

[DRAFT for COMMENT]

**International Planning Committee for Food Sovereignty (IPC)
Agricultural Biodiversity Working Group#
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***Biodiversity for Food and Agriculture:
the perspectives of small-scale food providers***

**Thematic Study for FAO's report
"State of the World's Biodiversity for Food and Agriculture"**

20th November 2015

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International Planning Committee for Food Sovereignty (IPC) Agricultural Biodiversity Working Group¹

Biodiversity for Food and Agriculture: the perspectives of small-scale food providers²

Contribution to FAO's report "State of the World's Biodiversity for Food and Agriculture" (SoW-BFA)

Thematic Study, November 2015

BACKGROUND and PURPOSE of the STUDY

The Secretariat of FAO's Commission on Genetic Resources for Food and Agriculture (CGRFA) has commissioned the International Planning Committee for Food Sovereignty (IPC) to prepare this study, which will be the IPC contribution to The State of the World's Biodiversity for Food and Agriculture (SoW-BFA).

This report reflects perspectives of civil society organisations (CSOs) including social movements of small-scale food providers about biodiversity for food and agriculture³. It presents what CSOs and, in particular, women and men small-scale food providers in a range of production and harvesting systems, are doing to develop and defend biodiversity for food and agriculture, above and below ground and in waters.

The report presents, in the framework of food sovereignty, the perceptions of the nature and impact of the drivers of loss of biodiversity for food and agriculture. Further, it presents CSO activities, which have helped mobilise and enabled communities and social movements in many productive ecosystems across the world, to sustain and improve biodiversity for food and agriculture and resist changes that undermine it.

As well as providing input to the FAO report, it is also intended that it will contribute to the discourse in social movements about biodiversity for food and agriculture.

¹ The International Planning Committee for Food Sovereignty (IPC) is the civil society interface with FAO on matters concerning food security. It is an autonomous and self-organised global platform of small-scale food producers, rural workers' associations, grassroots/community-based organizations and social movements to facilitate dialogue and debate among actors from civil society, governments and others actors working on Food Security and Nutrition agenda at the global and regional level. The IPC's Agricultural Biodiversity Working Group, which has been commissioned to prepare this paper.

² This paper covers the contribution made by farmers, pastoralists, forest dwellers, fishers and other small-scale food providers to the conservation, development and sustainable use of biodiversity for food and agriculture

³ "Biodiversity for food and agriculture" is the sub-set of biodiversity developed by or co-evolving with people in all types of environments (and at all levels – varieties/breeds, crops/livestock/fish/forest, food-producing ecosystems) on land above and below ground, in inland waters and in the sea. It embraces not only all species harvested by people (crop, livestock, forest, fish, aquatic, fungal, insect etc.) but also the support species – e.g. pollinators, predators, soil microorganisms and the ecosystem functions provided by these species – which enable the harvested species to flourish. It takes into account the different ways land and water resources are used for production, and also cultural diversity, which influences human interactions at all levels. From the perspective of the IPC agricultural biodiversity working group, "Biodiversity for Food and Agriculture" is synonymous with "Agricultural Biodiversity" as defined by CBD, FAO and others: see, for example: <https://www.cbd.int/doc/case-studies/agr/cs-agr-1998-12-rpt.pdf> ; <http://www.fao.org/docrep/x2775e/X2775E03.htm>

Methodology

The report is focused on presenting the perspectives and experiences of social movements and civil society organisations on the state of biodiversity for food and agriculture. In this sense, the methodological approach has prioritised the compilation of testimonies and initiatives of local organizations that are directly involved in the management and conservation of biodiversity and depend on it for their livelihoods. These have been supplemented by information from other sources to provide both further examples of actions and activities by small-scale food providers and also more general information about biodiversity for food and agriculture.

Members of the International Planning Committee for Food Sovereignty (IPC) Agricultural Biodiversity Working Group prepared a framework proposal, identifying particularly relevant challenges and opportunities for biodiversity conservation, development and use. The themes and priority areas were inspired by documents and recent position declarations of networks and social movements representing peasant agriculture, artisanal fishers, pastoralists, forest dwellers and indigenous peoples around the world.

The method of data collection was constrained by the resources and time available to carry out the work. To document testimonies that bring in the voices of local organisations, the writing team prepared a questionnaire. (see Annex 1). This was sent in the second half of 2014 by e-mail to key contacts in networks and regional organisations across the world. Hub contacts such as MAELA – the Agroecology Movement of Latin America – disseminated the questionnaires in their regions to other grassroots organisations. CSO groups, such as the agricultural biodiversity community (abc) network⁴, were also sent the questionnaire. In addition, whenever possible, there were discussions with food producers from social movements who were present at team meetings and in various international meetings in 2014 and early 2015.

Unfortunately, there were few answers to the questionnaire, confirming the limitation of this approach for collecting information from and about grassroots organisations. Direct interviews to fill the void at that stage were not feasible. The team therefore decided to intensify information gathering through searching documents published online and in hardcopy collections. This search considered documents prepared by CSOs, declarations and reports by social movements as well as scientific literature, especially for the initial sections that considered small-scale food providers perceptions on biodiversity for food and agriculture and their concerns about losses and the causes of these.

For the final section on what small-scale food providers are doing to regenerate and sustain biodiversity for food and agriculture, the search focused on information about and by grassroots organisations published online in different languages and formats, including videos, newsletters, workshop reports, websites and social media. This was time-consuming in finding the original sources and triangulating information, but revealed the wealth of information published by local organisations, especially on video platforms. Unfortunately, many of these videos are in local languages and may not be translated into one of the languages used by the writing team (English, French, Spanish, Portuguese) and therefore could not be used. The authors have also referred to and quoted from Declarations produced by civil society and social movements' forums in the past decade.

Testimonies provided both by questionnaire respondents and via the documented resources give a sample of the diversity of productive environments and uses of biodiversity for food and agriculture, as described in the matrix (see Annex 2). This matrix attempts to present cross-sectoral / producer group and cross-agro-climatic zone classification in the world. A number of these have been summarised in the third section.

While the authors recognise and thank the IPC Working Group and the many other people and organisations who have contributed to the study it has been prepared by a team of writers⁵ who remain responsible for its content and any errors of fact or interpretation. .

⁴ The agricultural biodiversity community (abc) network was set up as part of joint programme of Dutch NGOs HIVOS and Oxfam NOVIB. It involves NGOs mainly from Africa, Asia and Europe in activities to that foster knowledge sharing, learning, co-creation, collaboration and inspiration. The abc network helped prepare the Agricultural Biodiversity special issue of ECO for World Food Sovereignty Day, published at CBD/COP12 in 2014 www.cbdalliance.org/en/images/ECO_Files/COP12/ECO_50_special_issue_agriculture.PDF

⁵ The writers team comprised Bob Brac (BEDE), Angela Cordeiro, Patrick Mulvany and Maryam Rahmanian.

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Biodiversity for Food and Agriculture: the perspectives of small-scale food providers

Contribution to the “State of the World’s Biodiversity for Food and Agriculture”

SECTION 1: What does biodiversity for food and agriculture mean for small-scale food providers

1.1 Introduction

“I live off it. I feed myself from Pachamama. The water I drink and the air I breathe comes from Pachamama. This is my story. Here we still live with dignity, we don’t just survive”.
Member of the Women Defenders of Pachamama Front ⁶

Biodiversity is an essential part of ancient peasant strategies for survival and autonomy. It is the manifestation of the creativity and knowledge of peasants as they engage with the natural environment to satisfy their needs. Biodiversity embodies a dynamic and constantly changing patchwork of relations between people, plants, animals, other organisms and the environment, continuously responding to new problems and finding new solutions. In short, biodiversity can be seen as the result of the inter-play, across all ecosystems and over thousands of years, of cultural diversity and biological diversity.

The resulting diversity is very rich, with some production systems showing an extraordinary extent of diversity. For example, shifting cultivation, which is practiced in the tropics across the world, such as in Nagaland in India where at least 167 crops are cultivated in a typical jhum field (Ministry of Environment and Forests and Kalpavriksh 2004).

How do small-scale providers of food describe their relations with all living beings, in other words with “biodiversity”? How do these concepts shape the actions that they take through their search for survival and autonomy? How do they organise themselves to defend biodiversity and what have they been able to achieve? How can national and international institutions support them in their frontline work to continue adapting biodiversity to local conditions and to continue producing food - even today - for the vast majority of the planet’s people?

