available at: http://bgis.sanbi.org/nba/NBA2011_SynthesisReport_lowres.pdf

4 Kew Royal Botanical Gardens, Plant Resources of Tropical Africa (PROTA). Available at: http://www.kew.org/science-conservation/research-data/science-directory/projects/plant-resources-tropical-africa-prota. PROTA database: http://www.prota4u.info/

5 Campbell, M.C., Tishkoff, S.A. (2010), 'The Evolution of Human Genetic and Phenotypic Variation in Africa' in Current Biology, Vol.20(2), pp.1-15 (Philadelphia: Elsevier B.V.). Available at: http://www.ncbi.nlm.nih.gov/pmc/articles/PMC2945812/#__ffn_sectitle

6 The Christensen Fund (2015), Key Concepts: Biocultural Diversity (San Francisco: The Christensen Fund). Available at: https://www.christensenfund.org/about/key-concepts/

7 De Haan, C., Steinfeld, H., Blackburn, H. (1997), Livestock and the Environment, Finding a Balance (Rome: European Commission Directorate-General for Development, Development Policy Sustainable Development and Natural Resource). Available at: http://www.fao.org/docrep/x5303e/x5303e05.htm

Traditional seeds from Tharaka, Kenya. Tamara Korur for The Gaia Foundation.

This is especially true of biocultural seed and food systems.[8] In West Africa, for example, yam is eaten as the staple food. It is resistant to drought and many local pests, and can be stored and prepared in many ways. Yam has been the staple food for generations, and communities throughout Ghana and Nigeria celebrate a yam festival each year.[9] For the Igbo people in Nigeria, yams are also an important part of social exchanges and formal meetings, and a sacred element in prayer.

Whereas in the East of Africa, among the Adola and Itseo people of Eastern Uganda among others, sorghum is the staple food.[10] Beer brewed from sorghum has become an important part of festivals, rituals and social gatherings. In each case there is a profound cultural and spiritual link between the people and the food crops.

This biocultural diversity, the continent's bountiful natural and cultural wealth - in spite of years of colonialism, globalisation and the industrial growth economy (see Chapter 2) - provides the bedrock for resilience to climate chaos.

Africa's Wealth of Crop Diversity

Indigenous African food plants have been used and adapted around the world, and today several crops that were developed in Africa are staple foods in the diets of other regions.

African women farmers domesticated sorghum, a particularly drought resistant crop and the fifth most-grown cereal around the world today.[11] Due to its ability to survive extreme dry conditions, sorghum feeds people who would otherwise struggle to grow food. Likewise, finger millet and pearl millet are important cereals across Asia, and there is evidence that both crops had been transported from their native Africa to India as early as 2,000 BC.[12] Pearl millet was bred from wild relatives in the Sahel region, while Ethiopia and Kenya are centres of domestication of finger millet. These African crops have made major contributions to nutrition on other continents for thousands of years.

In the same way, farmers in Africa have adopted food crops from other continents and bred and developed them for their own purpose. When traders brought beans to Africa, Rwandan women found that different plants grew well at different altitudes.[13] On the steep mountain slopes of their land, the women began to mix and breed their beans to flourish in their environmental niche. This specialised breeding by women has made Uganda and Rwanda a 'second centre of diversity' for beans after the Andes and Mesoamerica, their place of origin.[14]

8 Howard, P.L. (2003), 'Women and the Plant World, An Exploration' in Women and Plants: Gender Relations in Biodiversity Management and Conservation, ed. by Howard P.L. (London: Zed Books), p.3.

9 Onwutalobi, A.C. (2015), New Yam Festival (Nweyi: Nweyi City). Available at: http://www.nnewi.info/new-yam-festival

10 Abdulsalam, I. (2012), 'The Iwa-Ji Ndi Igbo Festival of South-East Nigeria' in The Nigerian Voice Magazine, 4th Feb 2012 (Pretoria: The Nigerian Voice). Available at: http://olaniyithevoice.wix.com/thenigerianvoicemagazine/apps/blog/the-iwa-ji-ndi-igbo-festival-of

11 CIGAR (n.d), Crop Factsheet: Sorghum (Montpellier: Consultative Group on International Agricultural Research). Available at: http://www.cgiar.org/our-research/crop-factsheets/sorghum/

12 Carney, J.A. (2001), 'African Rice in the Colombian Exchange' in The Journal of African History, Vol.42(3), pp.377-396 (Cambridge: Cambridge University Press), p378. Available at: http://www.sscnet.ucla.edu/geog/downloads/594/35.pdf

13 Blair M. et al. (2010), 'Genetic Diversity, Inter-gene Pool Introgression and Nutritional Quality of Common Beans (Phaseolus vulgaris L.) from Central Africa' in Theoretical and Applied Genetics Vol.121(2), pp.237–248 (Berlin: Springer). Available at: http://www.ncbi.nlm.nih.gov/pmc/articles/PMC2886139/

14 Cardona, C., Kornegay, J, (1998), Bean Germplasm Resources for Insect Resistance, in Global Plant Genetic Resources for Insect-Resistant Crops, CRC Press, p.85.

How Small-Scale African Farmers Build Resilience

Farming is inherent with risk. Pests, disease, drought, flood – there are many ways in which a farmer's crop can instantly be wiped out. It is because of this that traditional farmers are masters at spreading risk. Unlike the vulnerable mono-crops promoted by industrial agriculture, traditional farming practices are rooted in resilience.

Farmers achieve resilience through three main approaches. These approaches are inherent in their practice; they are second nature. Firstly, farmers create a high degree of what we call plasticity in the crop. This means that it is able to grow over a variety of different locations. The seeds are exposed to a wide range of landscapes and conditions which influence their characteristics over time. They become locally adapted *in situ*, and they are continuously adapting and evolving to environmental influences such as changes in the climate.

Farmers further increase the diversity in their farms and fields through seed exchange systems, which most commonly take place at local markets. This allows them to spread their risk, ensuring that a specific seed variety is being grown and saved in a number of different locations. This is why we often find that crops are able to grow across different types of terrain and soil. They have been bred for this adaptive purpose, and this is the key to resilience in the face of climate change. If one crop is hit by drought, or falls foul of disease, it is recoverable through the exchange network. With this system, a seed variety can never be truly lost.

Finally, within their farm, farmers will plant a number of different varieties of seed, so that if they lose one, there will be several other crops which grow under those same conditions. With these sophisticated methods, it is little wonder that most of the breeding techniques used today in institutions have their origins on the farm. This is nothing new; farmers have this knowledge and it has evolved *in situ* between farmer and land for millenia. We need to revive and enhance this system if we are to cope with climate change and a growing population.

(extract from an Interview with Dr. Melaku Worede, Ethiopia, by The Gaia Foundation, November 2012)

The banana has a similar story in Africa. Brought over from South East Asia, where they were first domesticated, the banana plant resembled the ensette or 'Ethiopian banana'. The ensette was already a staple food in the region, and so farmers in Africa began to cultivate bananas too. Again they developed new breeds unique to Africa, adding greatly to the global genetic diversity of bananas.[15]

Tropical African domesticated plants that have been adopted around the world include the okra, aubergine, sesame, watermelon, bitter gourd, and black-eyed peas. In fact, two of the world's most popular modern beverages have their roots in Africa's biocultural heritage - coffee crops were first grown in Ethiopia, while the kola nut (giving flavour to cola-flavoured soft drinks) is native to West Africa.

Kola nuts have traditionally been chewed in West Africa as a natural stimulant, and it was this quality that a large industrial soft drinks company was after for its recipes.[16] However besides being a stimulant, the kola nut has both cultural and medicinal uses and a deep ritual and spiritual significance within its native setting.[17] In Nigeria it is presented to elders and at first meetings, and often forms part of a dowry; among the Igbo a kola nut is broken open and prayed over; while among the Tikari in Cameroon, kola trees are sacred and, as such, collectively protected by the whole community.[18] [19] Kola nuts are also traditionally used to treat depression, as a diuretic and detoxicant, to ease breathing problems, increase stamina and ease hunger pangs.[20] These meanings were lost on the Americans who used it to create a soft drink, but they persist in the cultural home of the plant.

Women Custodians of Seed Diversity

Seed diversity lies largely in the hands of women in most traditions in Africa - from seed selection, to storage, to deciding which varieties to plant and how much, depending on the different types of rain which they assess are likely to come. Before harvesting, women identify which crops should

15 Carney, J.A., Rosomoff, R.N. (2011), In the Shadow of Slavery: Africa's Botanical Legacy in the Atlantic World (Berkeley: University of California Press), p.35.

16 Coca-Cola does not contain Kola nut extract. This is despite etymology of the world 'cola' stemming from the name of the nut. See: Online Etymology Dictionary (n.d.), Cola (n.). Available at: http://www.etymonline.com/index.php?term=cola

17 Lovejoy, P.E. (1980), 'Kola in the History of West Africa' in Cahiers d'études africaines. Vol.20(77-78), pp.97-34 (Paris: Éditions EHESS). Available at: http://www.jstor.org/discover/10.2307/4391682?uid=3738032&uid=2129&uid=2&uid=70&uid=4&sid=21102787688373)

18 Duru, M.C. (2005), 'When Signifying Goodwill is no Longer enough: the Kola Nut and Gender among the Igbos in Nigeria and Belgium' in Food and Foodways: Explorations in the History and Culture of Human Nourishment, Vol.13(3), pp.201-219 (Abingdon: Taylor & Francis).

19 Asogwa, E.U., Agbongiarhuoyi, A.E., Mokwunye, F.C., Ndagi, I., Adebiyi, S., Ndubuaku, T.C.N. (2012), 'The Challenges of Kolanuts Processing, Trade and Export from Nigeria and other Sub-Saharan Countries' in International Journal of Science and Nature. Vol.3(1), pp.6-11 (Lucknow: Society for Science and Nature). Available at: http://www.scienceandnature.org/IJSN_Vol3(1)M2012/IJSN-VOL3(1)-2R.pdf

20 Burdock, G.A., Carabin, I.G., Crincoli, C.M. (2009), 'Safety Assessment of Kola Nut Extract as a Food Ingredient' in Food and Chemical Toxicology. Vol.47, pp.1725-1732 (Philadelphia: Elsevier B.V.). Available at: http://hydh.hbstl.org.cn/uploadfiles/ETGLW2D813010409640 76.pdf

Ejere community, Ethiopia. Jess Phillimore for The Gaia Foundation.

be selected for seed and which for food. Over generations, women have expertly selected crops with a wide range of characteristics to meet various needs, from yield to disease resistance, from taste to post-harvest use, from cooking time to storability. Studies show repeatedly that women have a more extensive seed selection criteria than men.[21] Although men in many traditions cultivate specific crops which are complementary to those nurtured by women, further enhancing the diversity of the food system.

The choice of which crop varieties to plant when the rains come requires a deep and subtle capacity to read the wider ecosystem and the behaviour of the climate. Women seed custodians have to determine which of the seeds they have bred will do best in conditions they predict are about to unfold. In the context of climatic instability, this refined ecological knowledge held by women becomes ever more essential.

Traditionally, from an early age, girls learn with their mother and grandmothers. They become ecologically literate, learning through practice in the gardens, fields and forests. Reading the signs in the ecosystem requires careful observation and attention to detail – changes in the behaviour of insects, plants, animals or birds, levels of moisture, patterns of rain or drought, and so on. Knowledge of the constellations and the relationship of the moon cycle also have an important bearing on determining the seasonal cycles, rains and planting systems.[22]

The family relies largely on the women to make a correct judgement of both the weather patterns they predict and the varieties of crops they select to plant, to assure the family of food. This is traditionally a highly skilled and respected role because the survival of the family and the community depends on it.

Knowledge of seed selection also requires a deep knowledge of how to store their different varieties of seeds safely from one season to the next, and sometimes for decades. Women have evolved a range of methods, depending on the variety, from smoking the seeds over the fire to protect them, to mixing seeds with herbs and ashes to guard them from fungus and pests.[23] Cereals tend to be dried in the sun and then kept in granaries. Pest repelling weeds such as marigold are also used, often together with ash. These practices have been evolved and refined through careful practice and observation over generations.

Their knowledge and skills traditionally earned women status and respect in the family and the community, who relied on them as custodians responsible for seed diversity for food, nutrition, cultural activities and local economies.[24] It is this respect which has been undermined since the colonial period (see Chapter 2).

21 Howard, P (2003), 'Women and the Plant World, An Exploration' in Women and Plants. Gender relations in biodiversity management and conservation, ed. by P. Howard, pp.1-48 (London: Zed Books).

22 Eco-cultural mapping and calendars, on The Gaia Foundation website. Available at : http://www.gaiafoundation.org

23 Gadzirayi, C.T., Mutandwa, E., and Chikuvire, T.J., (2006), 'Effectiveness of Maize Cob Powder in Controlling Weevils in Stored Maize Grain' in African Studies Quarterly, Vol.8(4) (Gainesville: University of Florida Press). Available at: http://www.africa.ufl.edu/asq/v8/v8i4a1.htm

24 Howard, P (2003), 'The Major Importance of 'Minor' Resources: Women and Plant Biodiversity' in Gatekeeper Series, No.112 (London: International Institute of Environment & Development), p5. Available at: http://www.frameweb.org/adl/en-US/2430/file/277/Women_and_Plant_Biodiversity_NP.pdf

Seed as Symbol of Life

Seed is a symbol of renewal, rebirth and the cycles of life. The huge potential of life is encoded in the tiny seed as it waits for the right conditions to unfold.

Across the planet, indigenous and traditional communities have understood seed as sacred because of its profound symbolic nature.[25] In many traditions seed is used as a symbol of renewal at each stage in a person's life, from childbirth to initiation, from marriage to death. It is used in celebrations and ceremonies to mark the transition between seasons. And it is used in rituals and offerings at sacred natural sites, shrines and other spiritual places and moments.

In these traditions, seed is very much a part of a woman's identity, knowledge and power. Seed and knowledge are one – it is a women's knowledge about her seeds that enables her to select them for different reasons, to store them and decide which to plant when. Seed is a source of pride, authority, autonomy and joy. No woman should ever be without seed - ready to plant when the rains come. As such, women who are seed breeders and custodians, tend to be highly respected and play a vital role as spiritual leaders in ceremonies and in customary governance systems, as well as being responsible for nurturing the family and the community with nutritious foods.

Women's Role in Sacred Natural Sites

Sacred natural sites are recognised internationally as "areas of land or water having special spiritual significance to peoples and communities",[26] and as the oldest conservation areas in the world, [27] essential in maintaining the integrity and resilience of ecosystems and landscapes. They cover a range of vital natural features in the ecosystem - waterfalls, forests, sources of water or wetlands, places where animals breed – and are recognised in indigenous and traditional cultures as sites where the ancestors and the spirit world resides, and as places of origin for some traditions.

It is for this reason that traditional cultures respect sacred natural sites - often viewed as the temples or churches of these traditions. There are strict customary laws to protect the sites and the wildlife inhabiting them. Women in many traditions are the custodians of these sites or responsible for providing the required indigenous seeds for the rituals which

Millet, South Africa. The Mupo Foundation.

are carried out within or near to them, often relating to the seasonal calendar, such as before planting to pray for rain, to potentise seeds, or for thanksgiving after the harvest.

Scientists, such as Ethiopian plant geneticist Dr Melaku Worede (see Guest Interview, p.9), emphasise the critical role that sacred sites play in maintaining areas where wild relatives can evolve and develop important resilient traits for breeding into the domestic crops. Doing so further enhances the genetic and crop diversity, essential for having more options to respond to climatic instability. These sites are also refuges for the biodiversity of the area, where plants, animals, birds and insects are protected and can flourish. This is essential for maintaining the integrity and resilience of the wider ecosystem, on which a healthy food system depends. Hence custodians of these sites play a central role in asserting that all sacred natural sites must be recognised as no-go areas for any activities other than the required rituals.

The call to adopt and implement 'no-go area' policies for the protection of key biodiversity areas, including sacred natural and cultural sites, is being made to government bodies and conservation agencies such as the African Commission[28] and the International Union for the Conservation of Nature,[29] by civil society groups and custodians, many of whom are women.[30]

25 The Gaia Foundation and The African Biodiversity Network (2015), 'Seed Keepers' Stories' on Seeds of Freedom Website. Available at: http://www.seedsoffreedom.info/our-projects/seed-keepers-stories/

26 Wild, R., and C. McLeod (eds.), 2009, 'Sacred Natural Sites: Guidelines for Protected Area Managers' in Best Practice Protected Area Guidelines Series, No.16 (Gland: IUCN & UNES).

27 Dudley, N., Higgins-Zogib, L. and Mansourian, S., (2009) 'Links between Protected Areas, Faiths, and Sacred Natural Sites' in Conservation Biology, Vol.23(3), pp.568-577 (Bristol: Equilibrium).

28 A Call for Legal Recognition of Sacred Natural Sites and their Customary Governance Systems (2015), available at: http://ow.ly/UyxUe

29 IUCN, World Parks Congress (2014), 'A strategy of innovative approaches and recommendations to enhance the diversity, quality and vitality of governance in the next decade' submitted to IUCN World Parks Conference. Available at: http://worldparkscongress.org/downloads/approaches/Stream6.pdf

30 NAPE (Uganda) and The Gaia Foundation (2014), Press Release 3rd July 2014. Available at: http://nape.or.ug/wp-content/uploads/Final-Press-release.pdf

My name is **VhoMakhadzi Vhuthanda**, the senior *Makhadzi* (woman elder) of my clan, the Vhuthanda, from Venda in northeastern South Africa. I am responsible for leading the rituals in our *Zwifho*, sacred natural sites, and for ensuring that the *Makhadzi* are growing enough indigenous seed, especially millet, for the required ceremonies.

"Our indigenous seed, Mbewu, is very important to us, because it connects us with Mupo, the Creation, the source of our lives, when we were first created. This is why our indigenous seed is used in all of our rituals and ceremonies.

We cannot use any seed – only the seed which we have planted, only the seed whose origin we know. Each time we plant our seeds, it reconnects us with the soil, the Creation. Millet is our most sacred seed, which we use in all rituals, and we mix it with other seeds.

Seed is itself about Creation, and it reminds us about the cycles of life. That is why we use it at each important time in our lives. When a baby is born, we mix all our indigenous seeds with millet and plant them at the gate, as a prayer to ask for the baby to be healthy. When a child is ready for initiation, seed is used. When we marry, when we die – seed is used.

For us, the seed is within us, it connects us to everything in Mupo, in Creation. Everything comes from seed, and a woman's role is deeply connected to seed because she knows about Creation. That is why women are responsible for our Zwifho (sacred natural site) rituals. We are responsible for the seed, from selection, to storage, to planting – the whole cycle, with all the required ceremonies.

As a Makhadzi, we carry a responsibility for being a person who has peace within herself, in her heart. We need to carry the peace of the ancestors. This is what makes the ancestors happy and everyone in the family happy. Our responsibility is to be strong as women. Not to hold grudges. We need to know ourselves and make peace with ourselves. When we lead our rituals and our prayers, we have to have a clean heart. This is how we keep order in our homes, in our community and in Mupo, all of Creation.

I am calling on everyone in the world to eat food which they know, which is nutritious. We need to go back to indigenous seeds, cultural foods and farming systems which grew out of the soils and the Zwifho, in each of our territories, where each of us have our origins. This will give us a long, healthy life.

Our generation, those of us living now, are responsible for bringing back the original order of Mupo, Creation, before it is too late, so that our children have a future."

Photo: VhoMakhadzi Vhuthanda, South Africa. Will Baxter for The Gaia Foundation.

Women and Wild Crop Biodiversity

Wild foods play a critical role in most traditions, in providing food and nutrition at times when cultivated crops are either not yet ready or coming to an end. They are often called hunger foods and are a highly nutritious and an essential part of a community's food system.[31]

Traditional farming practices in Africa create conditions for wild biodiversity to flourish, and women play an important role in protecting wild places and species. Even within cultivated areas like the home garden, women carefully enable wild greens (which industrial agriculture would call weeds) to grow. These wild greens of various types, including wild spinach, grow more quickly than the crops they are cultivating, giving the family a vital source of protein, minerals and vitamins while the domesticated crops are developing.[32]

In Kenya, gathered foods can contribute 35% of the weight of foods consumed during the wet season, when vitamin and mineral-rich, wild green vegetables grow quickly, and before the cultivated crops are ready to be harvested.[33] Incidences of drought also correspond with increased foraging activity, with mainly women gathering food from areas of their territory where they know the wild foods grow in drought conditions.[34]

Women tend to be the experts in monitoring and identifying the development of wild crops as they weed or forage. Through this role, they develop their encyclopaedic knowledge of wild plants and animal species, knowing in which season and conditions to find these foods and their nutritional value and uses. As climatic conditions change, so women monitor the changes in the ecosystem and the behaviour of wild foods - an accrued knowledge that can take up to a third of a lifetime to learn.[35]

Wild foods are found between the fields, along pathways, beside rivers and within and around sacred natural sites. From an ecosystem perspective, protecting the places where wild biodiversity continues to evolve and flourish is vital for enabling the landscape as a whole to deal with shocks such as floods or droughts, and to adapt to climatic changes. For example, riverine vegetation prevents riverbanks from bursting during floods and holds moisture during the dry season. Wild places are also home to a wide variety of important insects, especially the pollinators on which the global food system depends. Wild and domestic honey bees perform about 80% of all pollination worldwide, especially fruits, nuts and vegetables.[36] They are now highly threatened by the chemicals used in the industrial system, which undermines both ecosystems and the food systems.

At this time of increasing climatic instability, wild relatives are ever more essential for enhancing the genetic and crop diversity of farming systems, as they are constantly adapting to a range of often hostile conditions. They are a critical source of hardy new traits or characteristics to breed into the domestic food system. "*Everybody's food security depends on wild crop biodiversity and evolution*," explains Dr Melaku Worede, "*these varieties represent the up-to-date genetic wealth of the Earth and are the first to develop resilient qualities that domesticated crops rely on acquiring to survive*".[37]

This is how diversity in farming systems has been enhanced by farmers for millennia, by crossing wild relatives into the domestic crop system. Genetic and crop diversity is enriched through this process, and it is largely women who have the knowledge and skills to do so.

Traditional Livestock Knowledge

The often hidden role of women farmers and herders, in keeping and breeding livestock in traditional rural settings, is another element of Africa's diversity-rich food system and women's traditional knowledge base.[38]

In many traditions, women take care of livestock whether it belongs to them or to their husbands. They manage and collect fodder and have knowledge of medicinal plants used for animals. The poultry and livestock provide meat, milk and eggs, wool, leather and other products. Dung can be used as fuel, and is important for fertilising cropland and maintaining productive soil. Animals are also a form of insurance against economic or climatic hardships and the basis of many households' wealth. Unlike crops, they can be transported if there is a need to migrate, and they reproduce themselves and add to the family's wealth.