⁶ The Pachamama Front was created in 2006 to protect the water and the highlands territory of Azuay Region, Ecuador, from contamination generated by the mining projects. Thanks to these mobilizations, in 2008 Ecuador approved a norm called Mining Mandate, nullifying mining grants that did not obtain prior consent from local communities and mining projects situated in protected forests, buffer zones of protected areas and watersheds. However, the Ministry of Mining and Petroleum is not enforcing this norm properly.

This report seeks to answer these questions through the voices of small-scale food providers themselves – a challenging task. Peasants are often not organised into formal organisations, and even when they are, their priorities often focus on daily struggles to survive - which does not leave much time to document their experiences. For this reason, this report draws heavily on the reports of NGOs and those scientists who engage in participatory research. It also draws on reports of the organisations of small-scale food providers where available, some in-depth interviews, and the outcomes of civil society forums and workshops.

1.2 Cosmovisions

“Food integrity is ceremonial for Indigenous people, it’s not just a matter of nutrition. For example, people are linked to corn, or salmon. If something happens it changes the very identity of the people. So Indigenous people must be consulted and part of the decision-making process.”
- participant of Nyéléni 2007: Forum for Food Sovereignty

Traditional cultures include the diversity of peoples who have worked, and continue to work, with nature to provide food and other goods for themselves and the rest of humanity. They have, in general, developed important strategies for the sustainable use of natural resources in order to safeguard their livelihoods. “Because people were dependent for their survival on resources in their immediate environments, there were strong incentives for them to use resources sustainably. They could not mask this dependence with fossil fuel subsidies or capital markets in a globalized economy” (Berkes 2013).

The stories that human beings tell about the world around us determine how we interpret the events that take place within it and how we act in the world. What are the stories that small-scale food providers – the custodians of biodiversity – tell about all that is living? They are different than the stories that scientists and institutions tell about “biodiversity”.

Concepts of “biodiversity” may change over time and in different regions and production systems, but in general there are important overlaps which will be the focus of this chapter. Normally, peasants and Indigenous Peoples do not refer to the term “biodiversity” when speaking about all that is living unless they have adopted the term through their more recent engagements with science and/or policy. Therefore an exploration of the terms and concepts that they do use helps to uncover aspects of their worldviews that set them apart from scientific/institutional approaches to biodiversity.

Common to many traditional worldviews is the belief that all of nature is living and that humans beings are part of the family of living creatures, not outside of it. The landscape and all that it contains is living. “Traditional views tend to depict ecosystems not as lifeless, mechanical, and distinct from people, but as fully alive and encompassing humans. In some cases, traditional concepts of land also incorporate spirits of animals and other natural objects (as among the Dene of Northern Canada and Alaska), and spirits of human ancestors, as among some African groups and among the Australian aborigines (the concept of Dreamtime).” (Berkes 2013: 119).

The majority of native people from the Andean Region keep the ancestral “multiverse” cosmovision. According to this view, everything is connected, interrelated; nothing is out, but rather “all part of”. The harmony and balance of the unity and the whole are important for the community (Mamani 2010). This is mirrored by Amerindian people who personify plants, animals and fungi, as well as stars, watercourses and hills, among others. The narratives express the idea that all exist as

metamorphosis of others, with no differentiation between humans and other living or inanimate beings. More than concepts, nature and culture consist of viewpoints and perceptions, and can be interchangeable according to the context (Zent 2014).

These cosmovisions are echoed by indigenous peoples from other parts of the world, such as the Phnong people from Southeast Asia. Their cosmovision is animistic, which means that everything has spirits, including animals, plants, hills, stones, jars, buildings (UNDP Cambodia 2010).

The harmony of creation depends on human actions. As humankind is not separate from biodiversity, when there is diminished biodiversity there is disequilibrium i.e. sickness or disease in the entire system. For many indigenous peoples in South America their territory is a life space. The territory can be “prodigious land” (tierra sin mal), depending on both the knowledge and the ethical behaviour of people. People’s respect for customary norms allows soil, water and life to regenerate (ICCA Consortium 2012). The Aymara term “qamaña sum” is translated as “living well” or “live fully”, which means “live in harmony and balance”. They recognize that living against nature possibly allows human beings to live better, but that does not mean “living well” or a harmonious life between man and nature. Therefore, the “living better” approach is not accepted because it would mean that some people live better at the expense of the majority living badly (Zent 2014).

According to many traditional worldviews the relationship of human beings with unseen forces of nature conditions material reality. The African worldview is based on the understanding that the living world depends on the tripartite relationship between humans, nature and the spiritual world (Gonese et. al. 2003). According to the Karanga people, the ancestral spirits are the owners of humankind and responsible for its wellbeing. Their cosmovision is based on the three pillars of African philosophy: the human world, the natural world and the spiritual world. The Aymara and Quechua nations, for example, conceive that everything comes from two sources: Pachakama or Pachatata (cosmos father, energy or cosmic force) and Pachamama (Mother Earth, telluric energy or force), which generate all forms of existence. If human beings do not balance the sacred and spiritual in their daily lives (Chacha Warmi, Man Woman), it is no possible to achieve real changes in practical life. They also consider that all forms of existence have the same importance and keep a complementary relationship. (Zent 2014). Similarly in traditional Indian cultures it is believed that every dravya (natural substance) has distinct qualities (guna) and a definite role (karma) to play. Each species thus has value in its own place and is worthy of respect regardless of its worth to human beings (Ministry of Environment and Forests and Kalpavriksh 2004).

Just as biodiversity has supported livelihoods for millennia, respect for nature and its myriad life forms has enjoyed a central place in human cultures. In India, for example, animals and plants have been revered and often worshipped and forests, rivers, mountains and lakes are seen as abodes of the gods. The important tradition of sacred groves (protected patches of forest dedicated to deities and/or ancestral spirits) by many Indian communities is a reflection of the reverence for nature in their religious and socio-cultural life. (Malhotra et. al. 2001).

These brief examples have tried to paint a picture of the approaches to biodiversity of traditional cultures which are under much stress throughout the world. However, it is important to understand that these worldviews do not represent an “alternative” view, but rather inform the production systems that continue to deliver most of the world's food today. Even though these worldviews and the associated livelihoods systems are changing as pressures associated with processes of modernisation increase on the societies that hold them, nevertheless they are still important in many parts of the world, and in some cases where they have been lost, they are being recovered and sometimes re-created in new ways. In most places where biodiversity is still thriving, such worldviews are to be found.

1.2.1 Co-evolution has shaped human societies and nature

“We affirm that it is not possible to conserve animal diversity without protecting and strengthening the local communities that currently maintain and nurture this diversity....We defend a way of life that is linked deeply with our cultures and spirituality and not just aimed at production...”
Wilderswil Declaration 2007⁷

Human beings and other living beings have been engaged in an ancient relationship of mutual interaction shaping each other’s existence, a process of co-evolution. Nature shapes the possibilities of life for human societies and culture in turn shapes how we take care - or do not take care - of nature. Awareness of the links between nature and culture are explicit in some cultures. In several Indian languages, nature is seen as an unmodified life process, while culture is described as modified nature or life process (Ministry of Environment and Forests and Kalpavriksh 2004). There is a great deal of anthropological literature showing how interaction with a diversity of life forms and ecosystems has been the source of cultural evolution and technological innovation (McNeely 1992).

There are remarkable overlaps between the world’s biological and linguistic diversity on a global scale (the diversity of human languages has been used as the best available indicator of human cultural diversity). Ten out of 12 of the megadiversity countries (or 83 percent) also figure among the top 25 countries for endemic languages (Maffi 1999).

Farmer’s decisions regarding the biodiversity contained in a variety at a particular time are influenced by their context which is shaped by environmental, biological, cultural, socio-economic and policy factors. There are literally thousands of examples of particular varieties or breeds which are adapted to specific conditions.

Selection is not only shaped by material necessities, but also by factors such as spiritual beliefs and emotional factors. Alpaca and llama breeding by the wise men and women from Ayrumas Carumas requires special knowledge embedded in culture. The varied colours of alpaca wool [of which the indigenous peoples recognise 11 colours of alpaca wool] have a sacred dimension since they emanate from deep underground water sources. Breeding alpaca is not a simple technological matter, but requires the knowledgeable management of a highly complex combination of natural and ceremonial factors (Salas 2013).