31 Scoones, I., Melnyk, M., Pretty, J.N. (1992), Hidden Harvest: Wild Foods and Agriculture Systems, A Literature Overview and Annotated Bibliography (London: International Institute for Environment and Development), pp.158-160. Available at: http://pubs.iied.org/pdfs/6006IIED.pdf

32 Howard, P (2003) The Major Importance of 'Minor' Resources: Women and Plant Biodiversity. International Institute of Environment & Development (IIED) Gatekeeper series No.112. p7.

33 Wachiira, K.K. (ed.) (1987) Women's use of Off-Farm and Boundary Lands: Agroforestry Potentials. Final report. ICRAF, Nairobi, Kenya.

34 Rocheleau, D.E. (1991). Gender, Ecology, and the Science of Survival: Stories and Lessons from Kenya. Agriculture and Human Values, Vol.8, No.1-2, Pp.156-165.

35 Howard, P 'The Major Importance of 'Minor' Resources: Women and Plant Biodiversity', p.4.

36 Weyler, R., (2013), Honey Bee Collapse, a Lesson in Ecology, Post on Greenpeace Int. Website. Available at: http://www.greenpeace.org/international/en/news/Blogs/makingwaves/honey-bee-collapse-a-lesson-in-ecology/blog/45357/. See also: Delaplane, K.S., Mayer, D.F. (2000), Crop Pollination by Bees, (Wallingford: CABI Publishing), pp. 1-16.

37 Worede, M. (November, 2012), Personal Interview in Addis Ababa, conducted by Liz Hosken.

38 FAO. (2012). *Invisible Guardians - Women Manage Livestock Diversity*. FAO Animal Production and Health Paper No. 174. Rome, Italy. Pp.5 Available at: http://www.fao.org/docrep/016/i3018e/i3018e00.pdf

Shea Nut Trees in Zoosali, Ghana. Ruth Leavett for The Gaia Foundation.

The Wild Shea Nut Tree, Ghana - indispensable for women in arid areas

Indigenous shea nut trees are plentiful in Zoosali, a small rural village in northern Ghana, and home to the Dagomba community, one of the oldest ethnic groups in Ghana. Harvesting and preparing these wild shea nuts for making shea butter is a process that Dagomba women have practiced for generations. They process the Shea nuts in order to create shea butter which is used in most of their traditional foods, whilst the surplus can be sold at market, often to be made into cosmetics such as soap.

A native wild species, the shea nut tree is held in very high regard in Ghana and according to Dagomba tradition cannot be cut down or individually owned. The trees are not only vital for the local food and livelihoods, but also as a vital part of the ecosystem, protecting the land from erosion and desertification.

The nuts are harvested between May and July, just before the start of the rainy season. The women pick them when they have already fallen from the tree - a sign that they are ripe. The process of transforming the nut into butter involves a number of stages and demands attention to detail. Not everyone knows how to process the nuts, it is a skill which is passed on between generations of women in the community.

First, the outer skin of the fruit is removed. This takes place on the farm, before the nuts are carried back to the household compound. Once the nuts are at the compound, they are boiled in order to soften the hard outer shell, making it easier to break and reveal the seed. The nuts are then pounded to separate the seed from the shell. The seed will be picked out from the broken shells by hand, making it a long and fiddly process, but a very sociable activity for the women and an opportunity to rest from some of the other activities on the farm.

The discarded shells are used as fuel for cooking whilst the nut inside is used to make the butter. The nuts are pounded, roasted, ground and then beaten together with water. The fat which comes from the nut through this process is the boiled in order to separate the clear oil, and it is this which creates the shea butter. As the oil cools into shea butter it is beaten again to make it smooth.

Shea butter is used in Ghana as soap, for softening skin, for keeping warm in the dry season and for treating sprains and inflammations. In Zoosali it is used mostly for food, in dishes such as *snkaafa kpaligu*, a local rice dish made with butter.

Today, Sanatu is one of just a handful of women in the village who know how to make the butter. She learnt the process from her mother. Sanatu's daughter has learned the skill by observing and helping at every stage - but now, most of her contemporaries aspire to jobs in urban areas which are seen to have more of status than rural skills, and few want to learn this art.

Sanatu, Ghana. Ruth Leavett for The Gaia Foundation.

Women farmers, Ethiopia. Jess Phillimore for The Gaia Foundation.

As with plants, women's selection criteria for breeding animals are different from those of men or commercial interests, encompassing more criteria.[39] Studies show that women prefer their local, indigenous breeds to the 'improved' foreign animals bred and promoted for productivity, as they are better adapted to the region and present lower risks and less demands on women's time.

The Myth of Marginal Lands

The vital importance of wild and uncultivated areas, for the resilience of local food systems and of the landscapes they depend on, tends to be completely overlooked. Wilderness, common lands or culturally protected areas, from which women gather wild crops and foods, are often classed as 'marginal lands'.[40] So too are many traditional farming areas. This is because they are not involved in formal, market-based food or commodity production, and are therefore not valued and 'disposable'.

In reality these lands are usually utilised and governed by indigenous peoples, pastoralists or small-scale farming communities. They are often highly productive, taking into account the rich diversity of crops, plants, animals, insects, birds, and the livelihoods they support. In the context of climate change, they are essential places for wild relatives to evolve hardy traits for enhancing the domesticated crops. But through the lens of the modern industrial growth model, it is argued that 'marginal land' should be put to 'good use', meaning to be made 'commercially productive', according to the values of the market economy.[41]

In turn, this assumption over what qualifies as 'marginal' is used to legitimise large-scale land grabs. Typically, in Africa, the land is turned over to industrial agriculture and biofuel production, demanding high inputs of chemicals and fertilizers, for profit ventures.

When these lands are grabbed for commercial use, women in particular are negatively affected. Not only do they lose their land and livelihoods, but any available work receives only a minimal daily wage and contract agreements are more likely to be made with male heads of the household.[42]

Widening Circles of Seed & Knowledge
Exchange and Reciprocity

An essential practice amongst farmers across Africa and elsewhere is their enthusiastic exchange of seeds and knowledge with one another. Seeds are so vital in their lives, that farmers are naturally impassioned by seeds and their diverse traits. Instinctively they are inclined to swap, share, and exchange knowledge and to try new varieties and crops at any opportunity – markets, festivals, celebrations, travelling to relatives, or when they are doing a collective activity like weeding or harvesting.

This plays an essential role in widening both the genetic base and the distribution of different seed varieties, which enables

39 FAO (2012), Invisible Guardians - Women manage livestock diversity, FAO Animal Production and Health, Paper No. 174 (Rome: FAO), p.10. Available at: http://www.fao.org/docrep/016/i3018e/i3018e00.pdf

40 The Gaia Foundation, African Biodiversity Network, Salva La Selva, Watch Indonesia and EcoNexus (2008), Agrofuels and the Myth of Marginal Lands. Available at: http://www.cbd.int/doc/biofuel/Econexus%20Briefing%20AgrofuelsMarginalMyth.pdf

41 Ibid.

42 Tandon, N. and Wegerif, M. (2013), Oxfam Policy Paper 170: Promises, Power, and Poverty: Corporate Land Deals and Rural Women in Africa (Oxford: Oxfam). Available at: https://www.oxfam.org/en/grow/policy/promises-power-and-poverty

Prof. Patricia Howard from the UK is a Rural Sociologist, Political Ecologist and Ethnobotanist. Her book '*Women and Plants: Gender Relations in Biodiversity Management and Conservation*' (2003) looks at the central role that women play, and have played throughout history in most traditions, in maintaining and enhancing crop diversity.

"In the domestic sphere you will find women cultivating home gardens. Home gardens are rich small poly-cultural fields, which are usually closest to the kitchen. They are generally overlooked because they are seen as 'non-agricultural', but actually they involve more plant species and more knowledge about the cultivation of a greater number of varieties than in the main field crops. Especially people from the West think that diversity predominates in the fields. Yet, for most people in Africa, field crop production is only one of the ways to procure food. Home gardens, forests, wild areas or along the riverside are also vital and it is usually the women who tend to the plants in these 'wild' spaces. Women may respect certain cultural rules so that the plants in these wild areas are not over-exploited. Tending plants certainly doesn't stop at the boundaries of the field. It is often outside of the field that some of the most important sources of food grow.

There's an incredible amount of knowledge that goes along with plant cultivation in order to plan for the needs of the whole family and the community obligations in ways that are appropriate to your culture. The amount of knowledge that it takes to cultivate around 60 species in a home garden is quite profound, and it doesn't stop there. It's one thing to cultivate it, but it's another to know what to do with the crop once you've cultivated it.

The household is in many ways an experimental lab and so there's often a great deal of innovation going on there. Providing food security for the family means not just cultivating the crop but storing it and then preparing it to be eaten or to be used as medicine or in ceremonies. You need to know how it must be harvested, stored, perhaps transported, cooked and so on. Accruing this knowledge can take up to a third of a lifetime.

Just imagine how many crop types you need in order to meet the food needs of the whole family throughout the entire year: How much of each individual plant do you require to save, to eat and to plant again? What uses will you put it to? How many varieties might you need? Which can you plant in the climatic conditions you predict might be? Are they to eat or for beverages? Are they to store for next year, or perhaps to give as gifts at a wedding?

What is often overlooked is that women will have a number of different varieties of the same crop for numerous reasons. It may be because of the conditions in which the crop is grown, or because of the different cooking qualities of each, and the different types of traditional dish that they need produce using these varieties. All of this variety also enables them to respond to climatic instability, which as we know is predicted to be especially volatile in Africa.

Women may gain a great deal of status due to their knowledge and agronomic capacities. The women who have the most varieties may end up marrying important men, and they are greatly admired by fellow women. Women who are able to prepare all of the traditional foodstuffs and manage good kitchen gardens can gain a lot of respect. Women who are very active in preserving seed and who are able to pass this seed to other women, who may have not had such successful crops, will also have high status amongst other women.

All of this makes the domestic sphere incredibly important, and yet it's tended to be invisible to outsiders, including researchers and scientists. It's proven to be very difficult to estimate what's coming out of home gardens because the contribution of women in these environments, and the genetic diversity that women are managing in these so called "marginal spaces", are left out of agricultural statistics because these areas of production are small, or simply overlooked. This means that the vital role of the domestic sphere may be invisible – yet women are often the custodians of seed, the ones feeding the continent, and they also are crucial to feeding the region in the future, in the context of climatic instability."

Photo: Prof. Patricia Howard , UK.

Women basket-weaving in Kenya. Sara Davies for The Gaia Foundation.

the crops to adapt to a range of ecological and climatic conditions, as they spread from community to community.[43]

It also further enriches the shared knowledge and experience of the farming communities.

There are many ways in which this exchange happens in different cultures. Most common is through farmers' markets where seed, food and various goods are exchanged or purchased. These markets can range from the frequent and local, to the less frequent and regional. Through meeting at markets, as well as at social gatherings and community seed banks, farmers from different areas are able to trade, share and exchange indigenous seed varieties adapted to cope with differing local pressures such as poor soil, drought, floods and pests.

Exchanging seeds that have been nurtured by farming communities for generations means that farmers are able to benefit from both the qualities of the seed, and from the rich indigenous knowledge associated with it. And by further adapting the seeds they receive, they are increasing the genetic diversity found in their fields and the overall seed diversity in their region, as well as enriching their knowledge and practices.[44]

Kinship systems and rites of passage ceremonies - birth, marriage, death - or ceremonies to mark seasonal changes where often more than one community comes together, provide other opportunities for seed exchanges to take place. In southern Gabon, for example, women traditionally take cassava plants from their mother's garden when they marry and move to their husband's village. In these villages, there is a high variety of cassava plant species. In the north, however, the tradition has been for women to be given cassava plants by their mother-in-law when they arrive at the husband's house. Research shows how northern Gabon has significantly less diversity of cassava because plants had not been transported by the women from village to village, mixing and pollinating to breed new varieties of plant.[45]

Circles of reciprocity and exchange have also developed between communities when facing hardship. In the Sahel region, for example, nomadic, semi-nomadic and farming cultures have developed a sophisticated system of sharing that enabled all three to survive in conditions they could not have lived through in isolation, each providing something that the other needed. After harvesting their crops, the farmers would allow the nomads to graze their animals on the plant remains left in the field. As the animals were fed they fertilized the fields with manure and so enriched the soil for the next crops. For their part the semi-nomadic groups

43 Worede, M. (2011), 'Establishing a Community Seed Supply System: Community Seed Bank Complexes in Africa' in Climate Change and Food Systems Resilience in Sub-Saharan Africa, ed. by Ching, L., Edwards, S., & El-Hage Scialabba, N. (Rome: Food and Agriculture Organization of the United Nations).

44 Pautasso, M., et al. (2013), 'Seed Exchange Networks for Agrobiodiversity Conservation, A Review' in Agronomy for Sustainable Development. Vol.33(1), pp.151-175 (Berlin: Springer).

45 Delêtre, M., McKey, D.B. and Hodkinson, T.R. (2011), 'Marriage Exchanges, Seed Exchanges, and the Dynamics of Manioc Diversity' in Proceedings of the National Academy of Sciences, Vol.108(45) pp.18249-18254 (Washington DC: National Academy of Sciences).

formed trade links by breeding and exchanging livestock and crops between the three groups, linking all three together.[46]

Seed Continuums for Climate Resilience

Seed and knowledge exchange networks and reciprocity create 'seed continuums' – the passing of one crop from farmer to farmer across a given agro-ecological contour or area. This encourages crop 'plasticity' or adaptability, with the crop developing a range of characteristics as it adapts to differing microclimates.

The tracking of 'seed continuums' reveals how the same indigenous crop can be spread over many miles. In the context of climate change this is a vital insurance for maintaining crops diversity. If a climate event happens in one part of the contour, communities can recover the crops they lost from others on the contour.

"If you go to the SADC region, these contours are broken everywhere, because the big farms have taken over with their monocrops and there is discontinuity. But you may find fragments, and you can reintroduce varieties from elsewhere. This work is important for enhancing diversity and farmer's capacity to rebuild resilience," Dr. Melaku Worede.[47]

Cultivating Diversity for Climate Change Resilience

Enhancing diversity means enhancing resilience - the ability to deal with shocks and surprises. In agriculture a diversity of crops (agrobiodiversity) reduces the risk to farmers. By planting a diversity of crops and varieties, if unforeseen weather events take place, farmers are more likely to harvest some food. This becomes ever more critical now, for dealing with increasingly erratic weather patterns, rising temperatures and variable rainfall.

Cultivating diversity has been a conscious strategy of women seed custodians, to meet diverse needs, tastes and uses, and to maximise their chances of producing food under variable conditions. As mentioned, in many cultures men have their own complementary crops, which further increases the diversity of the farming system, and thus its capacity to deal with shocks and stresses.

In Rwanda, women scatter specific mixtures of beans chosen to suit the soil, the season and their needs in the kitchen and the community. This will give them a range of types of bean to harvest; and should there be a problem at least some of the mixture will survive.[48] In the Sahel, farmers grow pearl millet which can tolerate drought, together with sorghum which can tolerate water-logging, so that they are more assured to have a harvest.[49]

In many African rural communities, the greatest concentration of crop diversity is found in 'kitchen' or 'home' gardens. (See Guest Interview, Prof. Patricia Howard, p.20). These small areas are the domain of women, and are used as experimental areas where wild plant varieties can be introduced, providing novel opportunities for cross-pollination and domestication, and where food and medicinal plants tend to be grown.[50] Through careful seed selection women are able to generate all the micronutrients and vitamins their families require from these small areas whilst boosting agrobiodiversity.

Ethiopia is just one example where women tend to have various areas for growing food and nurturing wild plants, known as poly-cultural systems - many crops growing in different areas. Nearest the house is the home garden; another area is usually located near to a water source; and finally the fields, which are rainfed. Diversity is most concentrated around the homestead and decreases towards the field.[51]

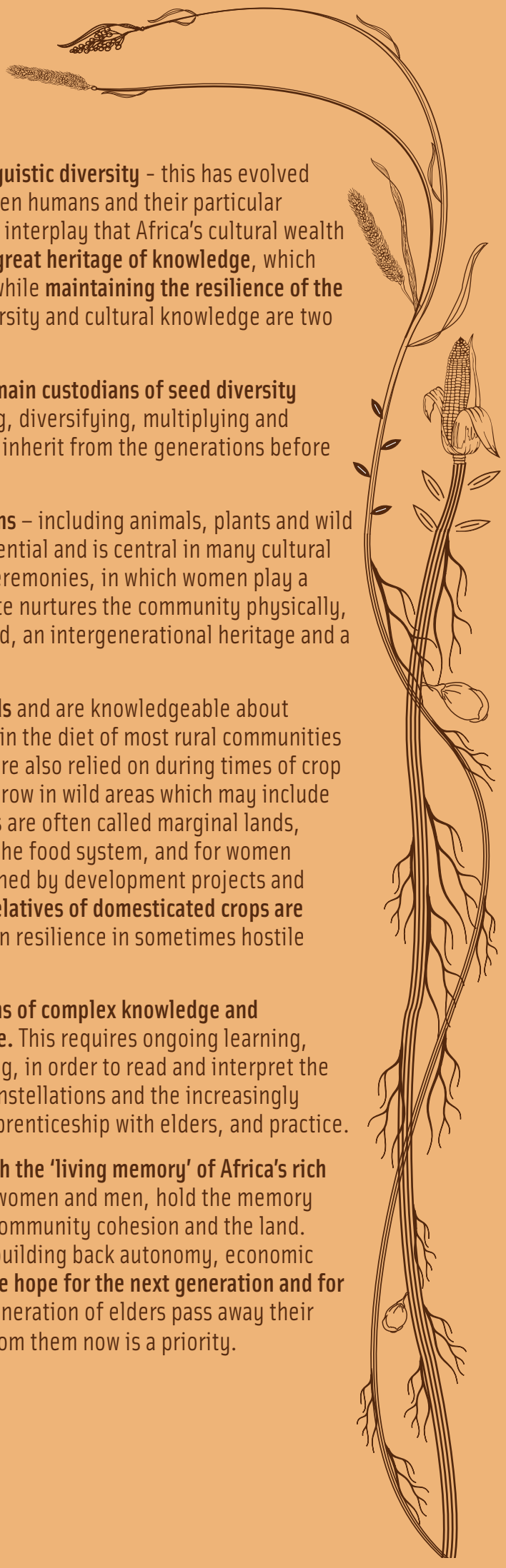
Given that Africa is likely to be hit hardest by global climate change, restoring these diversity-based farming systems is a priority, as well as the seed exchanges between communities. It is a vital insurance now and for generations to come. The role of women in this task is critical.

46 Nicholson, S.E. (1995), 'Sahel, West Africa' in Encyclopaedia of Environmental Biology, Vol.3, p.273 (Philadelphia: Elsevier).
47 GRAIN (2009), 'Melaku Worede (Interview in English)' in Seeding, 22 April, 2009 (Barcelona: GRAIN). Available at: https://www.grain.org/article/entries/709-melaku-worede-interview-in-english
48 Sperling, L., Berkowitz, P. (1994), Partners in Selection: Bean Breeders and Women Bean Experts in Rwanda (Montpellier: Consultative Group on International Agricultural Research), p9. Available at: http://www-wds.worldbank.org/external/default/WDSContentServer/WDSP/IB/2011/07/15/000356161_20110715025313/Rendered/PDF/632810WP0Bean000Box0361511B0PUBLIC0.pdf
49 FAO (n.d.), Sorghum bicolor (L.) Moench (Rome: Food and Agriculture Organisation of the United Nations). Available at: http://www.fao.org/ag/agp/agpc/doc/gbase/data/pf000319.htm
50 Howard, P. (2003). Chapter 1: Women and the Plant World, An Exploration. In: Howard, P. (Ed.) Women and Plants: Gender Relations in Biodiversity Management and Conservation. Zed Books
51 Reyissa, R. (November, 2012), Personal Interview in Addis Ababa, conducted by Liz Hosken.

Key Messages

on Women as Custodians of Seed & Food Diversity

- **The African continent has a rich biocultural and linguistic diversity** - this has evolved over millennia in a harmonious relationship between humans and their particular ecosystems and climatic conditions. It is from this interplay that Africa's cultural wealth has emerged. **Embedded in cultural practices is a great heritage of knowledge**, which has enabled traditions to adapt over generations while **maintaining the resilience of the ecosystems** on which they depend. Biological diversity and cultural knowledge are two sides of the same coin.
- **Women in most African farming traditions are the main custodians of seed diversity** – meaning selecting, storing, breeding, enhancing, diversifying, multiplying and exchanging seed, building on the knowledge they inherit from the generations before them.
- **Seed is at the heart of agri-culture and food systems** – including animals, plants and wild species. Seed symbolises life's ever renewing potential and is central in many cultural practices, such as rites of passage and seasonal ceremonies, in which women play a vital part. The seed diversity which women cultivate nurtures the community physically, culturally and spiritually. It is understood as sacred, an intergenerational heritage and a responsibility.
- **Women tend to be the main custodians of wild foods** and are knowledgeable about where these foods occur. Wild foods are essential in the diet of most rural communities because they are usually highly nutritious. They are also relied on during times of crop scarcity, often referred to as hunger foods. They grow in wild areas which may include pathways, riverbanks and sacred sites. Such areas are often called marginal lands, which belies their importance for the ecosystem, the food system, and for women as custodians. Wild areas are increasingly threatened by development projects and landgrabs. **As climatic instability increases, wild relatives of domesticated crops are a critical source of hardy new traits** that have shown resilience in sometimes hostile conditions.
- **Women in most farming communities are custodians of complex knowledge and skills about seed as well as biodiversity and climate.** This requires ongoing learning, observational capacity and a holistic understanding, in order to read and interpret the dynamic interplay between the ecosystem, the constellations and the increasingly erratic climatic behaviour. It takes dedication, apprenticeship with elders, and practice.
- **Elders living today could be the last generation with the 'living memory' of Africa's rich biocultural heritage**. Knowledgeable elders, both women and men, hold the memory of seed diversity and traditions for regenerating community cohesion and the land. Their traditional knowledge is the foundation for building back autonomy, economic empowerment and self determination. **They are the hope for the next generation and for rebuilding climate change resilience**. When this generation of elders pass away their precious knowledge will go with them. Learning from them now is a priority.



Ethiopia. Jess Phillimore for The Gaia Foundation.

2. Undermining Women's Role in Agriculture & the Community

From Colonisation to Globalisation

The accompanying symbol is called *Sankofa*, an Akan (Ghanaian ethnic group) symbol, and meaning "*looking to the past to create the future*". The understanding is that our past is a rich source of potential, like an egg full of nourishment to give birth to new life; a source of inspiration and learning to draw from, providing guidance for our lives. To make the best of our future we should "*know our roots*" to understand and build on our past heritage.