⁷ Wilderswil Declaration on Livestock Diversity, 2007, organised by the International Planning Committee for Food Sovereignty and attended by representatives of social movements of pastoralists and other livestock keepers and support NGOs

Box 1.1: The colours of the alpaca

“The whitening of alpaca herds has been taking place for more than three decades, pushed by the big wool industry. White wool earns higher prices in the market since it is more suitable for uniform dyeing processes and large

scale manufacturing. While white alpaca fetch a higher price in the market, they are also highly vulnerable to disease. They are not adapted to the high altitudes, are genetically weaker, and their abortion rate is higher. Scientific breeding methods do not fit with traditional alpaca raising practices. When white alpacas get sick, the herders’ natural medicine is unable to heal them (neither can veterinary treatment at times). Meanwhile, Peruvian gastronomy has discovered alpaca meat and it is offered in menus of fancy city restaurants. This has created demand for large

scale alpaca meat production. All these challenges shake the epistemological basis of traditional alpaca husbandry. The wise men and women from Ayrumas Carumas, living in the watershed of the Rio Blanco in a wide and endless mountainous landscape, the perfect environment for flocks of alpacas and llamas, decided to stand up for what they knew. First, the varied colours of alpaca wool [of which the indigenous peoples recognise 11 colours of alpaca wool] have a sacred dimension since they emanate from deep underground water sources. Second, breeding alpaca is not a simple technological matter, but requires the knowledgeable management of a highly complex combination of natural and ceremonial factors. In order to talk to scientists, the Andean alpaca breeders want to organise what they know, hoping to arrive at an understanding to develop natural methods of healing and breeding so that alpaca meat does not lose its flavour and nutritiousness, which derives from clean pasturelands and pure mountain air....They also spoke about the origin of the colours, the medicinal properties of the hair, and last but not least, the loneliness that herders feel in an unnatural all white flock of alpacas.” (Salas 2013)

Moving beyond selection of a particular variety, breed or species, the interaction between nature and humankind can be seen in the fairly recently developed term of “bio-cultural territory”. In some parts of Latin America, grassroots organizations apply this term which can be defined as “an inhabited space that joins effort, creativity and human care for nature. Moreover, it is the place that communities’ culture reproduces itself to feed, heal, play and tell. The bio-cultural territory is also the place to feel and dream, to be aware about the self-identity, where myths and rituals that give meaning to community life can be recreated”. According to this vision, there is no dissociation between human beings and nature, and the territory represents much more than land tenure (Barrera-Bassols et al. 2012).

Understanding of the deep mutual engagement of humans and nature is not exclusively a hallmark of indigenous and traditional cultures. As farmers from regions with long-industrialised systems of agriculture start to re-learn the importance of biodiversity, their views seem to grow similar to those of the more traditional cultures. For example, Jean-François Berthelot is a French peasant and baker and a pioneer of on-farm conservation varieties of wheat (he maintains more than 400 varieties of wheat in living collection in his fields with the help of a local organization CETAB). He is a member of the Peasant Seeds Network of France, which includes more than 80 organizations. He explains that scientists view plants as objects whereas, “...for me as a peasant, the plant is a subject with whom I live, I dream, we exchange. This calls for the human being in his/her entirety, mobilizing not only all my sensory organs but also my imagination. It is in this intimate relationship where time and space allow continued exchanges with the plant in dialogue that my imagination is built....I personally do not wish to unravel the mystery of the being of the plant, because everything is in movement, evolving, and is linked also with the engagement of the entire human being, the human imagination, his/her relationship with the plant.”

Box 1.2: “Plants of civilisations” tell the story of co-evolution of humankind and biodiversity

“In my view it is not possible to disassociate the date palm from the oasis and from the date cultivator. They form an inseparable whole.”

Nordine Bensaadoune, a date cultivator in the Beni Isgen oasis in the central Sahara of Algeria. He takes care of 400 date palms, made up of 90 varieties (BEDE 2011).

Plants that characterise and make possible long-lasting human societies are features of all major civilisations. “Plants of civilisations” tell the story of societies and cultures which would not be possible without them.

The co-evolution of plants and humans is particularly clear in the case of the date palm. The date palm is a major crop in hot desert oases. It is a necessity in order to shelter settled human communities in hyper-arid zones. In the Sahara, some communities have been living with the date palm for millennia. Co-evolution is mandatory. Without human care and irrigation practices, the date palm cannot survive, and without the protection and the products of date palm no human community can maintain itself permanently in a desert territory. Diversification of date palm cultivars is huge. In each traditional oasis there are on average one hundred varieties and each variety has a specific use. Many exchanges -- of plants and knowledge, and social links -- occur between oases. Desert civilisation exists and the date palm is part of this civilisation.

Further north, towards the southern Mediterranean, the ancient Berber civilisation survives in the Atlas mountains from diverse occupations, in a co-evolution with figs and olive trees. For centuries the only staple food was figs, in everyday meals. As with the date palm, co-evolution occurred with large diversification and social links between figs and human societies.

In the North Mediterranean mountains the same story can be found with the chestnut which was for centuries the staple food of refugees, protestants escaping Catholic repression.

Of course in the Mediterranean and Near East wheat and barley civilisations (based on landrace diversity and still in co-evolution with farmer communities) are still alive, even though largely destroyed by the industrial Green Revolution.

Further south millet (pearl millet, but also fonio, teff, enset, sorgho) is among the civilisation plants of Africa. Since its domestication four thousand years ago in the Tumbuctu region, hundreds of generations of Sahelian societies have relied on Pearl Millet, the only cereal to be able to survive on less than 400mm rainfall/year. Here again diversification is amazing.

Further south, near and in the tropical forest, the yam civilisation is spread across a large area.

1.2.2 Scope of Biodiversity for Food and Agriculture

Given the worldviews expressed above about the inseparable wholeness of life, it is clear that small-scale food providers consider biodiversity for food and agriculture very broadly. It includes all living things that are essential for human sustenance. To be precise, “biodiversity for food and agriculture” is the sub-set of biodiversity developed by or co-evolving with people in all types of

environments (and at all levels – varieties/breeds, crops/livestock/fish, food-producing ecosystems) on land – above and below ground – in inland waters and in the sea. It embraces not only all species harvested by people (crop, livestock, forest, fish, aquatic, fungal, insect etc.) but also the support species – e.g. pollinators, predators, soil microorganisms and the ecosystem functions provided by these species – which enable the harvested species to flourish. It also includes the organisms involved in fermented foods, which are abundant in many cuisines to develop a special taste, enhance shelf life, nutritional qualities and digestibility. Biodiversity takes into account the different ways land and water resources are used for production, as well as including cultural diversity, which influences human interactions at all levels.

Defining biodiversity is not, however, just about listing the different constituent “parts” of biodiversity (plants, animals, soil, etc.), but about understanding the inter-linkages between them. In line with the view of the integrated wholeness of life, an awareness of the interactions between the “parts” of biodiversity is crucial, and is a key feature of peasant farming.

For example, in Rajasthan, grazing by buffaloes and camels helps control weed populations and this, in turn, supports nesting habitats for bird colonies. The birds in turn help to control pest populations (VIKSAT and Nehru Foundation for Development 2003).

The Tamia fisherfolk community, in the South of Madagascar, is in charge of Tsinjoriake, a protected area comprising a mangrove ecosystem, an important dry forest and the habitat of many species, birds and lemurs. They are convinced that the conservation of the forest and wildlife is essential for the maintenance of the mangroves and sea life in general and this is why they decided to protect it. Similarly, the communities that protect Ankodida—a biodiverse forest in the Anosy region—do so because the area maintains a microclimate that permits them to find some water even during the dry season, when food is extremely scarce (ICCA Consortium 2012).

1.2.3 Modern ecological worldviews

“The young generation of farmers in my region are more interested in diversity, whereas their parents were working according to the industrial model.”

Jean Louis, participant at the Wilderswil Forum on Livestock Diversity, Confederation Paysanne, France

Worldviews that respect nature are not exclusive to traditional societies. In addition to the more traditional worldviews, a number of contemporary concepts explore and offer ideas that may help restore a sense of sacred respect for nature. They include Naess’ deep ecology, E. O. Wilson and Stephen Kellert’s biophilia hypothesis (love of living beings), and the Gaia hypothesis of James Lovelock (Berkes 2013). The views that form the foundations of biodynamic agriculture and permaculture and similar types of production have with some traditional worldviews. As the ecological crisis deepens ordinary citizens and also modern day farmers are becoming increasingly interested in schools of thought that give greater value to nature and to the inter-relatedness of all living beings.

1.2.4 Knowledge systems

“Our knowledge is alive, shows itself in many ways and is essential for food sovereignty. It is local, collective, and diverse and is ever changing and dynamic – not static – and gathers strength through exchange and solidarity.”
 Synthesis Report, Nyéléni 2007: Forum for Food Sovereignty.

Within the world of people's knowledge systems there is a gathering of hypotheses, observation, experimentation and evidence that spans centuries of experience. These knowledge systems have their own peer review systems. For example, positivist science insists that testing must be done by “controlling” all but one of the variables, however an effort to “test” indigenous knowledge in Sri Lanka soon found that it was impossible to test indigenous practices *separately* in an effort to find out “what worked” because the practices were inter-related. “One practice, for example, could include ecological concepts and materials, astrological timing, spiritual influences and social norms.” (Upawansa and Handawela 2003). Faced with this complexity (and not wanting to reduce it to its “constituent parts”), the researchers eventually came up with a measure of 'degree of indigenoussness' of the practices of a particular farmer and compared this with his or her costs, labour, yields and farm income. They found that though it was difficult to come up with all the data they wanted, it was still possible to draw some general conclusions.

While there is an increasing recognition among many international and some national institutions about the importance of indigenous knowledge, this rarely means giving equal importance to indigenous knowledge. In reality, where multiple knowledge systems are concerned, the supremacy of positivist science is normally tacitly assumed. Attempts to incorporate indigenous knowledge and public or citizen science often include only those aspects that are consistent with positivist science (Leach and Scoones 2003). According to the sociologist Boaventura de Sousa Santos, “Faced with rival knowledges, hegemonic scientific knowledge either turns them into raw material (as is the case of indigenous or peasant knowledge of biodiversity) or rejects them on the basis of their falsity or inefficiency in the light of the hegemonic criteria of truth and efficiency” (de Sousa Santos 2006).

The hegemony of positivist science is very risky. This knowledge system has focused on dividing inter-connected parts of the whole into separate objects. It has been argued that if our soils, rivers, food and bodies are polluted it is because we have lost the ability to appreciate the whole (Jones et. al. 2011). Not only does this lead to ecological crisis, but also to social crises: in separating mind from reality, the objective worldview also separates us from our experience, from each other and from nature (Reason 1998).

1.2.5 From cosmovision to practice

Traditional worldviews have shaped specific practices and institutions that help to develop and safeguard diversity. These include landscape and field management practices, such as terracing, fallowing, run-off channelling, soil moulding, mulching, use of fire, selective weeding, interplanting, to name a few (Alcorn 1991).

In general, religious or cultural sanctions have been an important mechanism for the protection of biodiversity. These sanctions may be invoked in two ways: through the prohibition of species or of areas (Berkes 2013).

Prohibitions on species

Months or seasons of worship of certain species protect them for regeneration, such as restrictions on using plants during flowering and fruiting seasons (Malhotra 2003). Species associated with rituals often have important functions such as medicinal, food, or economic value. Restrictions of use refer not only to wild biodiversity for food and agriculture, but also domesticated biodiversity. “It is a taboo among the pastoral communities to sell the female breeding stock. It is a custom even today to maintain the breeding bull as a ‘temple bull’ or as a community resource in Tamil Nadu, Rajasthan and many other parts of India.” (Prakash 2003: 29).

Prohibitions on areas: sacred groves

Sacred groves are areas of natural or near-natural vegetation, where harvesting of any living matter is generally prohibited. This customary protection of the habitat over centuries has resulted in conservation of a range of rare and endemic species in the sacred groves. Sacred groves or sacred forests occur throughout the world, especially in India, Indonesia, South America, and parts of Africa. Even today their number is not insignificant. At least 13,720 sacred groves have been reported so far in India, but the National Biodiversity Strategy and Action Plan of India estimates that the true figure is likely to be between 100,000 and 150,000 (Malhotra 2003).

The biodiversity that sacred groves help conserve is certainly significant. A botanical survey in a sacred grove in Nigeria showed 330 plant species in the area compared to 23 in surrounding non-protected areas (Berkes 2013).

1.3 Women and biodiversity

“Women traditionally held knowledge, we are losing part of ourselves as women when we lose our seeds and the knowledge they contain. Loss of biodiversity is connected to loss of identity and loss of knowledge.”

- participant of Nyéléni 2007: Forum for Food Sovereignty⁸

“We are 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 resources and the struggling to end violence in every form, sharpened before this capitalist and patriarchal economical system.”

The Women of La Via Campesina International Manifesto issued in June 2013, during the IV Women’s Assembly⁹

Across the globe, women predominate as wild plant gatherers, home gardeners and plant domesticators, herbalists and seed custodians as well as custodians of related knowledge.

Women and men often have different knowledge about, and preferences for, plants and animals. Across the globe, women predominate as wild plant gatherers, home gardeners and plant domesticators, herbalists and seed custodians as well as custodians of related knowledge. Women

⁸ The Forum for Food Sovereignty: Nyeleni 2007 was a key milestone in the movement for food sovereignty, organised by a broad coalition of social movements and civil society organisations and with the participation over 500 participants from more than 80 countries.

⁹ Women of La Via Campesina International Manifesto. 2013. IV Women’s Assembly, Jakarta, June 2013. Available at <http://viacampesina.org/en/index.php/our-conferences-mainmenu-28/6-jakarta-2013/resolutions-and-declarations/1451-women-of-via-campesina-international-manifesto-2>

represent the main guardians of livestock diversity. In spite of this, it is often true that women do so without equitable participation in the access and control of natural resources needed to sustain biodiversity. For example, women's criteria for choosing certain food crop seeds may include cooking time, meal quality, taste, resistance to bird damage and ease of collection, processing, preservation and storage. For example, in Mexico, maize varieties preferred by women are the most resistant to the local weather, the most nutritious and give the highest tortilla yields; these maize varieties are different from the ones grown for commercial purposes (Cabrera et al. 2001). Men are more likely to consider yield, suitability for a range of soil types and ease of storage. Both are essential for human welfare (Aguilar).

Women represent the main guardians of livestock diversity. First, women make up the majority of poor livestock keepers, representing two-thirds of the estimated 600 million poor livestock keepers in the world. Second, because of their largely reproductive role in the economy, rural women tend to have an affinity for indigenous rather than improved breeds because they are easier to care for. Third, as women are severely disadvantaged with respect to land ownership, locally adapted breeds that can access and utilize common-property resources represent an enormous asset – playing a role that cannot be fulfilled by improved breeds. Finally, the feminization of agriculture in some areas as a result of out-migration of men to urban areas turns women into the main keepers, and thereby conservers, of locally adapted live-stock breeds, even if this is by default rather than because of a conscious decision.

In spite of the fact that an increasing number of experiences are highlighting the sustainable manner in which women use biological diversity, it is often true that women do so without equitable participation in the access and control of such resources. There is a tendency to ignore the natural spaces predominantly used by women in favour of those used by men, and to undervalue non-commercial (mostly female) production spaces in favour of commercial (mostly male) production spaces

The majority of plant biodiversity research is not gender sensitive. This has led to incomplete or erroneous scientific results with respect to the diversity, characteristics and uses of plants, and the causes and potential responses to genetic erosion.

1.4 The multiple roles of biodiversity for food and agriculture

The approach of peasant communities to biodiversity is strongly characterised by multiple roles. When asked what prompts them to make particular decisions to grow a certain crop on their fields, farmers in the Deccan plateau of India came up with a list of 16 points: need to raise two or more crops during a year; crop durations; need for cash; ensuring food security; need for fodder; need for fuel wood; need for thatching/fencing material; need for fibre; need for vegetables; need for oil; special foods for specific festivals; rejuvenating soil fertility and 'strength'; storability; need to prepare land for the next crop; medicinal properties; and warding off and reducing pest incidence (Satheesh 2002) The same holds for wild species. In Nepal, the Rai and Sherpa communities use 47 wild species for household consumption, 38 for fodder, 19 for medicine, 5 for religious and ceremonial purposes, 11 to make household implements, and 11 for trade as raw and processed materials (Sthapit et al. 2006). Some of the most important functions of biodiversity from the point of view of peasant societies are briefly explored below.