As we have seen, the natural and cultural wealth of the African continent is enormously diverse and abundant, and thousands of food plants – cultivated and foraged – have been further enhanced by each generation. The knowledge and roles that women have played has been critical in all spheres of life in most traditions. Yet today, the dominant perception is that Africa is helpless and poverty stricken; needs to be 'developed' in the image of the modern industrial growth economy; communities across the continent need to be educated because they are ignorant; communities plunder their natural environment and need to be displaced to protect pockets of biodiversity (parks); and farming communities need to abandon their 'unproductive' traditional crops and farming systems and buy modern 'improved' commercial seeds and 'inputs'- chemical fertilizers, herbicides and pesticides - to be productive.

As the *Sankofa* symbol advises, it is important to understand how this unravelling of the continent is happening and to recognise Africa's rich heritage. This provides the basis from which to find a way to rebuild its resilience and abundance, drawing on Africa's own inherent wealth and its tried and tested knowledge and practices, honed over generations.

This is especially important with regards to the traditional knowledge and role of rural women, which has been severely undermined, misunderstood and become invisible.

Over the last 70 years or so, the predominantly agricultural rural communities in Africa have increasingly lost their autonomy. First under colonial rule, and then as a result of independence when the new nation states continued to undermine and take power away from customary systems of governance and decision-making. Less well recognised is the repressive influence of this period on women, their roles and responsibilities, and their relationship with men and their land.

Colonialism brought with it Victorian era views that women were expected to busy themselves with domestic issues, while the men did the more serious work of politics and economics. Customary governance systems were distorted as chiefs or "headmen" were appointed and given special privileges for being loyal to their colonial masters. The traditional communal structures of governance and accountability to the ancestors, spiritual leaders and the councils of elders, were increasingly eroded. This included the role of women, who in many cultures are spiritual leaders and councillors, as well as being central in the farming and food system.[52]

Cash crops and plantations, first introduced by colonialism to feed the growth of the industrial economy in Europe, further undermined the role of women in African societies and their relationship with men. Initially the settlers feared that "*primitive African agricultural practices would spread crop diseases and contaminate their plantations*".[53] Later, African communities, especially men, were given incentives

52 Akyeampong, E., Fofack, H. (2012), The Contribution of African Women to Economic Growth and Development: Historical Perspectives and Policy Implications: Part 1: Pre-Colonial and Colonial Periods (Washington DC: World Bank). Available at: http://elibrary.worldbank.org/doi/pdf/10.1596/1813-9450-6051

53 Berger, I. (1999), 'Women in East and Southern Africa' in Women in Sub-Saharan Africa: Restoring Women to History, ed. by Berger, I., White, E.F. (Bloomington: Indiana University Press), p.44.

Ethiopia. Damian Prestidge for The Gaia Foundation.

to grow cash crops, with all the chemical inputs that went with industrialising agriculture. Women increasingly lost access to their farmlands, as well as the possibility of producing food to feed the family, to barter, exchange or sell, or to play their role in the wider community.

Women had already been sidelined through colonial politics. Now the very core of their role as custodians of seed and food began to unravel. Less land meant they could grow less food, usually on less fertile lands (because the best was given over to the cash crops), and they were often relegated to helping their husbands with the cash crops, which were now the men's domain.

Private ownership of land was introduced, and women were excluded from the process of "*registration and consolidation of land, granting titles to individuals*".[54] Men on the other hand found themselves in a new position of power over women, in the home and on the land - though reduced to cheap labour for the colonial powers, with a few handpicked headmen being given undue authority over their community.[55] The new nation states, established in the postcolonial period, generally reinforced this distorted leadership structure, by developing an alliance with the traditional rulers in areas where communal land tenure systems prevailed. This has further unravelled the system, bestowing powers of 'ownership' to chiefs, previously unknown in customary law and practice.

The combined impact of the colonial and independence experiences have taken their toll - manifest in the widespread erosion of women's access to land, traditional knowledge, seed diversity and farming practices; and the undermining of their role and social standing in the family and community, resulting in their loss of self-confidence.

Since the early 1980s there has been a continuous attempt by the World Bank, the International Monetary Fund (IMF) and increasingly the G7, to introduce neoliberal programmes, where control is shifted out of the public domain into the private sector, to solve the problems of the African economy. One of the key elements of neoliberal policies is to turn the remaining communal land into private property, which can then be used as collateral for loans to buy seed and chemicals marketed primarily to men. In Asia this path has led to men building up enormous debts from the loans for seeds and chemical inputs, and has resulted in thousands of suicides among male farmers because of the humiliation of losing their land to their debtors.[56]

Globalisation has amplified economic, political, social and cultural power dynamics across international boundaries while the World Trade Organisation regulations facilitated the free entry of foreign corporations into African countries. The flow of goods and services across countries, the changes in agricultural production and marketing, alongside the availability and accessibility of cheaper goods from global trade, have particularly disadvantaged the role and responsibility of African rural woman. Increasingly, corporate interests and the free trade ideology has demanded the protection of corporations as the condition for investment and economic growth, at the expense of social, economic and ecological justice.

The value judgements and assumptions underpinning colonialism, and later globalisation, create an oppositional world where 'anything other' than modern is defined as inferior. 'Progress' into the globalised world of production and consumption is seen as necessary and inevitable – and what everyone should strive to achieve.

Other cultural and spiritual beliefs and values are judged as heathen, backward, and to be converted to male dominated

54 Rodney, W. (1973), How Europe Underdeveloped Africa (London: Bogle-L'Ouverture Publications).

55 Smith, F.S., Eyzaguirre, P. (2007), 'African Leafy Vegetables: Their Role in the World Health Organisation's Global Fruit and Vegetables Initiative' in African Journal of Food, Agriculture, Nutrition and Development, Vol.7(3), p.1 (Rural Outreach Program).

56 Shiva, V. (2000), Stolen Harvest, the Hijacking of the Global Food Supply (Cambridge, Mass.: South End Press).

religions and the market growth economy. Women are cast as playing supplementary and reproductive roles, and men are brought into the market economy through economic incentives. People who are not educated according to the western tradition, are deemed uneducated, no matter how much knowledge they have acquired in other ways.

Modern scientific research agendas serve to reinforce this domination and cultural bias, because of the lens through which they see the world. This is reflected by the fact that remarkably little research has been done on the role of women in rural communities in Africa. One study for example, concluded, "*very little is known about the production and consumption of African Leafy Vegetables*" - the domain of women for millennia, and simply invisible to the predominantly male researchers.[57]

Industrialisation – Turning Life into a Commodity

The industrial revolution was underpinned by a reductionist scientific worldview which introduced the idea that the Earth is like a machine, whose parts can be understood, manipulated and repackaged for human benefit – genetic engineering of plants and animals being a reflection of this thinking. Nature is seen as an inanimate 'resource', to be exploited for economic growth, without consequences. This modern science has been turned to the service of commercial interests, raising questions about its objectivity.

Studies show how this extractive relationship with the Earth, which has now been globalised, has led very quickly to the multiple ecological and social crises we face today: the sixth mass extinction of species;[58] global warming through releasing fossil fuels into the atmosphere, leading to climate change and ecosystem collapse;[59] growing social injustices and disparities between rich and poor;[60] increasing displacement of communities from their land resulting in burgeoning urban squalor, to name but a few.[61]

From land and water, to food and medicine, to seed, plants and animals – even carbon - virtually all aspects of life are being commodified and privatised. The drive is to increase economic growth through expanding monopoly control over 'resources' and markets to maximise profit. This has resulted in the deskilling of society, making societies increasingly dependent on the market economy, experts, modern science and corporations to meet their needs.

Seed is an example of an ancient tradition, at the heart of farming systems, which has been increasingly turned from a system of sharing seed and knowledge under community control, to a 'commodity' controlled by commercial monopolies, where farmers become consumers, dependent on what is marketed to them. Farmers are stripped not only of their seed, but also of the knowledge that enables them to make decisions and control their lives.

> *"The industrial revolution has turned economics from a prudent partnership with nature for mutual sustenance, to provide the basic needs for health and wellbeing of the human community, as well as for the renewal for the larger community of life, into a process of turning nature into commodities for profit maximisation for the few. The wealth of nature, and that produced by women for sustaining life, is rapidly decreasing. More commodities and more cash means less life – to the point where nature's regenerative capacity is increasingly impaired. In society, women's work in sustaining life is devalued, as it is not contributing to the industrial growth economy, so it too is drained of life."*[62]

When the very conditions on which rural communities depend - land, water, soil, seeds, wild areas - are commodified, privatised, and converted into industrial monocultures or extractive wastelands, then displacement, dependency and growing poverty is an inevitable consequence.

Agri-Culture to Agri-Business

Agriculture underwent a radical transformation in just a few decades, post-World War 2, with the use of chemicals previously used as weapons turned into fertilisers and pesticides. It transformed agri-culture into agri-business, actively promoted by ever fewer global agrochemical companies, with food being viewed as a commodity rather than as a source of sustenance, reciprocity and joy.

57 Haverkort, B., van't Hooft, K. and Hiemstra, W. (2003), Ancient Roots, New Shoots: Endogenous Development in Practice (London: Compas & Zed Books).

58 Barnoski, A. et al. (2011), 'Has the Earth's Sixth Mass Extinction Already Arrived?' in Nature Vol.471, pp.51-57 (London: Nature Publishing Group).

59 Rafmstorf, S., 'Anthropogenic Climate Chance: Revisiting the Facts' in Global Warming: Looking Beyond Kyoto (New York: Brookings Institution Press, 2008), ed. by Ernesto Zedillo. Available at: http://www.pik-potsdam.de/~stefan/Publications/Book_chapters/Rahmstorf_Zedillo_2008.pdf

60 Adger, W. and Kelly, P., (1999), 'Social Vulnerability to Climate Change and the Architecture of Entitlements' in Mitigation and Adaption Strategies for Global Change Vol.4, pp.253-266 (New York: Springer).

61 McMichael, A., Woodruff, E., and Hales, S., 'Climate Change and Human Health: Present and Future Risks' in The Lancet (Amsterdam: Elsevier, 2006) Vol.367, pp.859-869, Available at: http://saludsindanio.org/sites/default/files/documents-files/151/Climate_Chg_Human_Health.pdf

62 Shiva, V. (1989), Staying Alive; Women, Ecology and Development, (London: Zed Books).

Dr. Vandana Shiva from India is a celebrated feminist, philosopher of science, writer and science policy advocate. She is deeply committed to the protection of farmers' rights to their own seed stock, as well as exposing threats to the world's farmers posed by the potent combination of global liberalisation of trade and patent protection of agricultural processes and products. Her publications include *Staying Alive* and *Biopiracy: The Plunder of Nature and Knowledge*. She received the Right Livelihood Award in 1993.

"The masculinist paradigm of food production, which has come to us under many labels such as 'green revolution' or 'scientific agriculture', involves the disruption of the essential links between forestry, animal husbandry and agriculture. This has been the basis of diversity based farming for millennia. The renewable base of agriculture provided by women through carrying green manure and fodder to farms and carrying compost and organic matter to fields, has been systematically undermined by reductionist agriculture. This industrialised model of agriculture replaces renewable inputs from the farm by non-renewable inputs from factories, and displaces women's work with the work of men and machines using hazardous agri-chemicals as inputs.

The very meaning of agriculture was transformed with the introduction of the green revolution paradigm. It was no longer an activity that worked towards a careful maintenance of nature's cycles and provided society with food and nutrition; it became an activity aimed primarily at the production of agricultural commodities for the market, to generate profit. Nature, women and peasants were no longer seen as primary producers of food. The shift from thinking in the context of nature's economy to thinking exclusively in the context of the market economy, created the specificity of the hybrid seeds, chemical fertilisers and pesticides, mechanisation and large-scale irrigation. These technologies were developed in order to maximise profits from agriculture. They were not developed for protecting the soil and maintaining its fertility, protecting and nurturing biodiversity, for making food available to all as a basic human right or providing livelihoods in food production. The emergence of a new breed of agricultural 'experts' with fragmented knowledge of components of the agricultural system, driven by the market system, led to the displacement of the traditional agricultural experts - women and peasants.

This paradigm results in the disruption of nature's ecological cycles and displaces women from maintaining those cycles. From seeing farming as a process of nurturing the Earth to maintain her capacity to provide food, a masculinist shift takes place which seeks to dominate and control nature in order to extract maximum profits. Ecological destruction is one inevitable result of this commercialisation of food production, and the loss of fertile living soils. Economic deprivation is the other, because production for profits, instead of providing for basic needs for food, excludes large numbers of women and peasants from food production and even larger numbers of women and their families from food. Hunger and famine today are intimately related to a patriarchal model of progress which sees sales and profits as indicators of well-being and thus destroys the real well-being of people and nature.

In all agroecological practices, women play central productive and creative roles. They are the experts and the controllers of food security and health care systems. Their work and nature's work in sustainable food production today is being destroyed by a system which puts modern man at war with the web of life in order to extract profits and gain control over nature and the economy. Nature and women, as maintainers of soil fertility, protectors of plants and managers of pest control and as reproducers of genetic wealth in all its diversity, are being displaced by a handful of multi-national agri-business corporations which control fertilizer production, pesticide production and the seed industry, and hence control the food chain.

The peasant farmers movements around the world are growing the momentum to turn this tide, and the role of women in these movements is central."

Photo: Dr. Vandana Shiva, India.

The result has been a significant loss of agricultural biodiversity in domesticated crops, as well as wild plants and animals, and the erosion of soil fertility, water systems and cultural diversity across the world. Over the last few decades some 75% of plant genetic diversity has been lost globally; and 30% of livestock breeds are at risk of extinction, with a staggering 6 breeds being lost each month.[63]

The globalising food system relies on just 12 crops and five animal species for 75% of the food it supplies – considered to be a more 'economically efficient' approach. This has reversed millions of years of evolution of diversity on our planet.[64] The rich diversity of crops and foods nurtured by diverse cultures for millennia, and largely by women, has been dramatically stripped away in the last 20 years.

This has created a global food system that is highly vulnerable. If disease or lack of ability to adapt hits one crop, there are big losses as there is no diversity to fall back on - especially dangerous at this time of climatic instability, to which industrial agriculture is a major contributor (see Hidden Facts on Industrial Agriculture p.29).

Despite the dominance of just a handful of companies monopolising the global food system, the vast majority of the world's population is still fed and nourished by small-scale farmers.[65] The International Assessment of Agricultural Knowledge, Science and Technology for Development (IAASTD) Global Report highlights that, in Africa, 90% of the agricultural production comes from these small farms.[66] The International Fund for Agricultural Development (IFAD) states that small-scale farmers produce 80% of the food in developing countries, and 65% of food for the population in the world.[67] Miguel Altieri quotes a similar figure: 33 million small (mostly female–run) farms in Africa, representing 80% of the farms on the continent, produce a "*significant amount of basic food crops with virtually no or little use of fertilizers and 'improved' (commercial) seed*".[68] GRAIN calculates that these farms cover 14.7% of the agricultural land in Africa, on average 2.2 hectares per farm.[69] The figures speak for themselves in terms of productivity.

Adding insult to injury, the global food system wastes one-third of the food it produces through its many inefficiencies – from petro-chemical-dependent industrial agriculture, to flying food around the planet, to transport, refrigeration, packaging, sell by dates and so on.[70] G20 ministers have admitted that "*food waste is a global problem of enormous economic, environmental and societal significance*".[71] There is enough food to feed the hungry now and into the future. Feeding the world is not a technical problem, it is a political and economic issue.

HIDDEN FACT: Industrial Agriculture is the Biggest Contributor to Climate Change[72]

In 2011, GRAIN produced a ground-breaking report which showed that the agro-chemicals used in industrial agriculture are themselves a major contributor to climate change, together with the related global agri-business food system. Chemical fertilisers and pesticides, petro-chemicals, are derived from fossil fuels, while others like potassium and phosphates are mined. These chemicals release potent greenhouse gasses such as Nitrous Oxide (N_2O) and Carbon Dioxide (CO_2)[73] into the atmosphere, because they kill soil micro-organisms and break down organic matter in the soil.

Agri-business, with its large-scale monocultures, also uses large amounts of fossil fuels. Chemical fertilisers and pesticides, fuel guzzling machinery for large plantations, as well as the transport, processing, storage, refrigeration, packaging and distribution of food around the planet, contributes between 44 to 57% of global carbon emissions.[74,]

HIDDEN FACT: Industrial Agriculture Strips Soil of its Life, resulting in massive Soil Erosion

Reports show that globally the soils on which food growing depends are seriously eroded, depleted and being lost at staggering rates due to industrial agricultural practices. Worldwide, industrial agriculture is depleting soil between 10 and 40 times the rate at which it can be naturally replenished.[75] This startling fact is compounded by an estimate that in 60 years the world's topsoil will be gone if we

63 FAO (2006), What is Happening to Agrobiodiversity? (Rome: FAO). Available at: http://www.fao.org/docrep/007/y5609e/y5609e02.htm

64 FAO (2006), What is Happening to Agrobiodiversity? (Rome: FAO). Available at: http://www.fao.org/docrep/007/y5609e/y5609e02.htm

65 IFAD (2013), Smallholders, Food Security, and the Environment (Rome: International Fund for Agricultural Development) p.6. Available at: http://www.unep.org/pdf/SmallholderReport_WEB.pdf

66 IAASTD (2009), Agriculture at a Crossroads: Global Report. (Washington DC: Island Press). p.8. Available at: http://www.unep.org/dewa/agassessment/reports/IAASTD/EN/Agriculture%20at%20a%20Crossroads_Global%20Report%20(English).pdf

67 Naerstad, A. (2012), 'Who Produces Our Food?' on the Agricultural Transition Website (Agricultural Transition). Available at: http://ag-transition.org/1769/who-produce-our-food/ See also IFAD (2013), The Adaptation Advantage: the Economic Benefits of Preparing Small-Scale Farmers for Climate Change. (Rome: International Fund for Agricultural Development), p. 6. Available at: http://www.ifad.org/climate/resources/adaptation_farmers.pdf

68 Altieri, M.A. (2008), Small Farms as a Planetary Ecological Asset: Five Key Reasons Why We Should Support the Revitalisation of Small Farms in the Global South (Penang: Third World Network), p.6. Available at: http://www.twnside.org.sg/title/end/pdf/end07.pdf

69 GRAIN (2014), Hungry for Land (Barcelona: GRAIN). Available at: https://www.grain.org/article/entries/4929-hungry-for-land-small-farmers-feed-the-world-with-less-than-a-quarter-of-all-farmland

70 The Guardian (2015), Food waste an enormous economic problem, say G20 ministers, 8th May 2015 (London: Guardian News and Media). Available at: http://www.theguardian.com/environment/2015/may/08/food-waste-an-enormous-economic-problem-say-g20-ministers See also: FAO. (2013), Food Wastage Footprint: Impact on Natural Resources, Summary Report (Rome: Food and Agriculture Organisation of the United Nations) p.6. Available at: http://www.fao.org/docrep/018/i3347e/i3347e.pdf

71 G20 Agriculture Ministers (2015), Final Comuniqué, 8 May 2015. Available at: http://www.g20.utoronto.ca/2015/150508-agriculture.html

72 Vermeulen, S.J., et al. (2012), 'Climate change and food systems' in Annual Review of Environment and Resources Vil.37, pp.195-222 (California: Annual Reviews).

73 Smith, K.A., McTaggart, I.P. and Tsuruta, H. (1997), 'Emissions of N20 and NO Associated with Nitrogen Fertilization in Intensive Agriculture, and the Potential for Mitigation' in Soil Use and Management, Vol.13, pp.296-304 (New Jersey: Wiley).

74 GRAIN (2011), Food and Climate Change: The Forgotten Link (Barcelona: GRAIN). Available at: http://www.grain.org/article/entries/4357-food-and-climate-change-the-forgotten-link

75 Crawford, J. (2012), 'What if the World's Soil Runs Out?' in Time, (Dec 2012). Available at: http://world.time.com/2012/12/14/what-if-the-worlds-soil-runs-out/

do not take action now.[76] The severity of the situation led the UN General Assembly to declare 2015 the International Year of Soils.[77]

Industrial single crop agriculture exhausts and erodes the soil because of excessive tillage and over application of chemical pesticides and fertilisers.[78] These agrochemicals kill the diversity of micro-organisms which live in the soil that breakdown organic material and aid plant growth. Chemicals can persist in the soil for years, effectively depleting the naturally occurring minerals, enzymes and vital microorganisms. It can take years before micro-organisms return to soils that have had toxic chemicals applied.[79] As soil structure is broken down through the use of agrochemicals, its water retention is reduced, further drying the soils and adding to loss of soil when it rains, thereby contaminating water systems.

The agro-toxins are taken up by the plants and the animals and humans who eat the plants. Different agro-toxins have different effects, increasing the risk of reproductive and developmental disorders, immune-system disruption, endocrine disruption, impaired nervous system function, and certain cancers.[80] The World Health Organisation (WHO) estimates that two thirds of the deaths which occur each year due to agrochemical poisoning are in developing countries, and this is likely to increase as the use of toxins is projected to grow.[81] Insects, such as pollinators like bees, which plants depend on, are killed too.

In contrast, micro-organisms responsible for the fertility of the soil - which occur naturally through decomposition and recycling of organic materials[82] - aid in the plant's absorption of essential nutrients, help soil store water and nutrients, regulate water flow, and filter pollutants.[83] Healthy plants rich in minerals, vitamins, enzymes and microbes from fertile soils provide essential nutrients for animals and humans.

It is the small-scale diversity-based farming practices which have stood the test of time, enriching rather than stripping the soils of fertility.

Public rally against GMOs. CIKOD, Ghana.

GMOs - Fooling or Feeding Africa?