1.4.1 Survival and autonomy

Biodiversity is an essential part of peasant strategies for survival and autonomy. It is precisely the emphasis on diversity, and on the use of local resources, which has given traditional systems the stability and sustainability that has ensured agricultural productivity for centuries (Altieri 1990).

1.4.2 Culture

All traditional societies that have succeeded in keeping their resources productive over time have done so in part through religious or ritual representation of resource management, although perhaps the key point is not religion per se, but the use of emotionally powerful cultural symbols to help maintain a sense of sacred respect (Anderson 1996).

For example, in folk and tribal communities, music is not just a form of entertainment but is an essential element in many activities of daily life and plays a prominent role in several rituals. In the agricultural cycle — events such as planting, transplanting, harvesting, winnowing, threshing, grinding etc., are all marked by songs and music. Many key concepts such as seasonal diet; agricultural practice, cleaning and conservation of water bodies make up the lyrics of these songs. The songs also serve a ritual purpose — a harvest song may give thanks to God for a beautiful harvest, but it also is sung with the belief that this traditional song, if sung, will ensure that the following harvest will also be fruitful (Malhotra 2003). However, the use of culture is not just about the folkloric traditional practices of the past. Culture is a potent tool for organisations and communities working to safeguard biodiversity today. In Nepal, modern local organisations are using drama, poetry, song and diversity fairs to promote awareness about the importance of agricultural biodiversity and to share knowledge about specific varieties (Sthapit et al. 2006).

1.4.3 Ecological production

Multiple species and multiple breeds/varieties

Many traditional practices are starting to be better understood and supported by scientific literature. For example, maintaining a diversity of crops (both temporally and spatially) is an established part of good agronomic practice. “Crop rotations, intercropping and growing different varieties of a single crop have all been shown to have beneficial effects on crop performance, nutrient availability, pest and disease control and water management. Multicropping, intercropping, alley farming, rotation and cover crops are all ways of combining crop species in ways that have positive effects on productivity and yield stability. Species-rich communities also deliver other ecosystem benefits, such as greater water retention in the upper soil, greater diversity amongst complementary and associated species (including pest-controlling organisms above and below ground) and overall greater resource use efficiency than in species-poor communities”. [FAO and PAR 2011]

The use of multi-species and multi-breed herds and flocks is one strategy that many traditional livestock farmers use to maintain high diversity in on-farm niches and to buffer against climatic and economic adversities (FAO and PAR 2011). Species combinations enhance productivity and yields also in aquatic systems. Diversification of fish species and breeds in aquaculture also enhances resource use efficiency and reduces waste. (FAO and PAR 2011).

Intraspecies diversity can also be directly beneficial in cropping systems. Traditional farmers often return to genetically heterogeneous local varieties to help recover from extreme weather events, such as flooding, droughts and storms and to cope with specific additional stresses such as climate change. Under stress conditions, the risk of crop failures is lower with landraces than with modern varieties; . This leads farmers to perceive landraces and intraspecific diversity as an additional instrument for ensuring stability and productivity under unpredictable climatic conditions. Modern varietal mixtures of many crops can also out yield the mean of their monocultures (FAO and PAR 2011).

1.4.4 Nutrition

Nourishment is an important motivation behind the co-evolution of humankind and biodiversity. The sources of nourishment come from wild and cultivated biodiversity, from farms, territories but also from home gardens. In Bangladesh at least 40 percent of the food consumed by the poor comes from uncultivated sources (Sthapit et al. 2006). Women farmers of the Medak district of Hyderabad, India are full of praise for the nutritional values of uncultivated greens: "it helps us cope with the poverty and "Doggali greens are tastier than chicken eggs". They are also unanimous in the view that uncultivated greens bring "plentifulness" (barkat) to their meals. They use 79 different uncultivated leafy green vegetables. Many are extremely rich in micro-nutrients important to human health (Mazhar et al. 2007: 38). Their testimonies are backed up by academic research carried out in their communities. A study found that traditional food such as sorghum, pulses and green leafy vegetables are major sources of energy, protein, iron, vitamin C and vitamin A, and that mothers from villages with the traditional food intervention had higher intakes of energy, protein and iron. (Schmid et. al. 2007).

Home gardens are an important cornerstone of nutrition in many parts of the world. In West Java, Indonesia a single home garden can have from 56 to 602 species. These gardens have not only been important sources of food, fodder, fuel, medicines, spices, construction materials and income but have also been an important means for on-farm management of a wide range of plant genetic resources (Sthapit et. al. 2006).

Nutrition is rightly gaining more attention as malnutrition and obesity are recognised as major global challenges. Perhaps the solution to the obesity epidemic lies in biodiversity. "Diets increasingly low in variation but high in calories contribute to increasing problems of obesity and non-communicable diseases which can now be found coexisting with malnutrition or undernourishment in the same family or community (Popkin 2002).

1.4.5 Health

All cultures from ancient times to the present day have used plants as a source of medicines. Even today as many as 80% of the world's people depend on traditional medicine for their primary health care needs. The preliminary results of a study on behalf of WHO has shown that the number of individuals using medicinal plants is large and on the increase, even among young people. It is not just in developing countries that medicinal plants are important. In the USA, for example, 25% of all prescriptions from community pharmacies between 1959 and 1980 contained materials from higher plants (WHO et. al. 1993).

The other side of biodiversity and health is that systems which do not have enough biodiversity rely on chemical inputs like pesticides, herbicides and fertilisers. The health effects of these substances, both on human beings and on the rest of the natural system has been widely documented.

1.5 Changes over time

“Our Creation Story teaches us that the first Grandparents of our people were made from white and yellow corn. Maize is sacred to us because it connects us with our ancestors. It feeds our spirit as well as our bodies.” Juana Batz Puac, K’iche’ Maya, Day Keeper

As described above (see 1.1), peoples have cultural respect for, and help develop, biodiversity for food and agriculture. They are often the first to notice changes that could impact on this biodiversity.

Over millennia, biodiversity for food and agriculture increased first slowly then more rapidly in the past 1,000 years, as crops criss-crossed continents, until the advent of global industrial commodity production and the trickle-down of this model of production into local food systems. In the last 100 years it has become increasingly under threat, yet peasant producers, pastoralists and artisanal fisherfolk, those who provide the majority of the world’s people with food, continue to develop the biodiversity for food and agriculture. They are at the frontlines and therefore are almost always the first to notice changes that could impact on this biodiversity.

1.5.1 Centres of Origin and Diversity

The identification of the Centres of Origin of crops, based on an analysis of diversity of varieties in different geographical zones (Vavilov 1920), has helped pinpoint the cultures that originally developed food crops from wild plants. For example, the selection and development from the grass ‘teosinte’ to maize in meso America; the selection of nutritious non-shattering grasses that were developed into cereals in the Fertile Crescent; the development of breadfruit in the Pacific islands; the breeding of domesticated cattle in western Asia, chicken in SE Asia, pigs in China. The managed interactions between different types of plants and plants and animals, for example, legumes and grains, livestock and crop production, further develop diversity. These components of the Biodiversity for Food and Agriculture are in a constantly dynamic state of change as they coevolve with people and the human-managed environment (see 1.2.1 above). And with the development of the harvested species, other species important for their production, such as pastures, pollinators, soil organisms and pest-predators, coevolve with them, as do associated pest and disease organisms.

1.5.2 Migrations of crops and livestock

As populations migrated over millennia, they took with them their crops and livestock, which were then adapted to new ecologies and needs, creating ever more varieties and breeds. For example, the spread of beans from meso America to the Andes; wheat and other cereals across North Africa; rice from India southwards and west, and rice from China to the east; cattle from Asia across Africa and then to South America. All these migrations stimulated the development of new varieties and breeds. The interactions between cultures and communities that may have been based on exchange and trade of foods hastened the development of new varieties of crops and breeds of livestock adapted to the new environments.

With the increasingly rapid interactions over the past 1000 years between cultures resulting from conquest, colonisation and forced migrations, there were major shifts of crops across the world, in part driven by trade and in part as subsistence for the displaced populations (both conquerors and slaves). New crops spread from the Americas to Europe and vice versa after the Spanish Conquest

bringing, for example, tomatoes and potatoes to Europe and wheat to the Americas. Biodiversity for food and agriculture further increased in new locations.

1.5.3 Commercial pressures and historical changes in biodiversity for food and agriculture

Commercial incentives to move industrial crop production to more benign ecologies that had lower pest and disease burdens, more compliant labour and better access to commercial markets saw many plants moved rapidly across the globe e.g. sugar, rubber, coffee, cacao, quinine, to provide commodities and pharmaceuticals to dominant economies. Foods for oppressed labour were moved to new parts of the world such as Breadfruit brought by Captain Bligh from the Pacific to feed slaves in the Caribbean and cassava taken by the Portuguese from Brazil to feed slaves in West Africa. The development of global super powers in the 19th century with a reach across the globe facilitated, with the help of botanic gardens, the rapid movement of industrial crops around the world to be produced in vast plantations producing commodities such as oils, sugar, grains, coffee, tea and cacao. The rapid development of monocultures of plants, increasingly dependent on imported chemicals, and the unsustainable harvesting of terrestrial and aquatic plants and animals, displaced sustainable ecological practices and hastened the erosion of biodiversity for food and agriculture.

SECTION 2: How is the state of biodiversity for food and agriculture changing and what are the causes?

“We share a concern over the dangerous loss of agricultural biodiversity and of the loss of dignified and viable livelihoods in the countryside.”

Africa-US Food Sovereignty Statement, October 2014

In this section, testimonies and declarations provide an indication of the perceptions of small-scale food providers, mainly through quotes from their forums and similar gatherings, of the reductions in biodiversity for food and agriculture, the causes of the losses and the impacts of these. Although these perceptions of loss have many different causes, in this chapter the testimonies and statements are clustered under six headings relating to the impacts of model of production, land and water grabs, undermining collective control over biodiversity, markets, research and technology systems and governance.

These perceptions are made in the context of changes over the past five centuries, with the advance of colonialism, conquest and global commerce, the changes in the state of biodiversity for food and agriculture, especially of key food and commodity crops, have been dramatic as crops and domestic animals criss-crossed the globe and plantation agriculture became established across the world. In the past 70 years, in the wake of the 20th century global conflicts and subsequent instability in food supply, international efforts to increase production of staple grains and commodities were intensified. These efforts include the consolidation, intensification and simplification of peasant systems (Green Revolution technologies), as well as the industrialisation of agriculture and livestock production, including large-scale land-use changes from forests to crops, and the expansion of industrial fisheries.

“The loss of biodiversity in agroecosystems brings devastating consequences. ...simplified, human constructed agroecosystems may be unable to maintain their structure...[with] the accelerated loss of resilience and diversity and the erosion, salinization or decline in the fertility of soils”. (Egziabher 2002).

2.1 The Industrial Model of Production and Consumption

Box 2.1: Summary of perceptions of the causes of loss of biodiversity for food and agriculture

- **The industrial model of production and consumption** is rapidly eroding rural societies that manage biodiversity for food and agriculture.
- It uses **genetically uniform monocultures** of crops, livestock and fish, increasingly **genetically modified**, while locking up diversity in **gene banks**.
- **Land grabs and ocean/water grabs** extend the area under this model of production.
- Intensive use of **pesticides, herbicides and chemical fertilisers** further reduce biodiversity and ecosystem functions.
- **Climate change**, exacerbated by this model, is putting new pressures on the local diversity of crops and livestock as weather patterns change, and new pests and diseases proliferate.
- **Industrial research systems** for this model, de-value and erode peasant and indigenous knowledge, local research capacities and the multitude of local innovation systems which foster biodiversity.
- **Monopolies**, favoured by this model, control industrial seed, agrochemical and industrial commodity markets, which jeopardise freedom for peasants to access and use biodiversity.
- **Industrial Property Rights** and other laws which protect monopolies **criminalise peasant producers** who challenge the industrial model of production and consumption and its effects

The industrial model of production has the use of high-response crop varieties and livestock and aquatic breeds, high applications of agrochemicals and the simplification of ecosystems at its core. Its impacts in the countryside, as witnessed by peasants across the world, include the rapid spread of monocultures, increases in pesticide poisoning, resource consolidation and the exodus of producers.

“...the agricultural model imposed by agribusiness corporations, supported by international financial capital, and based on GM monocultures, the massive use of pesticides and the expulsion of peasants from the countryside... is primarily responsible for the food, climate, energy and urbanisation crises.”

Final Declaration at the 6th CLOC-Via Campesina congress, 2015

“... our soils, rivers, agro-ecosystems and forests are more and more degraded by industrial agriculture, and are still losing biodiversity and local seed production and the costs of conventional production based on the “Green Revolution” model continue to rise.”
Statement of the First Encuentro of Campesino to Campesino Agroecology (March 2015)

“The industrial model of livestock production is causing the destruction of our animal diversity as well as our own livelihood... The following consequences in livestock keeping communities due to industrial livestock production include: loss of small and family based production; smallholder bankruptcies and suicides; economic dependency, including through importation of feed; destruction of environment; young and new herders cannot enter into production because of economic barriers; breakdown of social relations; government research and breeding policies geared towards “high productivity” with the indiscriminate introduction of new breeds which have caused us to lose our local breeds”
(Wilderswil declaration, 2007).

The industrial model can produce excessive waste; it is built on an economy of surplus production rather than on the basis of ecological sustainability and realising the Right to Food.

“This food loss [due to the economic imperatives of the industrial food system] also results in a loss of biodiversity and a loss of resilience in food systems... This is what happens when the human right to culturally appropriate and nutritious food is reduced to an entry on an economic ledger.”
CSM intervention to CFS41, 2014

Ensor summarises some of the threats arising from the simplification of agricultural systems (see Box 2.2).

Box 2.2: Threats from the Simplification of Agricultural Systems

Current conventional industrial agriculture tends to simplify agricultural systems and reduces diversity. Agricultural methods and practices are made increasingly similar the world over to enable industrial scale production of similar products. Monocultures of single varieties of plants are grown over vast fields and prairies, in ways that facilitate mechanised planting, weed control, chemical spraying and harvesting. Similar seeds, livestock breeds, aquatic organisms, inputs and machines are supplied globally by an ever decreasing number of corporations. Diversity is the enemy of these large scale processes: diversity creates a complex landscape that prevents the homogenisation of methods and the uniformity of product demanded by the commodity supply chain. This simplification and the associated deterioration of the agroecosystems is compensated for through the introduction of chemical inputs - fertilisers, pesticides and herbicides and the increasing using of antibiotics in livestock. Thus, fossil fuel dependent industrial processes are required to provide agricultural inputs and sustain productivity. Yet while yields may be supported in the short term, these highly simplified agroecosystems cannot achieve homeostasis and remains in long term decline. (Ensor, 2009)

Industrial production is also both a cause of biodiversity loss as well as a driver of climate change, which, in its own right, also has impacts on biodiversity.

2.1.1 Climate change

As summarised by the same author (Ensor, 2009), conventional industrial agriculture relies heavily on fossil fuel. Mineral fertilisers, for example, are energy intensive to produce and also generate 19% of all human-induced nitrous oxide emissions. Fertiliser usage is projected to rise 37% by 2030. (Bruinsma, 2003) Energy assessments reveal that conventional crop rotations generate the equivalent of nearly three times more carbon dioxide than the same crops produced using organic methods. (Robertson, 2000). At the same time, chemical dependant large-scale monocultures undermine biodiversity, leading to increased vulnerability to environmental change. (Egziabher, 2002)

The impacts of climate change are keenly felt in the arctic, affecting livestock grazing and the survival of reindeer, caribou and other arctic livestock in the tundra ecosystem, as the Arctic Biodiversity Assessment has catalogued.

“One of the Arctic Biodiversity Assessment Key Findings points out climate change to be far the most serious threat to the Arctic biodiversity and in the recommendations it calls for efforts to among other things, reduce greenhouse gas emissions. The Global greenhouse gas emissions are resulting in rapid changes in the climate and physical environment of the Arctic with widespread effects for societies and ecosystems and repercussions around the world... We also see changes in the distribution and migration of living resources that might require adjustments in their management. The increased accessibility of the Arctic and an increase in global demand is also boosting industrial interests in the Arctic... [and] an explosion in mining interests in our homeland... [and] the fish-farming industry occupying attractive fish spawning grounds or fishing grounds.”