Genetically Modified Organisms (GMOs) or the use of Genetic Engineering (GE) in agriculture involves moving a gene from one species and putting it into another species. The technique is imprecise and unpredictable, making the introduction of Genetically Modified (GM) plants and animals into agriculture highly controversial, with ethical, social, health and ecological implications.[84]

Agrochemical companies have invested substantially in the research and development of GM seed. They argue that any 'new GM organism' produced is their own invention, and therefore, they claim, it can be owned and patented. This same argument is used to justify forbidding farmers from saving GM seed for re-planting, because the company claims ownership of each generation. The companies also claim that wherever the patented gene appears, the crop belongs to them, even if it appears in crops because it was carried by wind or insects.[85]

Farmers may unknowingly save seed that has been contaminated with GM pollen.[86] There have been more than 100 cases where farmers have been sued by agrochemical companies because the company's patented gene appeared in their seeds, even though the farmer had not bought GM seed. Some farmers, like Percy Schmeiser, have been almost bankrupted by legal fees defending their right to protect their crops from contamination by corporate genes.[87]

The GM industry claims that it has the solution for feeding the world, especially for Africa. Yet facts show that food is

76 Arsenault, C. (2014), 'Only 60 Years of Farming Left if Soil degradation Continues' in Scientific American (London: Nature Publishing Group) Available at: http://www.scientificamerican.com/article/only-60-years-of-farming-left-if-soil-degradation-continues/
77 http://www.fao.org/soils-2015/about/en/
78 Lin, B. et al., (2011) 'Effects of Industrial Agriculture on Climate Change and the Mitigation Potential of Small-Scale Agro-ecological Farms' in Animal Science Review, ed. By David Hemming (Wallingford: CAB), p.72.
79 Krishnan, P. (2013), 'Impact of Pesticides on Soil', Presentation delivered for MSc in Environmental Science. Available at: http://www.slideshare.net/reddevil04/impact-of-pesticides-on-soil
80 WHO (2015), 'Toxic Hazards' on The Health and Environment Linkages Initiative Website (Geneva: World Health Organisation). Available at: http://www.who.int/heli/risks/toxics/chemicals/en/).
81 Ibid.
82 Rec.gardens.ecosystems (2013), 'Introduction to Soil Microorganisms' webpage. Available at: http://www.ibiblio.org/rge/faq-html/b-add.htm
83 Krishnan, P. (2013), 'Impact of Pesticides on Soil', Presentation delivered for MSc in Environmental Science. Available at: http://www.slideshare.net/reddevil04/impact-of-pesticides-on-soil
84 Say No to GMO (2014), 10 Reasons We Don't Need GM Foods (Say No to GMO). Available at: http://www.saynotogmos.org/10reasons_need.pdf
85 Friends of the Earth (2004), Briefing Note: Gene Flow (Brighton: Friends of the Earth). Available at: http://www.foe.co.uk/resource/briefing_notes/gene_flow_updatejan04.pdf
86 Ray, D.E. (2004), 'Monsanto vs. Percy Schmeiser: The Canadian Supreme Court Rules' in MidAmerica Farmer Grower, Vol.21(25), 18th June 2004 (Perryville, MO: MidAmerica Farmer Grower). Available at: http://agpolicy.org/weekpdf/202.pdf
87 The Gaia Foundation (2008), The Toxic Legacy of GMOs. Available at: http://www.gaiafoundation.org

not the primary purpose of GM crops being developed by the industry: "*Practically the entire area of GM crops planted globally today are soybeans, corn, canola and cotton. The first three are used almost exclusively to make cattle feed, car fuel and industrial oils for USA and Europe, while cotton goes into clothing*".[88]

Furthermore, such solutions for feeding the world ignore the amount of food waste globally, which is enough to feed 3 billion people.[89] On the basis of an estimated 793 million people starving worldwide,[90] there is food for the world's starving 3.8 times over.

According to Henk Hobbelink of GRAIN, "*Agribusiness wants us to believe that GMOs will feed the world; that they are more productive; that they will eliminate the use of agrichemicals; that they can coexist with other crops, and that they are perfectly safe for humans and the environment. False in every case. The reality is the opposite: GMOs are part of the problem, not part of the solution.*"[91]

Land grabbing: Biofuels, Speculation & Extractive Industries

FARM LAND GRABBING

In recent years, foreign investors have led a dramatic new wave of land acquisitions in Africa, at a rate and scale not seen since colonial times. More than 50 million hectares – an area more than double the size of Ghana - have been appropriated in the last decade for use in industrial agriculture, as financial investment, for mining and extractives, or for biofuel production.[92] Millions of people have been displaced as a result of this.

Land grabbing has been exacerbated by rising global food prices, the economic collapse in 2008 and by climate change events.[93] Wealthy countries in the Middle East and Asia, who are dependent on food imports, began acquiring large areas of fertile African agricultural land. Unprecedented droughts in Russia, Ukraine and the USA, affecting wheat supplies, further exposed the vulnerability of the global food system dependent on a few countries for the bulk of the supply of certain crops. Countries began the search for land to ensure that they could control their own production of food. Deals were done directly with host governments, for vast areas of land and the communities affected by them were dispossessed.[94]

Corporations also seek to control land for large-scale food production, as a commodity to sell on the global market. An estimated 10% of total global land grabbing can be put down to speculation.[95] European pension funds, for example, often look for investments that may take years or decades before they become profitable. It is estimated that $5-15 billion are already going into farmland acquisitions as large amounts of Africa are bought up cheaply and left idle, producing food for no-one, as speculators anticipate the value of the land to rise in the future.[96]

BIOFUELS LAND GRABBING

The search for energy alternatives is increasing as pressure to address climate change grows. Biofuels, extracted from crops (bioethanol from sugar or maize, biodiesel from soya, palm oil or jatropha), have been presented as the environmentally responsible alternative to coal, oil and gas. Growing enough of these crops to meet the vast international demand requires land, and lots of it, and Africa has been a major focus for biofuel investors.[97]

Contrary to claims from industry, biofuels are not 'carbon neutral' - they do not absorb the same amount of CO2 when growing as when they are burned as fuel, which means they are in fact a net contributor to carbon emissions.[98] The wave of biofuel- driven land grabbing has forced small-scale farmers, pastoralists and indigenous peoples off their land. It has destroyed forests, wetlands and grasslands. Some African governments have given supposed 'marginal lands' to investors; others have declared targets putting agricultural land aside for biofuel production.[99]

MINING AND EXTRACTIVES LAND GRABBING

Other drivers of land grabbing in Africa are the mining and extractive industries. Over the last decade prospecting has grown exponentially as the price of metals and minerals has rocketed, because materials are becoming more scarce. The

88 GRAIN (2013), GMOs: Fooling –er, "Feeding" the World for 20 Years, April 2013 (Barcelona: GRAIN), p.2. Available at: http://www.grain.org/article/entries/4720-gmos-fooling-er-feeding-the-world-for-20-years

89 Tristram Stuart, 'the Global Food Scandal' http://www.tristramstuart.co.uk

90 FAO (2015), The State of Food Insecurity in the World, Key Messages. Available atL http://www.fao.org/hunger/key-messages/en/

91 GRAIN (2013), Op.cit.

92 New Internationalist (2013), Infographic: Land Grabs, the Facts, May 2013 (Oxford: New Internationalist Publications). Available at: http://newint.org/features/2013/05/01/land-grabs-the-facts-infographic/

93 GRAIN (2008), Seized: The 2008 Landgrab for Food and Financial Security (Barcelona: GRAIN). Available at: http://www.grain.org/article/entries/93-seized-the-2008-landgrab-for-food-and-financial-security

94 Transnational Institute (2013) Op.cit.

95 New Internationalist (2013) Op.cit.

96 Friends of the Earth (2012), Briefing: Pension Funds and the Financing of Land Grabs (Brighton: Friends of the Earth). Available at: http://www.foe.co.uk/resource/briefings/pensions_and_land_grabbing.pdf

97 Gaia Foundation, Biofuelwatch, African Biodiversity, Salva La Selva, Watch Indonesia and Econexus (2008), Agrofuels and the Myth of the Marginal Lands. Available at: https://www.cbd.int/doc/biofuel/Econexus%20Briefing%20AgrofuelsMarginalMyth.pdf

98 Searchinger, T., Heimlich, R., Houghton, R.A., Dong, F., Elobeid, A., Fabiosa, J., Tokgoz, S., Hayes, D. and Yu, T.H. (2008) 'Use of US Croplands for Biofuels Increases Greenhouse Gases through Emissions from Land-Use Change' in Science, Vol.319, pp.1238 – 1240 (Washington DC: American Association for the Advancement of Science). Available at: http://www.whrc.org/resources/publications/pdf/SearchingeretalScience08.pdf

99 African Biodiversity Network, Ethiopian Centre for Consumer Protection & the Gaia Foundation (2010). Biofuels – A Failure for Africa. Available at: http://www.gaiafoundation.org

most concentrated deposits of minerals, metals and fossil fuels have been used up, therefore companies have been acquiring ever-larger amounts of land and use ever more destructive technologies and toxic chemicals to access the harder-to-reach deposits.[100]

African communities increasingly face the threat of new mining developments in their area, as governments liberally give prospecting titles and concessions. The extraction of metals, minerals, coal, oil and gas from the ground is accompanied by devastating ecological destruction, the toxic pollution of water, soil and air, deforestation, appalling working conditions, health problems, corruption and conflict - as outlined in the report "Undermining Agriculture".[101] The true cost of a few jobs for a few decades is the legacy of a toxic industrial wasteland left for generations to come.

Women are particularly impacted by land grabbing for mining activities - prevented from growing crops, or displaced from their land.[102]

The Green Revolution in Africa

The central justification for promoting a limited number of commercial high yielding crops, which require chemical inputs, is that they will provide food for the hungry.

The push by the Alliance for a Green Revolution in Africa (AGRA) is similar to the Green Revolution of the 1960-70s While initially there were large increases in yield in the countries in which the Green Revolution was first introduced (India, Pakistan, Mexico), the long-term costs have been enormous. The 1960s varieties of seed required chemical fertilisers, pesticides and water at very specific times or the yield was worse than traditional varieties. The benefit of increased yields came with ecological, economic and social consequences. The massive increases in the use of fertilisers and pesticides contaminated the water and soil. Many small-scale farmers could not sustain the purchase of all the inputs and had to sell their land to pay their debts.[103]

The current AGRA initiative includes training of African scientists in Green Revolution technology, and setting up marketing networks to promote commercial seeds, chemical inputs and credit schemes to the farmers. The major difference from the earlier Green Revolution is that now the seeds can be genetically modified (GM) and patented, while in the 1960s in India, seeds remained in the public domain.

Dried seeds. The Gaia Foundation.

Today, farmers who purchase patented seed are forced to buy them each season, because they are bred not to produce viable seeds for the next season. This puts cash and control into the hands of the corporations who provide the seed and the necessary chemical inputs. It is a privatisation offensive against small-scale farmers, who presently retain control over seeds in Africa. Aside from the financial implications, the loss of control over seed destroys the role of women custodians of seed diversity, with food security and nutrition at risk and vulnerable to climate instability. [104]

In Africa, of the seeds used for food crops by small farmers, 80% are still seed saved by farmers and locally exchanged with family and neighbours.[105] Farmers do not have to buy seed every season, with cash they do not have, for they possess a greater wealth in their remaining indigenous seeds and knowledge systems, freely shared and developed over centuries.

Currently, food in Africa comes from about 2,000 different plants (in contrast, the US food base derives mainly from 12 crops).[106] Narrowing the crop diversity of food reduces the variety of nutrients needed for human health; increases crop susceptibility to pathogen diseases; and minimises the parent genetic material available for future breeding.

The 'high yielding' commercial varieties being pushed across Africa have already reduced the rich diversity of farming systems wherever they have taken root. These commercial seeds are uniform and therefore cannot grow in the differing conditions across the continent, nor can they meet all of the

100 Sibaud, P. (2012), Opening Pandora's Box: The New Wave of Land Grabbing by the Extractive Industries and the Devastating Impact on Earth (London: The Gaia Foundation). Available at: http://www.gaiafoundation.org
101 The Gaia Foundation (2014), Undermining Agriculture: How the Extractive Industries threaten our Food Systems. Available at: http://www.gaiafoundation.org
102 Ibid. p.32.
103 Ibid.

104 Glaeser, B. (1987), The Green Revolution Revisited: Critique and Alternatives. (Oxford: Routledge), p.2.
105 Shiva, V. (1999), Monocultures, Monopolies, Myths and the Masculinisation of Agriculture in Development, Vol.42(2), pp.35-38 (Cambridge: The Company of Biologists).
106 Ashton, G. (2013), Is Africa About to Lose the Right to her Seed? (Barcelona: GRAIN). Available at: http://www.grain.org/bulletin_board/entries/4700-is-africa-about-to-lose-the-right-to-her-seed

diverse requirements of farming communities. Those farmers who do buy commercial seeds are finding that they are failing to produce as promised. (See Chapter 4, Women's Voices from the Fields). In Malawi, for example, which is often touted as a Green Revolution success story, short-term benefit of higher yields masks a net transfer from small-scale farming households to seed and fertiliser agribusinesses.[107]

Furthermore, AGRA's Africa Agricultural Status Report (2013) stated that "*there is growing public opposition to GM crops in Africa that is best described as a fear of the unknown*"; and gave the clearest indication to date of AGRA support for GM crops and their intention to use their influence to open African doors to patented GM crops.[108]

Most African governments have ratified the Biosafety Protocol, which allows them to delay research and production of GM food crops until they have gathered sufficient data about their impact on human health and the environment - and the perils of GMOs to environmental and social sustainability are well documented.[109] However, corporate interests are lobbying for governments to 'fast track' approval for new varieties, which would be for both GM and 'high yielding' commercial varieties.[110]

Corporate control of seed has already had an impact on the role of African women in agriculture. Commercial seed is heavily promoted as modern, progressive and productive. Traditional seeds are derided as primitive and unproductive. This directly undermines those women who are seed custodians. Their valuable knowledge is disregarded or ignored. Traditional seed diversity is eroding, and women are losing their role, status and respect in farming communities, and are turned at best into cheap labour to support the men.

Yet we have seen that small farming systems have not only sustained generations before now, but are still feeding the continent, using their traditional methods of enhancing seed and agro-biodiversity. The push for new commercial varieties at the expense of traditional models of cultivating diversity, is especially dangerous given the context of growing climate instability. Further erosion of Africa's seed diversity will make the continent's food production systems more vulnerable to climate change.

The Truth behind "Seed Harmonisation"

The latest threat to Africa's rich heritage of seed diversity comes in the name of "Seed Harmonisation Policies". A number of initiatives in Africa, such as AGRA and the New Alliance for Food Security and Nutrition (NAFSAN), are backing regional seed harmonisation policies which have been condemned by African small-scale farmer's movements and civil society networks as a 'new wave of colonialism'.[111]

These policies would cut small-farmers out of the seed producing system, and contradict the established "*rights of farmers to save, use, exchange and sell their farm seeds*", the original objectives of the International Treaty on Plant Genetics for Food and Agriculture (ITPGRFA).[112] Rural women, ousted from their role as seed custodians, could be criminalised if they exchange or sell seed.

Based on the 1991 Act of the International Union of the Protection of Plant Varieties (UPOV 1991) corporate control over African food systems will be increased through:[113]

- Making the access and privatisation of African germplasm easier for foreign interest groups;
- Providing very strong intellectual property protection, i.e. private ownership for corporate and commercial seed breeders;
- Preventing farmers from exercising their ancient right to freely develop, use, exchange and sell the seed they develop and save;
- Creating seed markets where only commercially "protected" varieties of seed are available to farmers;
- Shutting down farmer-managed seed systems and markets.

The harmonisation of seed policies are not being promoted one country at time, giving farmers and civil society the opportunity to challenge the accountability of their governments. Instead, these legal frameworks are being promoted through regional and sub-regional bodies – Southern African Development Community (SADC), Common Market for Eastern and Southern Africa (COMESA), OAPI (Organisation Africaine de la Propriete Intellectuelle), African Regional Intellectual Property Organisation (ARIPO).

The 'harmonisation' has little to do with food security and improving the lives of farmers,[114] but everything to do with allowing corporations unprecedented control over Africa's seed and food systems. According to Mariam Mayet of the African Centre for Biodiversity, it is "*a gross violation of (the)*

107 African Centre for Biosafety (2014), Running to stand still: Small-scale farmers and the Green Revolution in Malawi. Available at: http://www.acbio.org.za/index.php/publications/seedfood-sovereignty/467-running-to-stand-still-small-scale-farmers-and-the-green-revolution-in-malawi

108 The Guardian, 5th September 2013, GM Crops: African opposition is a farce, says group led by Kofi Annan. Available at: http://www.theguardian.com/global-development/2013/sep/05/africa-gm-genetically-modified-crops

109 Mentan, T. (2014), Africa: Facing Human Security Challenges in the 21st Century. (Bamenda and Buea: Langaa RPCIG), p.122.

110 Shiva, V. (2002), Genetic Modification and Frankenstein Foods, (New Delhi: Navdanya). Available at: http://www.navdanya.org/attachments/Genetic_Engineering2.pdf. See also: Friends of the Earth (2012), AGRA's Technology Push in Africa: Commentary by Mariann Bassey (Brighton: Friends of the Earth). Available at: http://www.foei.org/wp-content/uploads/2012/09/AGRAs-Technology-Push-in-Africa.pdf

111 African Centre for Biodiversity and SAFSC (2014), Glyphosate Must Fall Webpage. Available at: http://www.acbio.org.za/activist/index.php?m=u&f=dsp&petitionID=

112 GRAIN (2015), Seed laws that criminalise farmers: resistance and fightback

113 http://www.twnside.org.sg/title2/susagri/2012/susagri236.htm

114 International Convention for the Protection of New Varieties of Plants (1961), revised 1972, 1978, 1991. Available at: http://www.upov.int/en/publications/conventions/1991/act1991.htm

human and customary rights of African small farmers and communities".[115] These monopoly policies and laws violate the woman's role and responsibility and that of seed, as the universal symbol of life's creative and regenerative principle.

Ignoring the protests of their farmers and civil society networks, in July 2015 many African governments adopted a harmonised regional legal framework for the 'protection' of plant breeders' rights - the Arusha Protocol for the Protection of New Varieties of Plants (the 'Arusha PVP Protocol'). The Arusha PVP Protocol would effectively open up countries to commercial seed monopolies, while violating farmers' rights to save, use, exchange, replant, improve, distribute and sell the seeds they have developed over countless generations.

As explained by Elizabeth Mpofu from Via Campesina Africa, "*UPOV 1991-style PVP legislation may be a coup for the seed industry, but for farmers and indigenous people, it is a totally unjust and outrageous application of intellectual property*".[116]

The Alliance for Food Sovereignty in Africa (AFSA), a pan-African network of farmers and NGOs, is vehemently opposed. They vow to continue the struggle for seed sovereignty, including farmers rights - the original aim of the International Seed Treaty (ITPGRFA) - and the customary practices of small-scale farmers as upheld in the Organisation for African Unity (now African Union) Model Law.[117]

Africa's Changing Climate

Meanwhile, global warming is already affecting Africa and its impacts are set to grow.

The Intergovernmental Panel on Climate Change (IPCC) predicts that, "*the effects of climate change are expected to be greatest in developing countries in terms of loss of life and relative effects on investment and economy*"; it describes Africa as "*the continent most vulnerable to projected change*" where 14 countries are likely to be subject to water stress or water scarcity and "*a further 11 countries will join them in the next 25 years*".[118] Land areas may warm by as much as 1.6°C over the Sahara and over semi-arid regions of Southern Africa by 2050. In Southern Africa and parts of the Horn, rainfall is projected to decline by about 10 per cent by 2050. The west coast of Africa is currently affected by storm surges and is at risk from extreme storm events, erosion and inundation. With climate change, tidal waves and storm surges may increase and inundation could become a major concern.[119]

Loss of seed diversity and loss of soil is already being felt by African farmers as a result of climate change. Those farmers who buy commercial seed repeatedly report that when the rains come on time, in the right amount, and when they can afford fertilisers, the hybrid seeds that they have paid for may perform well; but in anything less than perfect conditions, the expensive commercial seeds fail. Instead, as the arrival and volume of rains in Africa become increasingly unpredictable, they find that the indigenous seeds – despite being told they were inferior - are productive in a diversity of challenging conditions. These locally adapted seeds, bred by farmers over millennia, ensure they can eat and make a living in times of climate change.

Women and their communities, who are able to nurture seed diversity therefore have a critical role to play in bringing back their varieties before the last elders with the seeds and knowledge pass away. This is our collective responsibility to future generations in Africa now - to ensure the children of today have the seed diversity and the associated traditional knowledge which they will need to carry them into an unstable future.

As described in Chapter 1, traditional seed diversity and related knowledge are inextricably inter-connected, and have co-evolved with each other through sophisticated local farming practices and seed selection, saving and sharing over millennia. Central to these traditions is an understanding that healthy food systems depend on healthy ecosystems.

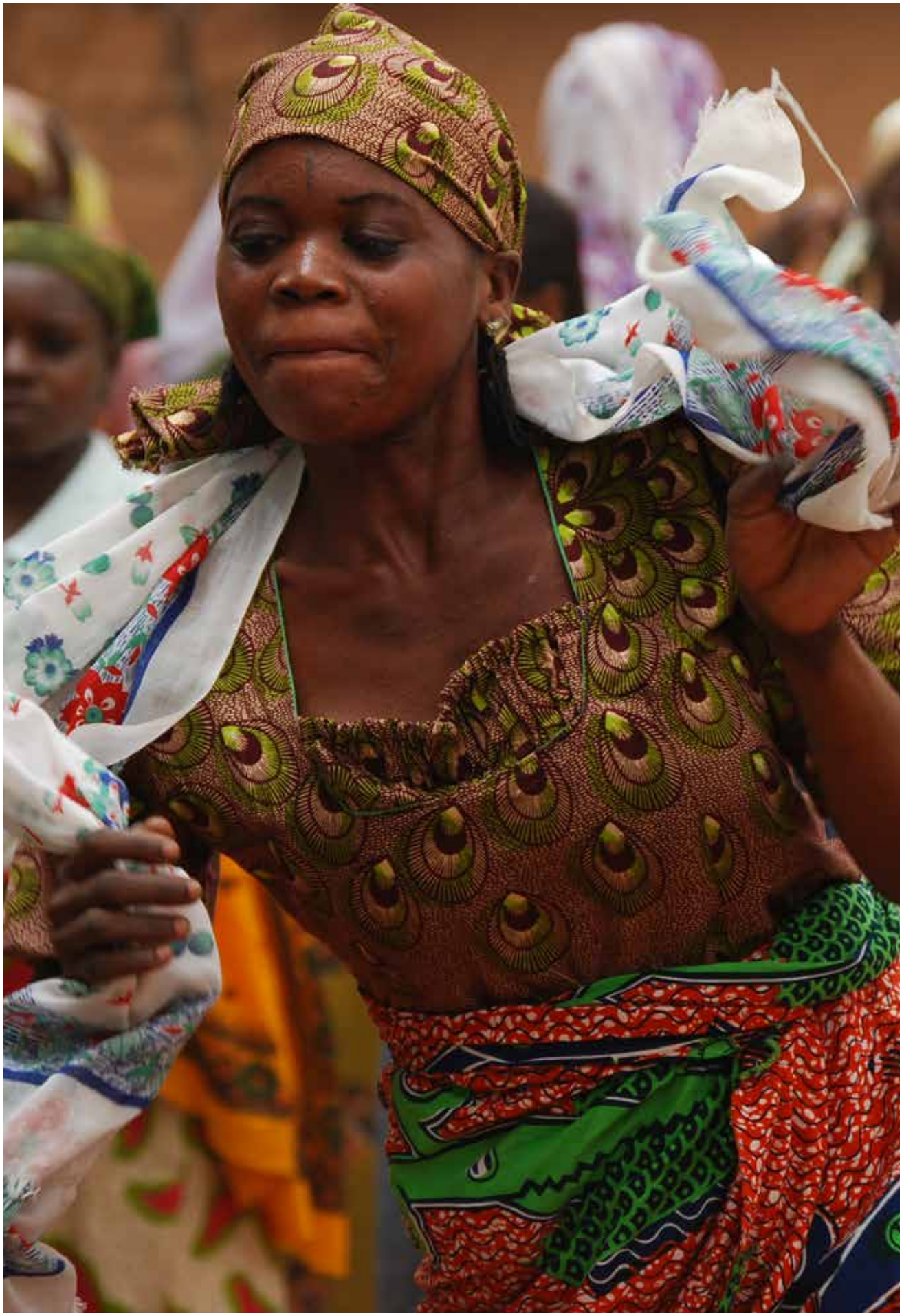
Women have been the primary custodians of seed diversity and related knowledge in most African farming traditions. When this interplay between people and their environment is lost, because the knowledge erodes or the seeds are lost, it is the women and their household food sovereignty which is most impacted.

115 Mayet, M. (2012), Harmonisation of Africa's seed laws: death knell for African seed systems (Johannesburg: African Centre for Biodiversity). Available at: http://acbio.org.za/harmonisation-of-africas-seed-laws-death-knell-for-african-seed-systems/
116 Ibid.
117 African Union (2000), African model legislation for the protection of the rights of local communities, farmers and breeders, and for the regulation of access to biological resources (Addis Ababa: African Union). Available at: https://www.cbd.int/doc/measures/abs/msr-abs-oau-en.pdf
118 IPCC (2007), Impact, Adaptations and Vulnerability in 4th Assessment Report (Geneva: IPCC) Available at: https://www.ipcc.ch/publications_and_data/ar4/wg2/en/ch9s9-es.html
119 Ibid.

Key Messages

on Undermining Women's Role in Agriculture & the Community

- **Traditionally women's knowledge has given them status in their community because of the central roles they play in the food system, spiritual practices and governance.** Respect for rural women has been severely undermined by a number of factors and their practical ecological knowledge is devalued. What we see today of women's traditional knowledge is a fragment of what used to be, because it is hidden, lost or ignored.
- **Colonialism brought with it Victorian views about women** - that they were best suited to domestic issues, while men did the more serious work of economics and politics. Pre-colonial **governance structures were replaced by a hierarchical, male dominated system, which marginalised women**. The knowledge and role of women has continued to be undermined, from post-colonial independence and industrialisation to corporate globalisation.
- Cash crops were introduced mainly to men, to provide for export markets, further marginalising women in agriculture. **Women's role as seed custodians was eroded further, diminishing their social standing and leadership in agriculture and in the community.**
- Free trade policies have enabled foreign corporations and their goods and services to undercut local produce and skills, intensifying the deskilling process. This has created **greater dependency on foreign interventions and supplies**, as well as creating conditions for poverty, as **local food systems and economies began to unravel**.
- As the commercial seed and chemical inputs of industrial agriculture and the Green Revolution began to make inroads into rural areas, so **soil and water toxification and depletion, loss of diversity, vulnerability to climate change and hunger have increased**.
- The 1990s saw the introduction of Genetically Modified Organisms (GMOs), the patenting of genetically modified seeds, and the push for commercial interests to own and control seed. Inspite of protests from farmers movements and civil society, **African Governments are adopting a 'harmonised' regional framework, to enforce seed monopoly laws**, enabling agro-chemical corporations to control Africa's seed system. This will **criminalise those who save, sell and exchange seed**, destroying the ancient role of women as custodians of seed, developed since the beginning of agriculture.
- The **global food system is controlled by a handful of agro-chemical companies and contributes up to 57% of the global greenhouse gas emissions**, which cause today's climate change. This same system strips the soils of fertility, destroys diversity-based traditional farming systems, and reduces capacity to sequestrate (absorb) carbon for mitigating climate change.
- Africa is experiencing a second major scramble for land - biofuels for energy, farm land grabbing to feed speculative markets, and the extractive industry to feed the insatiable hunger for energy and technology from the industrial growth economy. **Community lands are especially vulnerable, and women are again directly impacted**.
- Inspite of this onslaught, **small-scale farming - primarily the domain of women- still produces 80% of the food consumed in Africa on just 14.7% of the agricultural land**, demonstrating their productive capacity.



Resilience workshop, Zoosali, Ghana. Ruth Leavettt for The Gaia Foundation.

3. Restoring Women's Traditional Knowledge & Leadership for Resilience

Food Sovereignty: Asserting Small Farmer's Right to Flourish

Food Sovereignty is the right of peoples to healthy and culturally appropriate food produced through ecologically sound and sustainable methods, and their right to define their own food and agriculture systems.[120]

La Via Campesina, the International Peasant Movement for Food Sovereignty, has been growing over the last 20 years, igniting hope and solidarity amongst small-scale farmers the world over. It is one of the world's largest and most important transnational social movements. La Via Campesina's vision is "*to keep people on the land, producing food and culture, and building viable communities*".[121]

Since 2014 its International Operative Secretariat (IOS)has been hosted in Africa, because of the movement's concern that "*The transnationals have their eyes on (Africa). We extend solidarity…to stop this recolonization and choose a development path that will actually benefit the African people and peasants*".[122] The current General Secretary, Elizabeth Mpofu, based in Zimbabwe, is proud to be a farmer and agrees that "*It is necessary to raise the social standing and acceptance of small farmers in Africa, after all it is small farmers who provide a good and secure supply of food for all of the population*", inspite of the prejudice against them.[123]

The Food Sovereignty Movement emerged in response to the crises facing the world's farmers and food systems. It was evolved by farmers from the Global South, and recognises the contribution of indigenous peoples, pastoralists, forest dwellers, workers, fisher people and especially women, to the food system.[124]

The ethos of Food Sovereignty is that food should be produced in a culturally and ecologically acceptable manner. This is how traditional farming systems have regenerated their soils, water, biodiversity and local climatic conditions for generations. It recognises the vital role of traditional farming knowledge and farmers' diverse seed varieties as the basis of current and future agriculture.

Importantly, **Food Sovereignty provides a framework for reviving the role of women as Africa's primary seed custodians**, recognising "*the fundamental role played by women in guaranteeing Food Sovereignty*".[125] It is also an important part of the wider social movement responding to corporate control, exercising their right and responsibility to produce food to feed the world. In other words, "*citizenship in the context of locally determined food systems is claimed, and*

120 Declaration of Nyéléni, 27 February 2007. Available at: http://nyeleni.org/IMG/pdf/DeclNyeleni-en.pdf

121 Desmarais, A.A. (2007), La Via Campesina: Globalisation and the Power of Peasants (London: Pluto Press).

122 La Via Campesina, Press release, 13 June 2013. Available at: http://viacampesina.org/en/index.php/our-conferences-mainmenu-28/6-jakarta-2013/1427-la-via-campesina-international-passes-on-the-torch-to-africa

123 La Via Campesina, Press release, 12 February 2015. Available at: http://viacampesina.org/en/index.php/main-issues-mainmenu-27/women-mainmenu-39/1739-be-proud-to-become-a-farmwoman-say-elizabeth-mpofu

124 Food Sovereignty (2014), Declaration of Civil Society Organisations at the 29th FAO Regional Conference for Europe and Central Asia (International Planning Committee for Food Sovereignty). Available at: http://www.foodsovereignty.org/declaration-civil-society-organizations-29th-fao-regional-conference-europe-central-asia/

125 La Via Campesina (2015), Women's Struggle: for Food Sovereignty; Against Violence and Agribusiness (Harare: La Via Campesina). Available at: http://viacampesina.org/en/index.php/main-issues-mainmenu-27/women-mainmenu-39/1752-women-s-struggle-for-food-sovereignty-against-violence-and-agribusiness

rights are realised through the agency and actions of people themselves".[126]

In 2011 the Alliance for Food Sovereignty in Africa (AFSA) was launched, bringing together the different regional social movements, networks and alliances from across Africa. One of their **major priorities is the revival and recognition of African women's knowledge and role in agriculture**; as well as resistance to the monopoly seed laws and genetically engineered crops being imposed across the continent.

Pillars of Food Sovereignty

The first six pillars were developed at the International Forum for Food Sovereignty in Nyéléni, Mali, in 2007. The seventh pillar – Food is Sacred - was added by members of the Indigenous Circle during the People's Food Policy process.[127]

1. **Focus on Food for People:** Puts people's need for food at the centre of policies; Insists that food is more than just a commodity.
2. **Building Knowledge and Skills:** Builds on traditional knowledge; Uses community research to support and pass this knowledge to future generations; Rejects technologies that undermine or contaminate local food systems.
3. **Works with Nature:** Enhances ecosystem resilience, on which food systems depend; Improves resilience food systems through agroecology which mimics nature, including sequestrating CO_2 into soils; Cultivates diversity as nature does, especially seed diversity, important for climate change resilience.
4. **Valuing Food Providers:** Supports sustainable livelihoods; Respects the work of all food providers.
5. **Localising Food Systems:** Reduces distance between food providers and consumers; Rejects dumping and inappropriate food aid; Resists dependency on remote and unaccountable corporations.
6. **Putting Control Locally:** Places control in the hands of local food providers; Recognises the need to inhabit and to share territories; Rejects privatisation.
7. **Food is Sacred:** Recognises that food, and the seed it comes from, is a gift of life, and not to be squandered; Asserts that food and seed cannot be privatised or commodified.

126 Pimbert, M. (2011), Supporting Locally Determined Food Systems: the Role of Local Organisations in Farming, Environment and People's Access to Food in Leisa India Vol.13(3). Available at: http://pubs.iied.org/pdfs/G00464.pdf

127 http://foodsecurecanada.org/who-we-are/what-food-sovereignty and http://foodsecurecanada.org/sites/default/files/peoplesfoodpolicyprocess.pdf

Agroecology: an Ecologically and Socially Just Approach to Agriculture

Agroecology is a central dimension of Food Sovereignty and describes the whole food system linking production with the food chain and consumers. It applies ecology to the design of farming systems; uses a whole-systems approach to farming and food systems; and links ecology, culture, economics and society to create healthy environments, food production and communities.[128]

The practice of agroecology recognises that farming needs to keep regenerating the ecological foundations on which food production depends: fertile soil and nutrient cycles, good water supply, suitable and diverse crop varieties, and other factors that keep farmland and the wider ecosystem healthy for generations to come. It values diverse, polycultural systems; avoids the use of chemical fertilisers, pesticides, hybrid or GM seeds; and values more than crop yields.

By nurturing the fundamental ingredients for maintaining healthy ecosystems, agroecology produces good yields as well as the long-term health and resilience of the system, including human communities. This contrasts with an industrial agriculture approach that considers only yield, while undermining the fundamental ecological and social conditions on which agriculture depends.

For agroecology, the health of soil, seed and water are fundamental. Key principles that underlie agroecological farming practices are:

- Regenerating soils by enhancing the recycling of biomass, optimising nutrient availability and balancing nutrient flow.
- Securing favourable soil conditions for plant growth, particularly by managing organic matter, ground cover, and enhancing soil biotic activity.
- Minimising losses of solar energy, air and water by way of microclimate management, water harvesting and soil management through increased soil cover.
- Species and genetic diversification of the agro-ecosystem in time and space.
- Enhancing beneficial biological interactions and synergies among agrobiodiversity components, to promote key ecological processes.
- Practices which enable the soils to capture carbon dioxide (CO_2), from the air into soils, year after year.

Importantly, **agroecology builds on the accumulated knowledge and practices which farming cultures have built**

128 More and Better (2011), A Viable Food Future, (Rome: More and Better). Available at: http://www.moreandbetter.org/en/news/a-viable-food-future

Harvesting beans, Shashe Agro-Ecological School, Zimbabwe. The Gaia Foundation.

up over centuries, adapting to their particular ecological and climatic conditions. It **recognises the fundamental resilience of traditional farming systems and their rich ecological knowledge, especially those of women as cultivators of seed diversity** in most traditions.

Agroecology draws on a range of approaches, bringing together traditional and modern innovations, rooted in the same values. "*Agroecology has been practiced for centuries and it represents more than production of food. It is a way of being, a way of life that respects the environment, and provides livelihoods and income to the food producers in which women play a central role*" (Declaration of the Forum of Agroecology).[129]

The principles of small scale agroecological farming systems are to enhance local ecological conditions and cultural knowledge and practices, rather than create dependency on external commercial inputs.

A 2010 report to the UN Human Rights Council from Olivier De Schutter, the UN Special Rapporteur on Food, announced a review of 40 projects in 20 African countries, which switched to regenerative agroecological farming methods. They found that crop yields more than doubled over a period of seven years on average.[130] A UN Food and Agriculture Organisation (FAO) report in 2013 demonstrated that organic agriculture increases the resilience and sustainability of African farmers by restoring the ecological conditions for farming for generations to come.[131]

"*Compared to large-scale single crop industrial agriculture, small-scale agroecological farming not only uses less fossil fuel, but has the potential to capture (sequester) all of the current CO_2 emissions*", according to the Rodale Institute amongst others.[132] Citing 75 studies from peer-reviewed journals, including its own 33 year Farm Systems Trial, Rodale Institute concluded that if all cropland was converted to the regenerative model it would sequester 40% of annual CO_2 emissions; changing global pastures to this model would add another 71%, effectively overcompensating for the world's yearly carbon dioxide emissions'.[133]

This means that agroecological farming systems could actually reverse climate change, while feeding the growing population with nutritious healthy food, and providing meaningful livelihoods for millions of people.[134]

However, as outlined in Chapter 2, with large-scale industrial agriculture and agrochemical companies gaining more political control and influence, it is increasingly difficult for small farmers to stay on their land and to enhance the seed diversity they need to produce food and mitigate climate change. As Ryan Zinn writes "*without safeguards and support (for small farmers), we are putting both the global food supply and combatting climate change at risk*".[135]

129 Declaration of the International Forum for Agroecology (2015). Available at: http://www.foodsovereignty.org/forum-agroecology-nyeleni-2015/

130 UNHRC (2011), Farming Can Double Food Production in 10 Years (Geneva: United Nations Human Rights Council). Available at: http://www.srfood.org/images/stories/pdf/press_releases/20110308_agroecology-report-pr_en.pdf

131 Auerbach, R., Rundgren, G., Scialabba, N.E. (2013). Organic Agriculture: African Experiences in Resilience and Sustainability. FAO Rome 2013. Available at: http://www.fao.org/docrep/018/i3294e/i3294e.pdf

132 Rodale Institute (2014), Regenerative Organic Agriculture and Climate Change (Kutztown, PA: Rodale Institute). Available at: http://rodaleinstitute.org/regenerative-organic-agriculture-and-climate-change/

133 Molla, R. (2014), 'Can Organic Farming Counteract Carbon Emissions?' in The Wall Street Journal (New York: News Corp). Available at: http://blogs.wsj.com/numbers/can-organic-farming-counteract-carbon-emissions-1373/?mg=blogs-wsj&url=http%253A%252F%252Fblogs.wsj.com%252Fnumbersguy%252Fcan-organic-farming-counteract-carbon-emissions-1373%252F

134 Zinn, R. (2015), Food, Farming and Climate Change: It's Bigger than Everything Else (Barcelona: GRAIN). Available at: https://www.grain.org/bulletin_board/entries/5196-food-farming-and-climate-change-it-s-bigger-than-everything-else

135 Ibid.

Dr. Sue Edwards is Director of the Institute for Sustainable Development (ISD), based in Addis Ababa, Ethiopia. Over the last two decades, ISD has accompanied farming communities across the Tigray region of northern Ethiopia to restore their badly degraded environments through processes such as composting, and water and soil conservation - a remarkable story of implementing agroecological practices and taking them to scale.

"The Tigray Project started in 1996 with four local communities in the central, eastern and southern parts of Tigray region. Dr Tewolde Berhan Gebre Egziabher, then leading the development of the Conservation Strategy and Environmental Policy for Ethiopia, had been asked to design a programme that could be promoted among farmers living in degraded areas - to improve the productivity of their land and rehabilitate their environments, while at the same time contributing to carbon sequestration and adapting agriculture to climate change.

Agriculture is at the heart of Ethiopia's very diverse traditions. For millennia, farmers had been using traditional systems of fallowing, crop rotations, manure and wood ash to maintain soil fertility and their crop yields. We know that crop cultivation and breeding had been taking place here for at least 5000 years. In more recent history, Ethiopia's political interventions destabalised many of these traditions, leading to both ecological and cultural erosion.

Since 1995, the National Extension Intervention Programme was promoting increased food crop production by campaigning to get farmers to use chemical fertiliser along with high yielding varieties of seed, offering credit schemes and subsidised prices. In 2002, many parts of the country were hit by severe drought. Yields were hit badly and some crops failed completely. The crop failure left many farmers indebted to the credit schemes. In addition, in 2004, the Ethiopian Seed Agency began to promote and distribute seeds of high yielding crop varieties, and this was causing rapid erosion of farmers' varieties in some parts of the country.

The Tigray Project set about to find out if a community-based ecological approach to rehabilitate the land and improve crop production could both reverse land degradation and improve the livelihoods of poor smallholder farmers. A 'basket of choices' was designed to build on the respective local community's own traditional systems of farming and land management, with some selected additions from field-tested traditional and scientific knowledge. These included making and using compost to restore soil fertility, to sequester carbon, and to avoid getting into a debt trap by buying chemical fertiliser on credit; digging trenches for catching both water and soil along field boundaries; planting small multipurpose trees (particularly Sesbania sesban), local grasses and legumes on the mounds; and drawing on customary laws to make bylaws to control access to and use of local biodiversity, including restrictions on free range grazing by domestic animals.

Working with women-headed households was central to the project. Tigray has a high number of women-headed families because of the long civil war that ended in 1991. Traditionally women should not handle plough oxen and they therefore have to wait to have their land ploughed by a male relative or neighbour. This puts the single woman at a double disadvantage - her fields are planted later, and each day's delay in sowing reduces the final yield. A few women had taken up ploughing their own fields, generally at a social cost, with ridicule and ostracism levelled at them by their neighbours and relatives. ISD decided to find out if supplying women with seed of spices, which are high value crops, could help these women to increase their income, and counteract their disadvantages elsewhere. It was a great success. These women grow and sell the spices and get sufficient income to buy food and clothing for their families.

Just two years after the project's inception, data from four communities showed that using compost gave similar yield increases as the use of chemical fertilizer, and we knew we were on the right track! Without the financial burden of taking chemical fertiliser on credit, several farmers, including women-headed families, were able to improve their houses, buy chickens, milk cows, and beehives. By 2008, the official crop sample survey of Ethiopia for that crop year, showed that 86% of the nearly 700,000 farmers in Tigray were using natural fertilizer on nearly 200,000 hectares. Soil erosion in the region had been reduced by over 60%. The Tigray Project has now expanded throughout Ethiopia, and ISD is working with the Ministry of Agriculture and Rural Development. The approach recognises and builds on the local knowledge and practices of the farming communities."

Photo: Dr. Sue Edwards, Ethiopia.

Community Ecological Governance workshop - eco-cultural mapping, in Venda region, South Africa. The Gaia Foundation.

Community Ecological Governance: an Holistic and Inclusive Approach to Restoring Women's Rights and Responsibilities

Over the last decade a network of communities across Africa have been exploring ways to revive and enhance their complex traditional knowledge and practices and their related governance systems – and to restore food sovereignty based on agroecological principles.

Community Ecological Governance has become the term used for this approach to working alongside communities to: i) revive and protect indigenous knowledge, seed and food systems, sacred natural sites, and the community governance systems they underpin; ii) promote the passing of knowledge between generations; iii) restore and affirm confidence - especially among women; iv) re-weave respectful relationships within the community and with their ecosystem, back into a healthy and vibrant whole.

This holistic and inclusive approach is inspired by work developed together with indigenous communities in the Colombian Amazon during the 1990s, which resulted in them successfully reclaiming control of their territories and local governance, rooted in traditional knowledge and practices.

Through exchange visits between Africa and the Amazon, and trainings in core methodologies, the path to Community Ecological Governance has been piloted in a number of rural communities across Africa - supported by The Gaia Foundation, the African Biodiversity Network and partners.[136]

Central tenets for re-building Community Ecological Governance are that:

- Women play a central role in most farming traditions across the continent.
- Their role has been systematically undermined by each new wave of colonisation generated by the globalisation process, so that what we see today reflects a fragment of their true knowledge, capacity and responsibility.
- Communities know what is best for them and can find their own solutions, when they have the space and support to analyse their situation and reflect deeply enough, so that they can rebuild their lives from the foundation of their own rich heritage of knowledge and practice – but after decades of being undermined, it takes time to rebuild.
- Indigenous and traditional knowledge and governance is a holistic and interconnected system, mediating the dynamic interplay between the environment, the human community and the spiritual world, to maintain resilience over generations – the work is to restore these systems.
- A vital aspect of this work of regeneration is community peer learning exchanges, to enable communities to build a movement for transformation, to hold power to account and advocate for the necessary systemic changes required to support a just transition.

136 Partner organisations in Ethiopia, Uganda, Benin, Kenya, South Africa, Ghana, Zimbabwe. For more information, see http://www.gaiafoundation.org/communities-ecosystems-governance

Gathering of African Sacred Natural Sites Custodians. The Gaia Foundation.

Women and their communities are being accompanied to strengthen their Community Ecological Governance. In East, West and Southern Africa, stories of change are being documented (See Chapter 4, Women's Voices from the Fields), as they adopt innovative, inclusive and practical strategies to revive and celebrate their traditional knowledge of seed and agriculture.

To follow, some of the guiding principles, steps and achievements are unpacked.

Inter-generational and all-inclusive

Globally, there is growing recognition that indigenous and traditional cultures have a wealth of knowledge and capacity for navigating the challenges of climate change.[137] This is the foundation from which communities can build a viable future in the context of climate change, and exorcise the dependency syndrome that has especially plagued Africa since the colonial disruption of its ancient heritage.[138]

The path to Community Ecological Governance acknowledges the disruption and fragmentation that communities have suffered, and appreciates that communities need time to revive and enhance their traditional indigenous knowledge and practices, to adapt to the present context, and to restore their roles and their confidence in themselves and their heritage.

Traditional complementary roles and responsibilities of women and men in agriculture and in governance, within the household and the community, need to be re-forged in the new context in which we now live, rooted in the strengths and knowledge of each.[139]

Knowledgeable elders, both women and men, are at the core of this approach - they are the cornerstone for reviving knowledge, seed diversity, land and community governance. Elders have experienced the greatest change within the community and they hold the ecological, cultural and practical knowledge and memory. They are the 'living memory' of the community traditions, passed on to them through an unbroken intergenerational transfer of knowledge, until now. The work of the current generation is to ensure this continuity is not broken.