Áile Jávo, President, Saami Council, Plenary Address to the Arctic Biodiversity Congress, December 2014 in Trondheim, Norway

The industrial model of production and its inter-relationship with the, the market and consumption patterns, investments, controls over production, research, technology development and governance is at the centre of the causes of biodiversity loss, as perceived by small-scale food providers. It focuses on few crops, few livestock and few fish species with biodiversity-reducing impacts on the productive environment – as can be seen in the following box that summarises this.

Box 2.3: Industrial commodity chains use few crops, few livestock breeds and few fish species

75% of crop diversity has been lost from industrial production. Of 7,000 food crops used in peasant food webs, industrial commodity chains trade about 150 crops, of which Rice, Wheat, Maize and Potatoes provide 60% of calories in the industrial food system.

Livestock breeds are lost at the rate of one each month: Of 40 livestock species domesticated by peasants, commercial livestock production is dominated by four livestock types – cattle, pigs, sheep and goats, and poultry

Soil biodiversity, pollinators and pest-predator populations are in decline: Billions of tonnes of soil and trillions of pollinators are lost each year.

Peasant production, and the diversity it cultivates, is under threat: in Europe 3 million farms have disappeared in the past 8 years.

Forests, wetlands and ‘unmanaged’ habitats are fast disappearing, reducing the diversity of ‘wild’ foods and crop wild relatives.

Fisheries are collapsing: 80 per cent of the world’s fish stocks are fully exploited or overexploited.

From more than 35,200 marine species, industrial fisheries focus on just five types of species.

(summarised from Pambazuka 2012; Shand 1997, official and other sources).

2.2 Markets which favour products of monocultures

Markets that favour limited varieties of crops, specific breeds of livestock and fish, and processed foods and fibres manufactured from these, have major impacts on what is grown and harvested. As was seen in Section 1, the market has changed the colour of alpacas in the Andes. It has equally impacted on the diversity of many of the staple crops in the industrialised food system as concentration in monopolies increases.

Monopoly control over seed and chemical inputs, markets, trade and retail is increasing. Six multinational corporations control 76% of the global pesticide market and 60% of the global industrial seed market. and they can now set the terms for how industrial commodities are grown globally. (adapted from PANNA 2012, etcGroup 2009).

The market, supported by extension systems can drive changes in production with consequent losses of biodiversity.

“Because of the Green Revolution, we gave up traditional practices and traditional seeds. The Green Revolution and the policies that supported it — programmes that provided farmers with hybrid seeds, chemical fertilizers, and pesticides for rice production, as well as a minimum support price only offered for rice — encouraged everyone everywhere to convert to rice paddies. But rice paddies use lots of water (and this is a dry region), and the use of chemical fertilizers has hurt the health of the people”.

Sheelu Francis is the President of the Tamil Nadu Women’s Collective (TNWC) in India, which is a member of the World March of Women¹⁰.

¹⁰ WhyHunger (2015) “Agroecology: putting food sovereignty into action”

The market, with its surpluses, may also provide food for public procurement, for example, as part of food banks or food aid to economically poorer sections of society.

“As many First Nation tribes were forcibly separated from traditional food sources and the spiritual cycle of the harvest, health has suffered. Too often, foodstuffs found in reservation stores are the familiar high-fat, high-sodium, sugar-larded, low-nutrition products that undermine good health. Diet-related disease rates spiked in many communities and today, populations have higher-than-average rates of malnutrition and other poor diet indicators. In particular, diabetes is a major health concern in their communities.”

Indigenous Diabetes Education Project, Broomfield, Colorado

2.3 Land and Water Grabs

Land and water grabs often due to large industrial projects, such as, for example, large dams, mining, plantations, ranching and large-scale aquaculture. These threaten both individual and collective rights and can lead to the displacement of people from their biodiverse territories and waters, degrading these through use of monocultures, destruction of mangroves, contamination and so on.

“Today, more than 200 million hectares of land have been ‘grabbed’ globally. Thus the huge profits of an elite are built on the systematic violation of the rights of the majority of peasants, farmers, informal settlements’ dwellers, fishermen, herders and nomads, who are dispossessed of their land and livelihoods by resort to violence, intimidation and torture. Land grabbing is always accompanied by water grabbing. Indeed, water grabbing occurs in all instances of unsustainable water-consuming farming, through the privatization of water utilities and management, the contamination of water brought about by uncontrolled mining, the eviction of communities for dams building, the militarization of access to water points, the dispossession of fishermen and shepherds of their livelihoods, and the penalization of water poverty. The criminalization of activists fighting for the protection of the commons has become widespread, albeit hidden by the authorities. Land and water resources are increasingly scarce, and therefore critical to the security of societies and the sovereignty of states. However, the scarcity underpinning the water crisis and the land crisis is not naturally given; instead, it is politically, geo-strategically and financially constructed.” (Dakar declaration against water and land grabbing, Oct 2014)

“Both privatization and government confiscation (“nationalisation”) of common resources usually lead to land use change having dramatic effects on the overall viability of pastoral systems and on the environment— both in terms of land degradation and pollution. These policies and changes exacerbate poverty of people and erosion of biological diversity, force people into migration and deprive our peoples of their subsistence base, cultural values, spirituality and dignity.”

Segovia Declaration of Nomadic and Transhumant Pastoralists, 2007

“In the arctic and sub-arctic zones, the loss of pastures and biodiversity is still the largest threat for the future existence of reindeer husbandry which needs flexibility when facing variations in climatic conditions during the different seasonal grazing.” (Saami Council, ibid)

“We condemn land grabbing and fragmentation, non-sustainable resource exploitation, bio-piracy, privatization, patenting of food plants and seeds, and other policies which result in dwindling access to land, water and other food related resources for Indigenous Peoples. We further express our solidarity and call for wide support for Indigenous Peoples and communities who are struggling to oppose these destructive policies and activities, and to work for restitution of lands and resources taken without the free prior and informed consent” (Jokkmokk Agreement 2011)

2.4 Undermining Collective Control over Biodiversity for Food and Agriculture

The removal of natural beings, including seeds, livestock breeds and fish species, from collective control reduces biodiversity for food and agriculture available on-farm.

“The market valorization of ecosystems and biodiversity is feverishly being carried out with the objective to trade, invest and create new speculation with life. La Vía Campesina rejects this approach. Biodiversity is based on living organisms reproducing freely. It should not become industrial property which controls its reproduction and use. Today, various forms of appropriation are being claimed on all organisms, as well as on their parts, such as genes, and traits. Moreover, the techniques and knowledge needed to reproduce them are being aggressively pushed as the intellectual property of industry. All of these property claims of industry are illegitimate. They prevent farmers and other local communities from maintaining biodiversity through their ecological practices and through their cultivation of nature as a common good. Private appropriation of land, water and seeds severely endangers the livelihoods of millions of families, as well as the food sovereignty and life of the planet.” Via Campesina 2010

“Plant [varieties] are being lost due to modern practices. Women traditionally held knowledge, we are losing part of ourselves as women when we lose our seeds and the knowledge they contain. Loss of biodiversity is connected to loss of identity and loss of knowledge.”

Nyéléni Synthesis Report, 2007

“so-called improved certified seeds are being promoted despite the knowledge that they are often poorly adapted, lead to a situation of seed dependency and are protected by intellectual property rights”

Djimini Declaration, 2014

2.5 Dominance of Research and Technology Serving Industrial Interests

Research systems working in the productivist research paradigm for industrial priorities may limit technology choices to those suited for industrial production. At the same time they can erode peasant and indigenous knowledge, local research capacities and the multitude of informal research

systems. Additionally the impacts of ‘*New Technologies*’ produced by these systems, such as Geoengineering, nanotechnology, Synthetic Biology etc., which are being developed, despite moratoria and precautionary concerns, will have major impacts on biodiversity and our food systems (etcGroup 2011, 2012, 2013).