The involvement of young people, girls and boys, is also critical, because the complex and holistic nature of traditional knowledge systems needs to be learnt through experience and practice, from a young age. This is how indigenous knowledge has been generated and transferred over millennia. Young people bring important new skills such as documentation and translation, but the written word cannot replace hard-earned practice, through which knowledge becomes embedded.

Reclaiming Knowledge and Leadership

As seen earlier in this report, women's knowledge of medicinal plants, wild foods and nutritious indigenous

137 Raygorodetsky, G. (2011), Why Traditional Knowledge Holds the Key to Climate Change (Geneva: United Nations University). Available at: http://unu.edu/publications/articles/why-traditional-knowledge-holds-the-key-to-climate-change.html

138 Maathai, W. (2011), An African Future: Beyond the culture of Dependency (London: Open Democracy). Available at: https://www.opendemocracy.net/article/an-african-future-beyond-the-culture-of-dependency.

139 The Gaia Foundation (2015), Climate, Seed and Knowledge (London: The Gaia Foundation). Available at: http://www.gaiafoundation.org

GUEST INTERVIEW

Dr. Fassil Gebeyehu, from Ethiopia, from Ethiopia, worked for many years with the Institute for Sustainable Development (ISD) and focused his PhD thesis on the Social Life of Seeds. He coordinates the Community, Seeds and Knowledge thematic area of the African Biodiversity Network, and shares his experience of reviving ecological knowledge with his home community, Keyarata.

Fassil and the Institute for Sustainable Development (ISD), supported by the African Biodiversity Network and the Gaia Foundation, held a series of community dialogues in Keyarata. The local farming population began to analyse what had happened to their land and to the surrounding watershed area of 3,000 hectares, and started mapping the future they wanted to see. It soon became a flagship example of the transformative power of strengthening Community Ecological Governance. Furthermore, simple soil and water conservation methods, seed revival, tree planting, and diversified farming practices, gave the landscape a new lease of life...

“Every morning and night the community would gather for a coffee ceremony. An elder conducted the ceremony and each member of the village would gift some food. While many such traditional social customs still hold strong, much of the ecological knowledge which helps to guide the communities practices around land and seed had been eroded. Population pressures on the land, and external influences such as religion and western education systems were undermining the indigenous knowledge systems of the farming community of Keyarata. This had resulted in a loss of confidence in traditional practices, and was reflected in the landscape with a loss of seed, of tree vegetation - particularly fruit trees - and extensive soil erosion.

The first thing that we did was take some of the farmers and local authorities to Tigray, in the northern part of the country, where a successful watershed management and landscape regeneration was already underway. This farmer-to-farmer exchange inspired the community to restore their landscapes and together we began a process of dialogues stimulating knowledge revival, and then practical approaches to regenerate the land.

To address the severe soil erosion from depleted tree cover and over-grazing, the community first started terracing their land. They planted trees along the terraces so that the roots would secure the soil. The trees give nourishment to the soil and foliage cover for protection in the long term. Once the forest cover is sufficient, the land beneath it regenerates quickly and grasses begin to grow.

Before 2005 there was just 6% forest cover in the woreda (or district) of Keyarata. We tripled this to 18% in just a year by planting a mixture of indigenous trees, some fruit bearing. Those who planted fruit trees gained new livelihood options and in selling the fruit they could then buy oxon and sheep. Across the watershed, more than 18,000 farmers benefitted - some with fruit trees, some with other agricultural or livelihood improvements. Beekeeping was another area where traditional skills were revived. By 2007 there were 452 modern hives, and 6441 traditional ones.

Agroecological methods, such as capturing water running off roofs, channelling water which is running down the hillside into water holes and irrigating the land, all played a vital part in this process of working with the land. Small wells were dug. The farmers have unrivalled knowledge of the landscape, they know exactly where there are underground sources of water. Their knowledge had not been completely lost, but their confidence in it had been. This is why community dialogues were key - a critical step in restoring biodiversity, seed diversity and fertile soils through building back confidence and teasing out ecological understanding from those who are most knowledgeable.

When it comes to seed in Ethiopia, there are different levels of knowledge; not everyone knows about seed. The depths of knowledge differ from person to person, usually relating directly to age and to gender, but it is women who are by far the most knowledgeable. Women are responsible for selecting the seed from the field or haystack, and they know exactly how much seed should be stored and where, depending on the seeds moisture content or dryness. Whenever the dialogues veered towards seed identification within the community, it was always the women who could tell me. The husbands would simply say ‘ask my wife!’

Through community dialogues and rebuilding the confidence in traditional farming and land practices, over 6000 small farmers diversified their means of livelihood and restored their previously degraded landscape.”

Photo: Fassil Gebeyehu, Ethiopia.

Zoosali, Ghana. Ruth Leavett for The Gaia Foundation.

crops have, in most traditions, formed an inextricable part of their role in nurturing the family and the community. As custodians of seed diversity, women also play an important and often central role in the spiritual practices, which guide and govern the community as a whole. When their knowledge is undermined, so is their role, and thus women have increasingly lost their space in the home, the community and the governance system.

Through reviving both women's knowledge and the complementary knowledge of men, their roles and responsibilities are clarified and begin to be restored. This instills confidence and respect in the home and in the wider community; and fosters a greater sense of gender parity in critical areas of decision-making.[140] As knowledge and respect are restored, so the dynamics between women and men, and elders and young people, begins to transform.

It is from their rich heritage that women can regain their authority and play their role in defending their rights and responsibilities, and those of their communities, to govern their lives and protect their lands to ensure a viable future for their children.[141]

In communities where this work to strengthen Community Ecological Governance has taken root, women have restored their governance systems and leadership roles of women at many levels. In Kenya's Kamburu community, men returned land they had taken for cash crops to women, as they realised women's important role in producing healthy food for the family, the community and the ceremonies.[142] In Venda, South Africa, chiefs handed over communal land to women to grow food crops such as millet and sorghum, and to increase the supply of indigenous seeds for the community.[143]

In communities across South Africa, Uganda, Kenya, Ghana and Benin, there is increasing evidence of women's leadership and their essential role - from protecting sacred natural sites, to carrying out seasonal ceremonies for food security - being recognised and restored.[144,]

Weaving Bio-Cultural Systems back to Life

Community Ecological Governance unfolds in communities in different ways. Some will be more concerned initially about their seed and food system; others about their livelihoods, landscape, water supplies or sacred natural sites. Everything is interconnected, and ultimately the process and the different tools which communities learn to use, leads to the reintegration of the whole bio-cultural system - the basis of social and ecological transformation and resilience.

Given the pressures communities are under, there will always be challenges, but these processes enable them to build on structures and knowledge which are part of their heritage and identity.

Organisations and groups which accompany communities in this holistic process, usually need to unlearn what they have learnt about community development and avoid arriving

140 UNFCC (2013), Best practices and available tools for the use of indigenous and traditional knowledge and practices for adaptation, and the application of gender - sensitive approaches and tools for understanding and assessing impacts, vulnerability and adaptation to climate change. (New York: United Nations Framework Convention on Climate Change). Available at: http://unfccc.int/resource/docs/2013/tp/11.pdf

141 UNESCO (2009), Learning and Knowing in Indigenous Societies Today, ed. by Bates P., Chiba, M., Kube, S. and Nakashima, D, (Paris: UNESCO). Available at: http://unesdoc.unesco.org/images/0018/001807/180754e.pdf

142 Phillimore, J. (Dir.) (2009), The Kamburu Story. Available at: https://vimeo.com/7096771

143 The Mupo Foundation reports that Chief Tshidzivhe in Venda, South Africa allocated land to women to increase the supply of sorghum and millet seed to his community and others who had lost these seeds.

144 Field reports from partner organisations document the re-emergence of women's leadership roles, such as: in Venda, South Africa, and Tharaka, Kenya, where clan constitutions recognise the central role of women; or Ghana, where Queen Mothers have been officially recognised as traditional leaders custodians of sacred natural sites. See also: Phillimore, J. (Dir.)(2012) Sacred Voices. Available at: https://vimeo.com/49006743

with pre-conceived solutions. It demands a different way of working with communities - opening spaces for elders, youth, women and men to analyse and reflect on their situation, take the lead, identify barriers and their own priorities. In this way communities learn that they have the solutions and do not need to depend on outside help. They learn to assess what they feel they need from the others, and search for allies to assist on their own terms.

Community Dialogues - with knowledgeable elders at the centre

Community dialogues are the backbone of this approach, involving knowledgeable elders, women and men, as well as young people in the community. They offer powerful spaces in which the community revives their traditional practice of analysis and reflection. They provide opportunity to discuss challenges being faced; how things used to be and why they have changed; where the present disorder has come from; and how to restore order.

It is important that women and men have dialogues together, as well as on their own, in separate groups, so they can explore their differentiated knowledge and responsibilities in more depth. For example, traditionally women and men have different but complementary knowledge and responsibilities for seeds, crops and their uses. They also play different roles in maintaining customary laws and governance.

As the memory is revived, communities realise they have a wealth of knowledge and capacity to take back control of their lives. In this way, community dialogues inspire communities to search for lost seed and crop varieties, and begin to restore the practices to regenerate their farming systems and their land.

Dialogues are also a way for community to re-establish practice for reviving and maintaining community cohesion, reflection and decision-making, where it is essential for women and men to participate equally, to weave the basket of knowledge back to life.[145]

'Talking' Eco-Cultural Maps & Calendars

'Talking' maps and calendars (also known as eco-cultural maps and calendars), are a practical and participatory tool for a community's journey of reviving their traditional knowledge, seed and food systems. They provide a graphic and holistic representation of a territory: the dynamic interplay between farming systems, ecological systems, the climate, and the indicators of the changing seasonal cycles through the year.[146]

As communities develop their maps and calendars, these 'talk' to the memory of the elders, stimulated by visually reconstructing a picture of their ancestral heritage before it became disordered. It takes time for reflection and cross-referencing between the elders, to revive the memory of the ancestral order where the resilience of their ecosystems and farming systems were maintained and guided by customary ecological laws.[147]

Once communities are able to draw their ancestral past, they hold a common and compelling picture - a baseline eco-cultural map and calendar - of where they come from; how their whole territory used to be and all its interactions; the range of crops; the different activities indicated by the seasons; and the different roles of women and men in the farming, the home, the community and the governance system.

The next eco-cultural map and calendar they can develop is of the present. This tends to be a shocking moment for the communities, when they see how much has been eroded and lost from their ancestral past. It spurs the communities on to do maps of the future – one, if they do nothing and the trends of the present continue, and one of the future they want to see.

As they develop their map of the future they want, as a basis for securing their rights, they refer to the baseline ancestral map. They look at how climate is changing and ways in which they can enhance their resilience - for example, in bringing back their seed diversity and the related ceremonies for sacred natural sites.[148]

Zooming in - community research for deepening knowledge and seed revival

As communities go through the process of dialogues and developing their 'talking' calendars and maps, they identify their own priorities and plans, and the areas where they need further dialogue and research with the elders. There may be more varieties of seeds to explore, or more depth on traditional pest control; ways to rehabilitate critical areas like sacred natural sites and riverine areas; or customary laws and practices for protecting wild food areas and the ecosystem.

145 The Council of Europe (2005), The Role of Women and Men in Intercultural and Interreligious Dialogue for the Prevention of Conflict, for Peace Building and for Democratisation (Strasbourg: The Council of Europe). Available at: https://www.coe.int/t/DGHL/STANDARDSETTING/EQUALITY/03themes/conflict-prevention-peacebuilding/EG-S-DI%282004%29RAPFIN_en.pdf

146 Wilton, F. (2013), 'Eco-Cultural Maps and Calendars: "talking tools" that travelled from the Amazon to Africa' in Sacred Sites Research Newsletter, April 2013. Available at: http://fore.yale.edu/files/SSIREN_April_2013.pdf

147 UNEP-UNDP (2013), A Toolkit to Support Conservation by Indigenous Peoples and Local Communities (Cambridge: United Nations Environment Programme World Conservation Monitoring Centre). Available at: http://sgp.undp.org/images/ICCA_toolkit_FINAL_18may2013.pdf

148 The Gaia Foundation (2012), Mapping Sacred Sites on the Kathita River (London: The Gaia Foundation). Available at: http://www.gaiafoundation.org

Re-igniting Hope, Song and Seed, in Kenya

Kaguna Sabella grew up with her grandmother in the Tharaka region of Kenya, south east of the great Mount Kenya. She learned from her grandmother and, like her, began to lament the loss of their culture, knowledge, respect, seed diversity and the joy in communal work, of which her grandmother spoke so fondly.

Whilst Kaguna worried about the future of her children and the community, she found very few people who shared her concerns. She could see that the communities were fragmenting - each trying to survive on their own; that the trees were being cut, which was against the customary law and was affecting the soil; that the seeds, songs and knowledge was being lost; and that the young people were losing connection with their home and families as they were in boarding schools and spent holidays in urban areas. Others seemed blind to it.

Just as Kaguna was about to give up hope, her fate changed. In 2009 she met with members of the African Biodiversity Network. They talked about beginning a process of dialogue and reflection with knowledgeable elders from the communities, to analyse what had happened, how things used to be, and to start identifying their own priorities for change. They shared their poignant experience of visiting indigenous communities in the Colombian Amazon - communities who had faced similar adversity and had taken back control of their lives - and Kaguna was inspired. Asked if she knew of any knowledgeable elders who could help reflect on what had happened to the community over time, Kaguna set to work to identify those who were interested in participating in this reflection and process. Community dialogues began, and soon it became clear that one of the greatest common concerns of the different communities was the destruction of their sacred natural sites, along the river and on some of the major hills in the area.

With the backing of the African Biodiversity Network and the Gaia Foundation, in 2011 a large eco-cultural mapping workshop was organised for community groups, with a focus on sacred natural sites. More than 100 community members took part in the lively mapping process, and after 5 days the community had developed 3 ancestral maps of the past; 3 of the present; and 3 of the future, together with an eco-cultural calendar.

As they drew the ancestral maps and calendars, memories were ignited, and so too were the seasonal cycles and the songs. In Tharaka culture there is a song for everything, at every stage of life – from birth, to initiation, marriage and death. There are songs for each phase in the seasonal cycle – when you plant, when you weed, when you select seed, when you harvest. These songs contain messages about what you are doing, why it is important, the joy of working or celebrating together and how it builds strength. There are also songs that women sing when someone has broken customary laws. When this happens, the community knows something serious has occurred and there is no escape because women are the keepers of the law.

At the end of the 5 day workshop, Kaguna rejoiced – the songs are back – people are remembering!

The participants resolved to go back to their communities to continue their dialogues and the research to develop more detailed maps and calendars, 'zooming in' on their particular area of the territory. The community groups have continued to uncover their forgotten indigenous knowledge and a diversity of seeds and foods. They have since recovered almost half of what they identified as lost seeds, and are now multiplying them. They are connecting with other communities who are inspired to revive their traditional agricultural practices and seasonal ceremonies, and they are reviving the traditional ceremonies for sacred natural sites.

Kaguna has become a dynamic leader, accompanying communities and sharing her story of how women are taking the lead in reviving their knowledge and seed as well as the seasonal sacred site ceremonies with their communities. She participates, together with other women community leaders, in national, regional and international fora to advocate for the recognition and policy changes to support communities in their vital task.

Photo: Kaguna Sabella Julius, Kenya.

Eco-cultural calendar. The Gaia Foundation.

Often they form community research groups to zoom in on different aspects. As evident in the voices of African rural women in this report (see Chapter 4), it is the women who tend to lead on more detailed calendars, especially on seed and agro-ecological practices. When women reconnect with their profound knowledge and their role as seed custodians, they are unstoppable!

Community Exchanges, Markets & Celebrations: connecting communities, building local economies, and bolstering a movement for transformation

Exchanges between communities mutually involved in this journey are critical. Through these exchanges they can recover and share lost seed varieties and knowledge, and inspire continued momentum. Some communities may have more favourable conditions for multiplying certain seeds to share; others may have more elders with precious lost seeds and knowledge; while others may have sacred natural sites and ceremonies more intact.

Different traditions find much in common, as well as unique customs and practices which differentiate them. Solidarity and confidence grows as they feel part of a larger movement for transformation, united by a common concern for creating a viable future, rooted in their heritage.

As this inclusive path towards Community Ecological Governance unfolds and deepens, more seed varieties are recovered and multiplied and more food is grown, and households become secure in seed and food. This leads to sharing and selling their diverse indigenous seeds and foods at farmers markets, fairs and ceremonies.[149] As the process grows and more communities become involved, so the conditions for regenerating local economies begin to build.

Often schools are drawn into the process. Teachers become inspired and encourage children to develop their own eco-cultural calendars and maps by consulting their elders. The children respond with great enthusiasm to the invitation to become researchers, and the elders are delighted as they can at last share the knowledge they thought young people were not interested in learning.[150]

'Cultural Biodiversity Celebrations' can take place at schools and in communities, where the children demonstrate what they have learnt from the elders: the seeds they have discovered and collected; related songs and dances; stories about the birds, insects, plants and animals.[151] These are also good opportunities for sharing knowledge, seeds and food – widening the circles of exchange - and celebrating the growing voice of the women as custodians of seed, food, life.

Politicians, local authorities and the media can be invited to fairs and celebrations - opportunities to advocate for and affirm the community's commitment to rebuilding their food and farming systems, taking back control of their lives, and recognising the vital role of women in doing so.

149 Chituwu, C. (n.d.), Saving Seeds in Zimbabwe: an interview with Chester Chituwu. Available at:. http://www.gaiafoundation.org/saving-seeds-zimbabwe.
150 Belay, M., Edwards, S. and Gebeyehu, F. (2005), 'Culture as an expression of ecological diversity: Integrating awareness of cultural heritage in Ethiopian schools' in Mountain Research and Development, Vol.25, pp.10-14 (Bern: Mountain Research and Development).
151 Since 2006, MELCA-Ethiopia has organised celebrations, working with schools, communities, youth groups and the government to keep Ethiopia's ancient cultural legacy alive. See Revival (2015) film: https://vimeo.com/143994002

Women's research group, Uganda. The Gaia Foundation.

As the community and exchange systems rebuild, through celebrations, fairs and markets, so does the local economy, ensuring that the wealth generated remains circulating in the community and is not drained away.

Creating Conditions for Emergence to Scale

"When separate, local efforts connect with each other as networks, then strengthen as communities of practice, suddenly and surprisingly a new system emerges at a greater level of scale."[152]

Community Ecological Governance fosters a process of 'decolonising the mind' - communities analyse and reflect on their situation, how and why things have changed, what is meaningful and important to them, and how they can take back control of their lives.

As mentioned already in this report (Chapter 2), our past is a rich source of potential, and to make the best of our future we should "*know our roots*" to understand and build on our past heritage. Through reconnecting communities with their traditional roots, this holistic approach allows communities to assess for themselves what they want to revive and how they can adapt their traditions to the changing context.

The testimonies from Kenya, Benin, Uganda and South Africa (Chapter 4), show how women respond enthusiastically to the opportunity to restore their own knowledge systems and practices, and their role in the family and the community.

When they regain confidence in themselves and their own knowledge, they are better able to exercise their rights, to negotiate from a position of strength, standing firmly in their own knowledge and identity.

Reviving and adapting traditional knowledge and practices is not without its challenges. There can be resistance from within the community and from outside. Experience has also shown, for example, that those in the community who are more sceptical at first, are drawn in as they see that this is a practical, inclusive process, which can encompass differences and encourages respect at its core.

Partner organisations of the African Biodiversity Network and the Gaia Foundation - from Ethiopia, Kenya, Uganda, South Africa, Benin and Ghana - also vouch that, as community dialogues continue, more people tend to be attracted. Some are aware already of the importance of understanding their heritage, how much knowledge the elders have to share, and how this enables them to make informed decisions. Others are convinced when they see the practical results of this process - the planting and harvesting of resilient indigenous crops; restoring soil fertility and productivity of local farming land, which generates more income, especially for the women; and the growing respect, confidence and cooperation within the community.

In a world of increasing climate change and global corporate control, Community Ecological Governance offers a pathway to women and their farming communities to revive and build on their heritage, take back control of their lives, and continue to provide healthy nutritious food for their families and the continent, now and in the future.

152 Wheatley, M, Frieze, D. (2006), Using Emergence to Take Social Innovations to Scale. Available at: http://www.margaretwheatley.com/articles/emergence.html

Liz Hosken is Director of The Gaia Foundation, and co-author of this report. She has worked with communities, non-government organisations and networks in Africa and the Amazon, to encourage elder-centred processes with local and indigenous communities, particularly women. Here she talks about why community knowledge systems are so critical, and how a change of pace and perspective are required.

"Knowledge is power, according to indigenous communities in the Amazon. It is earned through rigorous observation, learning from knowledgeable elders and ongoing practice. Authority and respect come to those whose practice reveals their knowledge. In this sense, the power base of rural women in Africa is their intricate agri-cultural knowledge and expertise, which requires a capacity to read the wider ecosystem, the climate and the constellations. Their 'eco-literacy' has enabled them to provide food and medicine for the family, the community and cultural events for generations. Traditionally this earned them status, leadership and respect in the home and the community. Layers of colonisation have undermined and repressed these roles, making them increasingly invisible.

Traditional knowledge systems are holistic in nature, meaning they are rooted in understanding the dynamic interplay of the ecological and climatic systems, as well as the constellations, over the seasonal cycles of the year. For example, when women are deciding what they are going to plant, they are reading the behaviour of certain 'indicators' in the ecosystem – the behaviour of birds or insects, trees, rivers, the constellations, the phases of the moon, and the interplay between all these things. This is a holistic knowledge system which understands the complexities of ecosystems and how to maintain dynamic equilibrium.

Conversely, today's dominant thinking is founded in reductionist science, understanding the world through its component parts, rather than the dynamic interplay of the whole. The western knowledge system separates understanding into 'disciplines' like soil science, biology, zoology, physics, astronomy, agriculture, development, rights, climatology. The model of 'development' has come to mirror this world view, meaning that communities are approached by entities who work on a single issue - conservation, agriculture, education, women's rights, health, sanitation and so on – rather than recognising the interplay between all these things and the community. This serves to reinforce the fragmentation that communities have suffered through waves of colonisation.

In order to encourage and accompany women and their communities to revive and build on their holistic knowledge systems, those of us schooled in the dominant knowledge system need to learn another way. It requires us to support women and their communities to create spaces for dialogue and reflection to re-call their knowledge system – the interconnected picture of how the whole system works - enabling women to regain their capacity to read and interact with it. This requires the 'outsider' not to impose preconceived ideas of what the focus should be – food, seed, climate, conservation. Given the interconnected complexities of the system, any topic of discussion will soon weave back into the interconnected whole.

Furthermore, this approach requires a different pace and cannot be forced or rushed. Those accompanying women and their communities in the work of reviving traditional knowledge systems must allow time for the 're-membering' to take place. The slower the process, the deeper and more authentic the outcome.

In the context of climate change, there is now a growing recognition of traditional knowledge and its capacity to understand and maintain dynamic living systems. Those who now choose to walk the path with women and their communities and movements to revive and enhance their traditional knowledge and governance systems will come to recognise that this is also a journey about the transformation in thinking which is required to respond to the planetary crises we face. We must transition from a reductionist to a holistic worldview.

We must now "de-school" ourselves, as the philosopher Ivan Illich proposed, in order to be able to see the whole again, and learn the true laws with which we must comply to sustain life. This would establish the foundation for systemic change in today's dominant world of 'corporatocracy'.

Knowledge is power, and Africa's women seed custodians are among those who have a central role in building the power to transform."

Photo: Liz Hosken, South Africa

Ethiopia eco-cultural mapping workshop. Damian Prestidge for The Gaia Foundation.

Key Messages

on Restoring Women's Traditional Knowledge and Leadership for Resilience

- The International Peasant Movement for Food Sovereignty, La Via Campesina, is now being hosted in Zimbabwe, to support the growing small farmers movement in Africa. The ethos of the Food Sovereignty movement is to keep small farmers on the land, producing food and culture and building viable communities. It **recognises women's fundamental role in food sovereignty – producing food in a culturally and ecologically appropriate manner**.
- **Agroecology is an ecologically, socially and economically just approach to agriculture**. It is an holistic approach to farming which builds on the traditional knowledge and practices, evolved over generations. Agroecology is also central to food sovereignty as it enables farming systems to regenerate the ecological foundations for food production, for future generations.
- Agroecology is a potent way to restore damaged land and increase productivity without expensive toxic agro-chemical fertilisers. It has the capacity to sequestrate carbon dioxide, and if used widely enough could **absorb all emissions causing global climate change while providing healthy ethically produced food for the growing population**.
- **Traditional knowledge and practices, customary laws and governance systems can be revived and enhanced to allow the regeneration of the social and ecological conditions for producing nutritious and healthy food and building resilient inclusive communities, livelihoods and local economies.** This work, strengthening Community Ecological Governance, gives communities the foundation from which to respond to present-day challenges and opportunities, from a place of strength and confidence in themselves. Women play an active part in animating this process when given appropriate encouragement.
- **Ongoing community dialogues, reflection and community research** enable the complementary roles of women and men in cultivating seed diversity and in agriculture to become visible again. Their differentiated knowledge and responsibilities in the family and the community can be revived as they remember, assess and adapt their traditions, in order to rebuild a more reciprocal and mutually enhancing relationship, appropriate for the changing context.
- As women, men, families and communities **reconnect with their identity and their ancestral knowledge and practices**, their confidence in themselves grows, and they are able to take back control of their lives and livelihoods. This is the **basis for rebuilding local economies and the capacity to analyse and resist harmful external or internal initiatives**, such as promotion of privatised seeds and agrochemicals. By learning from other communities on the same path, and linking into farmer's and women's movements, they are further inspired and able to contribute to building a critical mass for change on the continent.

Woman farmer in Ethiopia. Damian Prestidge for The Gaia Foundation.

4. Women's Voices from the Fields

When I grew up we only ate traditional foods. I learnt with my mother and aunts how to prepare the traditional dishes. I also learnt about the different varieties of seeds, when to plant them, and how to store them. At harvest time we would first select the best seeds, before we harvested for food. I remember we had seven different varieties of cassava and many types of millet, sorgham, beans, sweet potatoes and others too. They all had names which explained them.

I am so passionate about reviving our ancestral knowledge before it is lost forever. Our generation has a huge responsibility. The next generation will not be able to survive without this knowledge. But it is also about our heritage, our identity, our confidence in who we are.

(Kagole Margret Byafuru, Uganda)

The testimonies in the following pages are from rural women who have been leading a revival process in their communities in different parts of Africa. They present compelling stories of how they and their communities have begun to regain control of their seeds, their land, their livelihoods and their lives. As they awaken to how and why their community, their farming traditions, their ecosystem and their rich ancestral heritage has unravelled, in some cases in just a few decades, they are spurred on to inspire other communities to join the growing movement. Joining forces across the continent, through community exchanges and through linking up with global networks, is ever more vital in order to strengthen resistance to the corporate takeover of Africa's seed and farming systems and to rebuild resilience to climate change.

As these testimonies show, women feel a deep sense of responsibility to ensure the next generation, their children and their children's children, have a viable future. They recognise that theirs is the last generation with the means to revive living knowledge and practices, through learning from the knowledgeable elders. Once the elders living today are gone, the memory of the community's heritage goes with them, unless communities work hard to learn from them now.

Gaining Confidence & Respect through Restoring Seed Diversity, in Ethiopia

Tolesa Alemayehu, a woman farmer in Ejere, central Oromia, Ethiopia, has been reviving traditional seed and farming practices - gaining confidence and respect in the community. She is a member of a local women's seed group.

"*For us, as a community, seed is our life. Seed is the basis of all of the food that we eat. It is the basis for everything. We use it to raise our children and to cook many different types of food. It is part of our lives each and every day. I'm a divorced mother and I'm raising three children alone – I am both a mother and a farmer.*

As a farmer I always need seeds. Having different kinds of seeds makes my life better because I have more variety to cook with and for my children to eat. In the house we use different crops for different purposes. Crops are not only for food - for example, teff is for injera, but it is also used with various crops for a woman when she gives birth to a child.

When a woman gives birth we make a type of porridge of many crops. The preparation of the mixture includes teff, finger millet, maize, wheat, barley, chickpea and telba. All of these grains are prepared individually and then they are mixed together into the porridge. It is very important to give to the mother as soon as she gives birth to the child. When a mother gives birth there is much bleeding. Also her back will be affected during the delivery and she will be in pain. There are so many physical tensions that the mother goes through during the birth but when she takes this mixture of grains she will be relieved very quickly. She will become very strong again within three days and the milk she produces for the baby will be full of goodness to help the baby be strong. We know that if a mother doesn't get this mixture she may not recover for a month or more.

If we only had one variety of seed, it is almost of no use to us. It has no meaning. A porridge made of just one variety would have no medicinal use to a new mother. Most of the women here give birth at home. We use the grains in the porridge as a medicine to help cleanse the impurities such as the blood that remains inside. It is the telba grain that deals with this. Every grain in the porridge has its own value – nutritional and medicinal. The woman could not get all this relief from just one grain.

As women, our role with seed in the household is very important. The tradition here is that girls learn to cook food from their mothers. According to our tradition, I spent much of my time with my mother and she taught me to make many foods, including injera - our staple food, cooked using teff flour. I have started to teach my daughter to prepare the dough for injera. First she watches me for two or three times, and then I let her start to have a go at different stages of the process.

The women are the ones who test the seed for taste and aroma. We select the best seed depending on the food that we want to prepare. If I find that a variety of seed makes good injera then I will put some aside for the next sowing season. The storage of seed is the responsibility of the women. First we select the best, fresh seeds from the field. I use a bag that allows air inside.

Photo: Tolesa Alemayehu, Ethiopia.

We don't place it on the ground; it must be placed on wood to keep it protected from moisture. We store them like that in the house and we also store some in the community seed bank in the town. We can store some there and take them out when the sowing season comes. The storage method depends on the type of seed. If it is maize we hang it above smoke and the smoke kills off and prevents the pests and keeps it safe. We must protect it from pests, to keep it safe.

I take the best of my seeds to the market, the one that will get the highest price. This is a good way to raise income for my family. But we don't always sell our seed, we also exchange it with neighbours. People know each other and they know who has the best seed, so they come and ask to buy it from that farmer. I will also tell my neighbour that this is a good seed which they should have. If you have a good seed variety then you should exchange it and work together. Most of the time we don't just give the seed away, we exchange it for another seed which may be of use to our household. The one who has the best seed is considered a model farmer. I have the best seed amongst the women farmers and that makes me very proud."

Communities in Ejere have been accompanied by EOSA (Ethio-Organic Seed Action), Ethiopia. The organisation works for the creation of local seed exchange networks by establishing community seed banks, promoting participatory varietal selection and farmer-scientist collaboration, and increasing the participation of women and young people. EOSA is active in several parts of both central and southern Ethiopia, provides technical advice and training for publicly funded community seed banks, and has provided input to Ethiopia's National Seed policy encouraging recognition of the value of local seed systems.

MELCA-Ethiopia is also active in working with local communities on ecological governance and community-based agro-biodiversity management, to conserve traditional seed varieties and maintain on farm diversity to strengthen their adaptive capacity to the effects of climate change. The organisation accompanies communities in three forest areas of Ethiopia - the Sheka forest (SNNPR), the Bale Mountains and the Sebeta Suba Forest (Oromiya Region). For more information: www.melcaethiopia.org

Learning from the Elders and Keeping Seed in Safe Hands, in Kenya

Teresa Makena Daudi from Tharaka community in Kenya, has been a leader in the seed revival process amongst communities in her area since they developed their eco-cultural mapping and calendars in 2011. They have successfully revived most of their lost seeds and are now food secure.

"Since the mapping, much has changed. We were really shocked when we developed the map of the present and saw how many of the traditional seeds we had lost. We had not even realised! How could this have happened? From then on we met regularly, and more people joined us, to learn from the elder women, to share what they knew, and also to see if any of them had any of the lost indigenous seeds remaining, perhaps hidden.

Photo: Teresa Makena Daudi, Kenya.

This is how we discovered elder women, often far away, who had a handful of a lost variety of seed they grew every year on the small piece of land their family left them to use. The families are usually not interested in the food these elders grow. They say it is old people's food.

But it was these elders who saved us, because now we have revived most of the seeds we identified as lost. They told us that now that they feel as if they have been reborn again because they have been valued once more. They thought they would die with their seed and their knowledge and their grandchildren would never know such foods existed.

The traditional seeds are sacred to us and used for special ceremonies like the birth of a child. We take seed when we visit the child, as a special gift for the mother. When we do ceremonies in sacred sites, women are responsible for bringing the required seeds and participating in the prayers. Or if we find we have a lot of seed then we make it into a special gruel to share when we are weeding together. We sing together, sharing news and tips on seeds and planting.

The ancestral calendars have been very important for us. We had lost much knowledge around planting – when was the best time to plant which varieties. The calendars helped us to clarify the patterns of the year and when things should happen. Which crops need to be planted in the rainy season and which in the long dry season. The ancestral calendar made the cycles and practices very clear and so we are bringing the seed and the lost knowledge back into our future calendar.

As we searched for our lost seeds, we would sometimes borrow a few from an elder, multiply them and then give her back more than she had given us, to show our appreciation. We would also share seeds with other women and explain what we knew. By learning from the elders we re-discovered exciting things like a type of pumpkin which is as big as a watermelon, but white inside. It grows well when it is dry, cooks well, and you can feed the cows with the outer skin. We have also re-learnt how to mix many different seeds together when planting. Traditionally elders would mix millet and green grams, pumpkin calabash seeds and castor oil as each plays a different role. The castor oil seed is a legume, so it holds the soil and feeds it. The different crops use different nutrients from the soil. So they help each other and whatever the weather, something will grow.

Some of the crops we lost and re-discovered are varieties of millet and sorghum. These have different characteristics - some grow best after short rains, some best after long rains. Some are very adaptable and can grow even if there is only a little rain. This gives us flexibility. As we began to re-discover these seeds, I started to experiment by growing indigenous crops such as green grams, cowpeas, millet and sorghum in one field, and in another plot, some distance away, I planted the seeds that the government had given us.

Once the crops started to grow, I watched carefully to observe how the different crops are doing. When I see which ones are doing well I tie them together. I'm looking for different things, not just yield. I also want a crop that tastes good or cooks quickly or which goes well with other vegetables. Over the few two years I have found that the indigenous crops produce more, especially when there is less rain. For example in the same season last year I harvested 4 bags of government green grams and 6 bags of indigenous green grams. Even though with the government green grams I need to use pesticides, it still did not help me to harvest more, but it cost me more. Plus the indigenous green grams taste so much better and they're also easier to store and to sell.

We have been reviving ways of protecting the crops from pests, without using chemicals. One of the methods the elders used was to mix certain herbs together, and then sprinkle the mixture along the edge of the fields to stop the pests. But of course the most important knowledge is to be able to read the signs. Our elders read the behaviour of the birds, the insects and the trees and they can tell what is likely to happen. Then they take action to prevent the pests before they come. But today most people rely on the radio and the government and this has made us blind to what's right there.

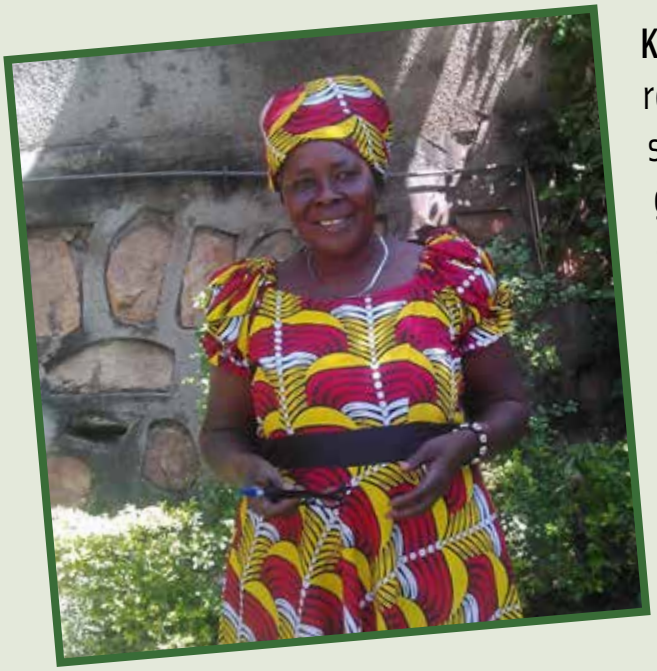
We are protecting our seeds naturally with ash, and we grow them with compost, which is good for the seed and the soil, and of course our health. Unlike the government crops, which produce for one year only, our indigenous varieties keep flowering and producing more and more seeds. Even if you only have a small piece of land you can multiply seeds and produce food from our indigenous seeds.

Now many people in the community want to join us, to share our seeds, because they can see we are producing a lot. We show them the rules and they pay a small fee to register. But others leave because they realise that it's a commitment; and it is, but it's worth it. All of us had to spend time learning from elders and making mistakes. It takes time. But once you learn it becomes much easier. Working together again makes a big difference to our lives as we support each other and don't need to rely on the government seeds or advice. We have our own path again now and you can see the food is back in the fields. Before we began this work together, people would grow just to sell; they wanted money not food for hunger. Now we see they are growing food first – to feed their families. They can then sell the surplus.

It feels so good now to see the children planting these crops with their mothers and grandmothers. The connection has been made again between the generations. Now we can be sure that the knowledge and the seed will be passed on to the next generation. We have learnt a very tough lesson. I know we will never let our seeds go again!"

Communities in Tharaka have been accompanied by the African Biodiversity Network, Kenya, together with local partner Institute for Culture and Ecology (ICE). The ABN hosts a regional network with 36 partners drawn from 12 African countries. ABN is committed to building climate resilience and reviving traditional seed diversity, through its Community Seed and Knowledge programme. It promotes ecological agriculture and local food sovereignty, and focuses on the central role of indigenous, locally-adapted seed and traditional knowledge, especially women's knowledge. For more information: www.africanbiodiversity.org

Revival of Traditional Seed, Food and Sacred Natural Sites, in Uganda



Kagole Margret Byarufu, from Hoima region of Uganda, is a custodian of seed and a sacred natural site. She has gathered her clan and custodians of other sacred natural sites together, to rehabilitate the sites and the land, and to bring back traditional seeds and farming methods to improve food production.

"I am a custodian of Wandiyeka sacred natural site. I inherited this role, as my family are traditionally custodians. My grandfather, father, aunt, sister and myself are all custodians of sacred sites. We support each other in this role, each one responsible for a different site. I was trained from an early age to be prepared for this work. My name, Kagole, is the name of one of our Goddesses, which signifies my role.

When I grew up we only ate traditional foods. I learnt with my mother and aunts how to prepare the traditional dishes. I also learnt about the different varieties of seeds, when to plant them, and how to store them. At harvest time we would first select the best seeds, before we harvested for food. I remember we had seven different varieties of cassava and many types of millet, sorgham, beans, sweet potatoes and others too. They all had names which explained them.

Photo: Kagole Margret Byarufui, Uganda.

For example one sweet potato was called Kansegenyuke, meaning 'I make as many I can'; another was called Kanyerebalye which means 'let me grow and people will eat'; and then there was Ndabirisoha, meaning, 'grow me and you cannot finish me'. I also learnt about the medicines and the wild foods and where to find them. You had to study the plants and animals carefully, to be able to read them, what they were telling you about when the rains would come or if there would be a drought. Also the moon cycles and the stars, they all have signs which tell you what is happening. Everything speaks to you if you know their language.

Many varieties of seed are needed in our sacred site rituals, to give thanks and to ask for them to be strong and productive when we plant them. Different sacred sites have different roles. Some are for the main community rituals for seeds, harvests and rain. Others we go to for healing people or the land.

Since I grew up, things have changed a lot. People today eat many different kinds of new foods, which are not from traditional seeds. This affects our sacred sites because we cannot do rituals with foreign seeds. Also people have lost interest in traditional ways. Many follow Christianity and do not agree with the rituals in the sacred natural sites. They say this is backward, and our sites have suffered because people no longer respect them. Many have been destroyed, the trees have been chopped down for agriculture. But then these farmers complain that their new crops do not grow. They do not understand that if you destroy sacred sites, there is a cost, not only to those who do it. This has pained me a lot.

I know my ancestors 17 generations back, and I feel them with me today. I feel responsible to them, because I would not be here without them. They passed their knowledge down, carefully, from one generation to the next. Learning traditional ways is hard work, there is a lot to learn and to practice before you feel confident to teach others.

I often wonder what future generations would say to us if they were born into a world with no roots, with no memory of how their family came to be, not knowing who their ancestors are, with no identity that tells them they are from a certain place with a long story and a lot of knowledge.

Recently I visited custodians in Ethiopia, together with custodians from other African countries. I was so inspired by their stories of how they too had lost their traditional practices; and how they had revived their sacred sites, which are now growing back. We visited one and you could feel it is coming back to life. Many people from the community were there, we were eating traditional foods, many young people were participating and dancing traditional dances, and the women were strong and proud. The women carry special sticks called Niké, made from a sacred tree and they told us how no man would dare to touch a woman who carries this symbol. It showed she had been through traditional training and was the holder of the law. It used to be like that here in Uganda. As custodians, we were highly respected in the past.

Going to Ethiopia gave me a lot of confidence. I realised other communities in Africa also have sacred sites and custodians, and although there are differences, there are many similarities. Also I could see that it is possible for communities to become interested again in traditional practices to protect sacred sites and to bring back the traditional foods. We had similar stories to share about how much had been lost, but also how things can be revived. We encouraged each other to go back home and do more.

When I returned from Ethiopia, I met with custodians from my own clan and called custodians from other clans. I told them what I had learnt in Ethiopia and shared my confidence with them. We had been working to strengthen our rituals and to protect our sites, but felt unsure about how many in the community would respond. We felt shy about talking too much about what we were doing, for fear that there would be a reaction. But we have found that there is a growing interest, and many of the women especially are very keen to share and revive our traditional seeds. There are many more varieties amongst us than we realised. By talking about it, more come forward with different varieties that they are still growing. The elders are our teachers. They know so much about how and when to plant which varieties; pest control; soils and how to read the weather, even if it is changing. We are all finding that the foreign seeds are not doing well because the rainfall is changing, and those who have continued to use the traditional varieties are growing more food.

I am so passionate about reviving our ancestral knowledge before it is lost forever. Our generation has a huge responsibility. The next generation will not be able to survive without this knowledge. But it is also about our heritage, our identity, our confidence in who we are.

The men in our community also have to remember their traditional responsibilities. Then we find how we can work together and we find a balance. We need to adapt some of our traditions, because things are different now. Now that more people have joined us, I am more hopeful, and we will continue to improve, because we are talking about things that really matter to us and our children's future. I do not reject modern ideas and developments, but they must not undermine who we are, our ancestral heritage. We must understand whatever we adopt and what impact it will have on our lives. We have lost so much because we accepted things blindly, without asking questions. Now we are asking lots of questions and becoming conscious again. My hope is soon we will be strong and united enough to take our questions to the government and to advocate for the recognition we require to ensure our children have a future."

Communities in Hoima have been accompanied by NAPE (National Association of Professional Environmentalists), Uganda. The organisation is committed to sustainable solutions to Uganda's most challenging environmental and economic growth problems. Actions include empowering women to participate in decision making at all levels, protecting the rights of communities affected by big infrastructure development, and making common cause with other civil society organisations on landgrabbing, gender and water governance. For more information: www.nape.or.ug

Custodians of Sacred Seed and Sacred Natural Sites, in South Africa

Vho-Mmbengeni Joyce Netshidzivhe, from Tshidzivhe community, South Africa. She is a senior Makhadzi (woman elder) and Chair of the Community Seed Group of the village. She tells the story of their journey so far in reviving seed diversity and related knowledge; in strengthening the role and recognition of the Makhadzi in the Clan governance system; and how they are now seed and food secure and able to support other communities.

"Since 2008 we have been working in our community, Tshidzivhe, to revive our memory about the seeds that we used to have; to search for the lost seeds; to find ways to multiply them so that they retain their quality and do not get contaminated; and to share them within our own community and now with others. We knew we were losing our diversity, and the dialogues and the eco-mapping and calendar work has helped us to see this clearly.

We were very motivated to find the seeds we had lost and other communities helped us. We have also supported them with the seeds that we do have, but which they have lost. In fact other communities have lost much more than we have. For example, we did not lose our sacred five-finger millet. This is because we are responsible for one of the most important sacred sites in

Photo: Vho-Mmbengeni Joyce Netshidzivhe, South Africa.

Venda, the Thathe Zwifho, and we have been continuing to do the required rituals, for which we need five-finger millet. The senior Makhadzi are responsible for the rituals and for growing the millet. The Thathe Zwifho, is a vital watershed area, where most of the rivers in the area originate. We also use finger millet in other ceremonies as we move through life, from birth to death, and the Makhadzi are responsible for these too.

Before this work began, we were considered to be one of the poorest communities in the area - backward and uneducated. We were not confident and we kept as hidden as possible. Now we are seen as the strongest community and the learning place for others.

We found these seeds by having many dialogues and doing careful research with the Makhadzi in the community. This often required travelling to more isolated communities which are more difficult for the government and companies to reach. The elders in these communities usually had a few seeds left, which they guarded carefully and often secretly, because they were told by their family that these were old fashioned and useless seeds. Their children or grand children had been to school and felt they knew more than their Makhadzi, even in these more distant places.

In our community we have three areas where we cultivate: around the homestead, where we grow many things, including some crops for seed; in the home garden, which is near a source of water, also often used for seed multiplication; and in the field outside the homestead, which is rain fed.

Some of the varieties we have revived are: 5 varieties of maize, (2 yellow, 1 white, 1 red, and 1 yellow); 3 varieties of beans, (1 cow pea, 1 black and 1 brown bean); many pumpkins of different colours, shapes and sizes for various uses; 4 gourd varieties, one is like a cup with a handle to drink with, but it is bitter so cannot be eaten; 1 calabash is used for storage and carrying water, and can be eaten when young; 1 small variety of calabash with protrusions on it – which is eaten; and many types of sweet potato with various uses.

In order to multiply these precious lost seeds, we have to ensure that they are grown in fields where they will not be contaminated by the bought seeds. Some of us are beginning to specialise in multiplying our seeds because we have the conditions to do so. I have fields for example, which are more isolated, away from people using hybrid or even GM seeds. I keep some of my seeds, exchange and sell some, and give some to the organisation who supports our work. They keep a safe community seed bank, and they help us share the seeds with other communities. Those who receive or buy our indigenous seeds, agree to give back more than they have taken, so that we can keep increasing the amount of seed and the diversity of seeds in our community seed bank, to ensure its stocks grow.

Now those of us involved in our seed group have enough food to feed our families. So we are ready to exchange and sell our seeds and our food to other communities. This is why we have formed a community cooperative, and we have opened a bank account. We plan to set up a farmers market at one of the schools, to sell indigenous seeds and foods and teach people about them.

The seed which we produce is in demand because people know it is good quality seed, produced by people who have the knowledge and competence. Our traditional foods are also increasingly sought after because of the quality and the taste. Other communities in our network of clans are inspired by the example Tshidzivhe is setting. So we feel we have achieved a lot, and we are on the right path, although there is still a lot more to do. Now that the Makhadzi role is recognized and supported in our homes and community, amongst the other clans, and even by the public, we can begin to spread the work more widely, because people take the Makhadzi seriously again."

The Tshidzivhe community has been accompanied by The Mupo Foundation, South Africa. The Mupo Foundation works to preserve and revive cultural diversity and food sovereignty in South Africa. It strengthens local communities in ecological governance by reviving indigenous seed, facilitating and encouraging intergenerational learning, and rebuilding confidence in the value of indigenous knowledge systems. Based in Johannesburg, the organisation began work in Kwazulu Natal and Limpopo and is now extending into Mpumalanga, Botswana and Zimbabwe. For more information: www.mupofoundation.org

Traditional Seed Diversity for Food and Medicine, in Benin

Houessou Anagonou Houeyiho, from Benin, is a priestess of the divinity Sakpata Djeholou Kpatazan (God of Earth), a traditional healer and naturopath. She leads the prayers, performs initiations for women, treats women and men, and also advises the Chief. At 60 years old, she is among those responsible for the traditional culture in the house of Akali, in Avaligbo village, Avrankou, in Benin.

"In Benin the people in rural areas depend on seed for their physical and spiritual wellbeing. Over the centuries, the seeds and the traditional knowledge and practices, have been transmitted from one generation to the next. Women hold a central role in preserving and sustaining the culture and the biodiversity of the community.

As part of Anagonou's work as a traditional healer, she preserves seeds, which for her symbolize life and the future. In her area, rituals for the protection of forests, plants and animals, and for securing rain and productivity, cannot take place without the use of traditional seeds. Beans, corn and palm nut are the main sacred elements, at the heart of these ceremonies. Seeds are important in many aspects of life in the community - for food, medicine, spirituality and for trade. Most households depend on cowpeas as a staple food, of which there are many varieties, such as voandzou (a type of bean). Based on these seeds, a diversity of traditional dishes are created for nourishment, for happiness and for celebrations, as well as for medicine. In terms of health and spirituality, seeds are used in the majority of traditional medicines, as well as being used for the protection and defence from bad spirits.

Seed and associated knowledge is passed down from generation to generation and shared among the community. Anagonou learnt mainly from her grandparents and also her father, who were all traditional healers.

Traditionally people plant a mix of seeds by hand, the type and combination of which depends on the season. Seeds of corn are often planted with beans or groundnuts in June and in September after the rains. It is during the short rainy season of torrential rain that cowpeas are planted. Women have the knowledge to select the appropriate seeds depending on their purpose. For example for marriage ceremonies, white seeds are chosen, whereas red seeds are selected for rituals to communicate with the ancestors.

Anagonou has already recuperated many disappearing seeds. With assistance from local organisation, GRABE-Benin, she has revived more than a dozen varieties of cowpeas and at least 7 varieties of corn. She is also trying to find seeds which are traditionally used for medicine, but which are becoming increasingly scarce. This is the focus of her work with the communities at present.

Anagonou stores her seeds in traditional ways including in the kitchen, hung from the ceiling above the fireplace, so that the smoke protects the seed; in bottles which are sealed; in sacred places for initiation and in or outside the house where they are mixed with ash. In addition to

Photo: Houessou Anagonou Houeyiho, Benin. (Source Appolinaire Oussou-Lio, GRABE Benin).

seed, she preserves extracts and essences of medicinal plants in her household store, in order to treat diseases.

As an elder, people come to learn from her and share seeds, increasingly with young people these days. She is eager to share seeds with the community and she encourages women to continue to save and exchange seeds with neighbours or friends or at markets. Those varieties which have disappeared in the community, and cannot be found amongst each other, they search for them in traditional markets and will buy them in order to re-establish the diversity the community once had.

Women in the community are concerned, because despite being present in everyday life, seeds have been disappearing, forcing those who follow the traditional customs to turn to those seeds which are imported and which do not have the same effect for health and spirituality. 'Our seed are increasingly being exported but we are working to preserve the remaining traditional seed' says Anagonou. She hopes that her actions will inspire others to protect their seed and respect indigenous knowledge, and she finds there is a growing interest.

There are many challenges which threaten sacred sites and seed, like pressure on land. Uncontrolled occupation and overpopulation of land is of great concern. Forests have been destroyed for agriculture resulting in the loss of many plant and animal species, which the community depended on for a range of needs. The community have also observed changes in the climate, especially the rain, which has become irregular and rare. They are focussing on selecting the more resistant varieties to conserve them, and to maintain their resilience.

Anagonou's vision is to have a bank of well preserved seeds, and fields conserving and producing seeds, to sustain the species and share with the community. She is mobilising women to revive and preserve seeds and teach the young generation. They are exchanging experiences with other communities and with other countries where possible. It is the women who take care of the children, and they are the ones who cook the meals to feed and nourish the family. Women care for humanity and their environment."

Communities in Avrankou have been accompanied by GRABE (Groupe de Recherche et d'Action pour le Bien-Etre au Benin - Research and Action Group for Wellbeing), Benin. The organisation is committed to the regeneration and safeguard of natural ecosystems, and promotes the economic development of rural communities in an environmentally sustainable way, with a particular focus on protecting the rights of women and children. A core programme area is to preserve and spread the valuable traditional knowledge of local elders, protect sacred forests, and organise inter-generational exchanges to foster a connection between youth and their cultural identity. For more information: http://www.grabebenin.org/

Zoosali, Ghana. Ruth Leavett for The Gaia Foundation.

Conclusion

This report calls for the recognition of the critical role African rural women have played and should continue to play in evolving and maintaining the continent's diverse and resilient agricultural systems. It emphasises that the knowledge and the status of women has been systematically undermined, making it invisible, and how the corporate-driven forces which exacerbate this continue to grow. It calls for the vital contribution of African women - as custodians of seed and nutritional food, medicine and biodiversity, and as spiritual, cultural and community leaders - to be recognised, dignified, and celebrated. It calls for their traditional knowledge to be re-valorised.

The preliminary research carried out for this report showed the alarming lack of information and awareness about the knowledge and practices of African rural women in agriculture. Yet the voices throughout this report are testimony to the pivotal work of women, not only as custodians of seed and food, but in rebuilding community cohesion, identity, meaning, inclusive governance, dignity and joy – and in contributing to the growing small farmers' movement. By linking up with each other and linking up with the growing movements on the continent, woman are able to play a vital role in advocating for the systemic change required for the transition to an ecologically, socially and economically just future.

The report calls for both practical and policy support for rural women, their communities and their social movements in Africa - and for a profound shift in agricultural and investment policies across the continent - as a matter of urgency.

Policies and practices should enhance women's participation; value and recognise women's knowledge; and enable women, as well as men farmers to participate in decision-making processes in agriculture, food production, land and governance. Women need to be acknowledged and supported, as the primary producers of food on the continent, able to both cultivate healthy food and climate change resilience through small scale agro-ecological farming systems.

The present global corporate scramble to control Africa's rich heritage of minerals and fossil fuels, water and agricultural lands, seeds and food systems, threatens to further destabilise the continent and create more conflict, further impacting on women. The effects of climate change, triggered in less than a century by the globalisation of the industrial system, is already being felt by small farmers and their ecosystems.

Africa's rural women, the custodians of seed and food, and their traditional diversity based seed, farming and knowledge systems, can make an essential contribution to regenerating the viability of our planet. They need our respect and support now in order to turn the tide before it is too late.

Resilience workshop, Zoosali, Ghana. Ruth Leavett for The Gaia Foundation.

Key priorities are:

1. The aggressive corporate free trade agenda being imposed on Africa is deeply and negatively affecting its rural communities and their capacity to feed the continent. The new wave of land grabbing throws them out of their homes and off their lands, whilst the industrial plantations and extraction that follows, dries up their wells and pollute their water systems. As corporate seed laws are enacted throughout the continent, age-old local seed exchange practices are criminalised. Women, who constitute the majority of Africa's farmers, are the ones most affected by loss of land and seeds. **A profound and radical policy shift that stops the corporate handover of Africa's land and seeds, and focuses on supporting small scale farming instead, is urgently needed.**

2. Given that Africa is already experiencing the effects of global climate change, the continent needs to rapidly enhance its seed diversity and restore the resilience of its traditional regenerative farming systems. The greater the seed diversity, the more options there are to draw on for dealing with worsening climatic instability. Cultivating diversity is the contribution that women have made in most traditions, since the beginning of agriculture. Their intricate ecological knowledge and capacity, together with their communities, enables them to feed the growing population, and mitigate the impacts of climate change. **Recognising and dignifying women's knowledge and role in agriculture and governance is paramount in securing seed diversity and climate change resilience.**

3. The knowledgeable elder women and men living today are the last generation with life-long experience as custodians of seed and diversity based agriculture. When they pass on, their seeds and the knowledge will go with them, unless their communities learn from them. The testimonies in this report show how women who are already taking the lead in this work are eager to inspire others, when they have the opportunity to do so. **Enabling women to play this role in knowledge transfer is our responsibility to generations yet unborn, and it is urgent.**

4. The mounting forces against women and small farmers required a response from strong social movements in order to resist corporate control and affirm their right and responsibility to defend ancestral seed and lands. **The Food Sovereignty movement and women's movement have an ever more critical part to play in supporting women and their communities to take back control of their land, farming and seed systems, and to link up with others to strengthen resistance and resilience.**

Woman farmer, Ethiopia. Damian Prestidge for The Gaia Foundation.

Acronyms

ABN	African Biodiversity Network
AFSA	Alliance for Food Sovereignty in Africa
AGRA	Alliance for a Green Revolution in Africa
ARIPO	African Regional Intellectual Property Organisation
CBD	Convention on Biological Diversity
CCD	Colony Collapse Disorder (bees)
CGIAR	Consultative Group on International Agricultural Research
CIKOD	Centre for Indigenous Knowledge and Organisational Development (Ghana)
CO2	Carbon dioxide
COMESA	Common Market for Eastern and Southern Africa
CSK	Community Seed and Knowledge
EOSA	Ethio-Organic Seed Action
FAO	United Nations Food and Agriculture Organisation
Gaia	The Gaia Foundation (UK)
GE	Genetic Engineering
GM	Genetically Modified
GMOs	Genetically Modified Organisms
GRABE	Groupe de Recherche et d'Action pour le Bien-Etre au Benin - Research and Action Group for Wellbeing (Benin)
G7	Group of 7 (major advanced economies)
G20	Group of 20 (international forum for governments and central bank governors from 20 major economies)
IAASTD	International Agricultural Assessment of Science and Technology for Development
ICE	Institute for Culture and Ecology (Kenya)
IKS	Indigenous Knowledge Systems
IPCC	Intergovernmental Panel on Climate Change
ISD	Institute for Sustainable Development (Ethiopia)
ITPGRFA	International Treaty on Plant Genetics for Food and Agriculture
MELCA	Movement for Ecological Learning and Community Action (Ethiopia)
NAFSAN	New Alliance for Food Sovereignty and Nutrition
NAPE	National Association of Professional Environmentalists (Uganda)
NGO	Non-Governmental Organisation
N2O	Nitrous Oxide
RAINS	Regional Advisory Information and Network Systems (Ghana)
SADC	Southern African Development Community
SNS	Sacred Natural Sites(s)
SALT	Society for Alternative Learning and Transformation (Kenya)
TKS	Traditional Knowledge Systems
UNEP	United Nations Environmental Programme
UNESCO	United Nations Educational, Scientific and Cultural Organisation
WHO	World Health Organisation

Glossary

Agribusiness - a catch-all term for profit making organisations conducting or facilitating agricultural ventures according to commercial principles, typically on a very large scale and using 'advanced', high input technologies.

Agrobiodiversity - the variety of plants, animals and micro-organisms whose existence is possible and sustained by interactions between human agricultural practices and ecosystems.

Agroecology - the application of ecological principles to agriculture or the wider food system. Agroecology builds on the accumulated knowledge and practices which farming cultures have built up over centuries, adapting to their particular ecological and climatic conditions

Agroforestry - a form of agriculture that integrates the cultivation and conservation of trees with the growing of food crops.

Biocultural diversity - the interlinked diversity of cultures and ecosystems that has co-evolved through reciprocal interactions between the two.

Biodiversity - a short form of biological diversity, means the diversity of life in all its forms.

Climate Change - a change of climate that can be attributed directly or indirectly to human activity and alters the composition of the global atmosphere - and which is in addition to natural climate variability observed over comparable time periods.

Community Ecological Governance - a term coined by the Gaia Foundation, the African Biodiversity Network and partners, to describe the bedrock that needs to be strengthened for achieving community and ecosystem resilience. This can be achieved through accompanying communities to revive and protect indigenous knowledge, seed and food systems, sacred natural sites and their community governance systems; the passing of knowledge between generations; restoring cultural identity and confidence - especially among women; and re-weaving respectful relationships within the community and with the Earth.

Conservation - the protection or restoration of natural ecosystems, vegetation, and wildlife.

Cross-Pollination - to pollinate a flower or plant with the pollen of another and thereby mix their gene pools.

Deforestation - the clearance or destruction of a forest or section of forest and conversion of the land to non-forest use.

Domestication - the process of changing the genetic make up of a group of living organisms over generations through selective breeding, to accentuate traits that makes them more useful to human beings.

Eco-cultural mapping & calendars - a community mapping process developed by Colombian organisation Gaia Amazonas, with indigenous communities in the Amazon. Through exchanges and trainings, the process has being shared with African groups by the Gaia Foundation. It enables a participatory and community-led process of developing maps and calendars of the ancestral past, the present and the future - with indigenous knowledge of the territory, farming systems and agrobiodiversity, climate and the ecological indicators of changing seasonal cycles.

Ecosystem - an interconnected community of biological organisms interacting with one another and their physical environment.

Food Sovereignty - the right of peoples to healthy and culturally appropriate food produced through ecologically sound and

Glossary

sustainable methods, and their right to define their own food and agriculture systems.

Gene pool - the stock of different genes in an interconnected system or population of living organisms.

Genetically Modified Organism (GMO) - an organism created by the modification of its genetic material at the molecular level- usually the addition of DNA from another organism, that would not or could not have occurred naturally. In crop species genetic modifications are patented as the intellectual property of the industry body that creates them, allowing them to control and collect royalties for its use.

Germplasm - a collection of genetic material belonging to an organism. For example, a collection of seeds.

Green Revolution - name given to the dramatic increase in the use of chemicals fertilizers to stimulate crop production, and synthetic pesticides and herbicides to kill pests and weeds, together with laboratory bred 'high yielding' varieties, introduced during the mid 20th century. In order to achieve high yields, green revolution crops were developed to depend on these "chemical inputs" derived from fossil sources and available from industry. The increase in production came at a high cost: research has shown that the chemicals killed off the vital soil organisms and dried the soils, making them infertile; the chemicals eliminated important insects and pollinators as well as 'weedy' food crops, and damaged ecosystems and human health; farmers became dependent on industry seeds and inputs, got into debt and lost their own seeds. Since the late 1990s, the development discourse in Africa began to dominated by the mantra of a New Green Revolution in Africa.

Herbicide - a synthetic chemical substance, commonly known as 'weedkiller', which kills or inhibits growth of plants other than the seeds bred to resist the toxin.

Hybrids – though they can occur naturally, the type of hybrid seeds or plants referred to in this report are created by cross breeding plants in such a way that the characteristics they were marketed for only appear in the first harvest. This makes it impossible to save or exchange seed for the following season. It is a win-win situation for the seed industry, as farmers have to buy new seed each season, which often leads to indebtedness. Hybridized varieties include the most common vegetables as well cereals.

Indigenous - in this report, the term means originating from or occurring naturally in a particular place.

Industrial agriculture - the dominant system of modern farming, also known as intensive farming or agriculture. It is charicterised by the use of advanced technology and machinery on a large scale, and promoting monoculture; requiring limited labour, and high inputs of fossil fuels, pesticdes and other chemicals.

Intellectual property rights - rights enabling an inventor to exclude imitators from the market for a certain period of time. With reference to seed and plants the term 'intellectual' refers to the scientific knowledge used to modify living organisms. The addition of this 'intellectual innovation' (the genetic addition of a strain of bacteria for example) was contentiously used to allow seed to become property through laws that recognise either patents or Plant Variety Certificates. This introduced the controversial idea that life could be owned and controlled. Companies promoted this to gain control over and capitalise seed supplies.

Land grabbing -refers to large-scale land acquisitions by governments and private firms, driven by industrial agriculture, speculation and extractive industires. The loss of farming land threatens the livelihoods of small scale farmers and compromises food security.

Monoculture - the cultivation of a single crop in a certain area, or, more broadly, the predominance of a single cultural idea or system over a diversity of others in an area or globally.

Patent - a set of exclusive rights granted to an individual or organisation by a sovereign authority to make, use or sell an invention regarded as their intellectual property. This can apply to new machines or technology, and even biological 'creations' such as GMOs and hybrid seed 'created' by humans. Patents guarantee private property over seeds that are considered to be new 'inventions' and prevent other people or industries from using or selling the 'invention' during a period of 20 years. Like Plant Variety Protection laws, patents confer property rights not only over seeds but also over the harvested and even processed crops. GMOs tend to be protected by patent.

Plant Variety Protection - a legal system that gives property rights to plant breeders over seeds. It enables nations to issue plant variety certificates that protect these rights by prohibiting farmers from reusing their seeds and/or demanding the payment of royalties for their use. The protection of plant varieties exists at the level of each country and is regulated at the international by UPOV, it differs from the patent system but both are examples of so-called 'intellectual property'. Plant variety protection and patents developed as two different systems, but today they tend to complement each other in guaranteeing property rights over living organisms.

Pollination - to convey or deposit pollen on a flower or plant, allowing fertilisation to occur.

Poly-cultural systems - the cultivation of many crops in a single area. Home gardens in Africa are typically rich, small poly-cultural fields.

Reciprocity - the non-market exchange of goods or labour between individuals, social groups and ecosystems that builds relationships between them and is for their mutual benefit.

Resilience - the ability to withstand or 'bounce back' from a period of disturbance or a sudden change.

Symbiosis - a relationship between two different organisms or groups that is mutually beneficial.

Traditional Knowledge - knowledge from a community's ancestral heritage, which continues to develop through careful observation and interaction with their land and ecosystems - also referred to as indigenous knowledge. It is passed on from one generation to the next through learning from experience and practice.

UPOV - refers to the the International Union for the Protection of New Varieties of Plants. This institution unites the countries that recognise Plant Variety Protection laws. Member countries guarantee breeders' rights to develop new varieties of plants and protect their 'innovations'. Recently many African countries have been pressured to become UPOV members through free trade or bilateral agreements between made with the United States or the European Union. The majority of member states have joined UPOV under the most recent version of its convention, passed in 1991, which strongly limits the autonomy of farmers over their seeds. The highly restrictive and even punitive laws of 'UPOV 91' have enabled transnational companies to control the industrial seed market.

"We welcome this timely report that celebrates rural African women, their relationship with seed, and their role in building a strong movement for food sovereignty. Right now, Africa is facing a huge threat to its rich and diverse seed, food and farming systems, as multinational seed companies lay claim to seed varieties as their private possessions, and our governments move blindly towards a regionally seamless and expedited trade in commercially bred seed varieties for the benefit, mainly, of the foreign seed industry. We cannot let this happen. This report shows us why and how it will impact on women especially."

Million Belay, Alliance for Food Sovereignty in Africa (AFSA)

"While the world has seen significant advances for communities fighting to realise their rights to land, food, and water, there is still much to be done. This publication focuses on the essential role of women as earth activists and custodians of seed. It talks about an agriculture that recognises and respects the essential role of women in food and nutrition, health and well-being, and does so in an accessible and fascinating way. Well done to the Gaia Foundation and the African Biodiversity Network for continuing to challenge the way we think and interact with our planet."

Louise Olivier, Open Society Initiative of Southern Africa (OSISA)

"In Zimbabwe we have observed that women farmers have very specific crops which they want to grow in addition to staple crops like maize. The surest way and perhaps the only way of accessing these seeds is to save them from their own harvest. Women farmers can maximise the number of crops grown on their land, and produce grains for a varied and nutritious diet. This report will contribute to increasing awareness on the critical role that African rural women are playing to save knowledge as well as seed diversity."

Nelson Mudzingwa, Zimbabwe Smallholder Organic Farmers Forum (ZIMSOFF)

"In the last few decades, Africa has been under tremendous pressure to open up its economies to foreign corporations, to industrialise its agriculture and to privatise its precious seed diversity. In the process, the contribution and profound knowledge of its rural women have been increasingly sidelined, marginalised and violated. Read this report to understand how this happened and why it is high time to support Africa's women to take centre stage again in farming systems, revive their knowledge and lead Africa towards food sovereignty."

Henk Hobbelink, GRAIN

"Few publications address the crucial role of African women as curators of some of the richest agrobiodiversity on the planet, much less map out not only the driving forces that cause these women to lose their heritage, status, and security, but that also discuss what can be done about this from the perspective of the women themselves, as well as their allies in the scientific and development community. Three cheers for this vital contribution!!"

Prof. Patricia Howard, University of Kent

African Biodiversity Network ABN

the Gaia foundation

AWDF African Women's Development Fund