“Introduction of Hybrids/HYVs [and modern agri-biotechnology] in agriculture, exotics in fish, honey bees and other categories, promotion of cross breeds in livestock, have acted as the most fundamental cause for the loss of Domestic Biodiversity in India”. (Indian NBSAP Domestic Biodiversity 1990; the Indian NBSAP was elaborated with many local consultations, very participatory and long process, involving grassroots groups across the country)

As concluded in the International Assessment of Agricultural Knowledge, Science and Technology for Development in 2008, areas subject to monocultures suffer significant losses of agricultural biodiversity (above and below ground and in waters) [some of the]” underlying causes of declining productivity embedded in natural resource mismanagement [include the] loss of biodiversity (above and below ground) and associated agroecological functions: Loss of biological diversity results from repeated use of monoculture practices; excessive use of agrichemicals; agricultural expansion in to fragile environments; excessive land clearance that eliminates patches of natural vegetation; and neglect of indigenous knowledge and local priorities.” (IAASTD Synthesis Report. p 61)

“The huge diversity of peasant and farmers’ seeds allows them to adapt, without chemical inputs, to the diversity of the environment and climate variations. The industry wants to replace this diversity with certain “improved” varieties that require everywhere the same chemical fertilizers and pesticides, and the same machines that replace small-scale farmers and peasants in the fields. But the industry cannot produce its “improved” seeds without drawing on the heritage of peasant seeds. This is why it has mobilized states to collect these seeds - at the same time that it works towards prohibiting them in the fields - and to lock them up in gene banks made available to the industry.”

Via Campesina CBD/COP10, 2010

“[We] denounce the fashion in which our states encourage the spread of GMOs and derived products and the promotion of industrial agriculture, with all the harm it has caused and continues to cause to our environment, health and economies. In fact, it has put immense pressure on all our resources: water, land, energy and both animal and plant biodiversity”

4th West African Seed Workshop, Djimini, Sénégal, 2014

“The threat to control rice and agriculture is very real... The International Rice Research Institute (IRRI), the Agrochemical Trans-National Corporations (TNCs) and Philrice should be held accountable to the people for deliberately exposing the people to harm, privatizing their seeds and contaminating rice fields and the environment. We should all unite to stop the commercialization of Golden Rice.”

Chito Medina, of the farmer-scientist group [MASIPAG](#), Philippines, 2014

2.6 Governance Systems that Serve Monopoly Interests

The governance systems that facilitate the enactment of repressive laws and legal restrictions (and commercial contracts) can limit access to seeds, livestock and aquatic organisms and hence the ability for small-scale food providers to enhance and adapt these to local needs. These measures include: Patents, Plant Variety Protection (PVP), Plant Breeders' Rights (PBR) and other Intellectual Property Rights (IPRs) – sometimes called 'Industrial Property Rights'. These governance systems which protect monopolies can criminalise peasant producers who challenge the industrial model of production and its effects.

These threats are globalised through Intellectual Property Rights clauses in Economic Partnership Agreements, Free Trade Agreements including the Trans Pacific Partnership, Transatlantic Trade and Investment Partnership, North American Free Trade Agreement, Central American Free Trade Agreement, and many more, Bilateral Investment Treaties and so on.

“Trade agreements have become a tool of choice for governments, working with corporate lobbies, to push new rules to restrict farmers' rights to work with seeds. Until some years ago, the most important of these was the World Trade Organization's (WTO) agreement on Trade-Related Aspects of Intellectual Property Rights (TRIPS). Adopted in 1994, TRIPS was, and still is, the first international treaty to establish global standards for “intellectual property” rights over seeds... Trade agreements negotiated outside the WTO, especially those initiated by powerful economies of the global North, tend to go much further. They often require signatory countries to patent plants or animals, or to follow the rules of the Geneva-based Union for the Protection of New Plant Varieties (UPOV) that provide patent-like rights over crop varieties. Whether in the form of patent laws or UPOV, these rules generally make it illegal for farmers to save, exchange, sell or develop seeds they save from so-called protected varieties.² In fact, in 1991 the UPOV convention was modified to give even stronger monopoly powers to agribusiness companies at the expense of small and indigenous farming communities. This 1991 version of UPOV now gets widely promoted through trade deals.” (Grain, 2014¹¹)

Challenges in the governance of research are illustrated by this example of how ICRISAT is changing its allegiances.

“... as part of a global network of agricultural research institutes under the CGIAR Consortium, ICRISAT's control over R&D is neither entirely in its hands, nor in the hands of small-scale farmers. While ICRISAT recognises the importance of public sector research, the penetration of the large corporate sector into global agricultural R&D is linked to the expansion of these corporations throughout the agricultural sector, and their concentration in the global market in general. There is worldwide concern about the eroding 'publicness' of agricultural research centres in general and their distancing from ordinary publics and small-scale farmers. Moreover, the concentration of resources to keep such a global public sector set-up alive has consequences for the decentralisation

11 Trade deals criminalise farmers' seeds, GRAIN, 2014. www.grain.org/article/entries/5070-trade-deals-criminalise-farmers-seeds

required by diverse smallholder farming. One example is the concentration of local seeds in global and national gene banks... Working more with the large private sector has meant that ICRISAT has had to embrace a corporate ethos and view of agricultural progress and modernity. This in part explains its pre-occupation with modern biotechnology, modern markets and modern-day Intellectual Property standards and their enforcement. Whereas in the past it would challenge any endeavour to privatise any inputs for subsistence farming, its new partnerships have pushed it into a role of garnering public acceptance of industries' proprietary technologies. It has also become more accepting of privatisation. (ADARSA, 2014)

2.7 Indicator Dilemma

Indicators for monitoring biodiversity change, and the causes of this, are a key challenge for institutions. They are based on the goals and targets set by those institutions and international processes such as the SDGs, CBD Aichi Targets, and the MYPOWs of various programmes. These indicators for assessing changes in or threats to biodiversity often do not reflect the perceptions of the main users and developers of biodiversity for food and agriculture – small-scale food providers.

The imposition of systems of monitoring that require indicators creates a dilemma. They have their own ways of monitoring change which may not be articulated as indicators and may not be related directly to the goals and targets set by institutions. As this section illustrates, the perceptions of change, the threats and the causes of the losses of biodiversity for food and agriculture and the impacts these causes, are in the context of the paradigm promoted by small-scale food providers – food sovereignty – not the paradigm of the industrial model of production and consumption.

Below, is a table of some of the types of changes that are observed by small-scale food providers. Developing participatory processes for gathering and interpreting this information might be useful in changing the ways in which biodiversity for food and agriculture is conserved, used and developed. Recognition of the validity and autonomy of these processes would be a prerequisite for informing policy.

Box 2.4: Changes observed by small-scale food providers

- Changes in the range of foods available through, for example, markets – including numbers of varieties and species of crops, wild foods and non-timber forest products; the number of different breeds of livestock and species of fish available for human consumption.
- Changes in the environment (both terrestrial and marine), in the range of species (including plants, animals, pollinators, birds, soil organisms) as well as the quality and availability of soils and water.
- Changes in human health from available foods (both cultivated and purchased) and through contamination by agrochemicals and veterinary medicines e.g. antibiotics.
- Changes in agrochemical use and their impact on the production environment and downstream in rivers, lakes and coastal waters.
- Changes in access to territory, grazing routes, water, seeds, livestock breeds and supportive markets.
- Changes in legislation which may reduce access to resources and criminalise small-scale food producers.
- Changes in the reach of the industrial model of production, and the products of its research (e.g. 'new' seeds and GMOs, new technologies).

SECTION 3: What are the organisations of small-scale food providers and civil society doing to enhance and defend biodiversity for food and agriculture?

“As women, men, elders and youth, peasants, indigenous people, landless labourers, pastoralists and other rural peoples, we are struggling to defend and to recover our land and territories in order to preserve our way of life, our communities, and our culture. The agroecological peasant agriculture we practice is a basic building block in the construction of Food Sovereignty and is the first line in our defence of Mother Earth. We are committed to producing food for people: the people of our communities, the peoples of our nations — rather than biomass for cellulose or agrofuels, or for exports to other countries. The indigenous people among us, and all of our rural traditions and cultures, teach respect for Mother Earth, and we commit to recovering our ancestral farming knowledge and adopting elements of Agroecology (which in fact is largely derived from our accumulated knowledge) so that we may produce in harmony with, and take good care of, our Mother Earth”

Via Campesina¹²

Undoubtedly, the continuity of dynamic management practices is the main contribution of peasants, fisherfolk, indigenous peoples and traditional communities to biodiversity conservation and development. Despite the challenges posed by the strong trend of homogenization of lifestyles and eating habits as well as the pressures on territories, there are substantial local actions to resist such adversities. The examples presented in this sub-section cover a broader range of initiatives, including improvement of home gardens diversity, in rural and urban areas, ecological cropping, mangroves restoration, development of sustainable fishing protocols, water management, among others. These practices contribute to sustaining cultural diversity for food and nutritional security, as well as to the conservation and protection of ecosystem functions.

As will be shown in the examples below, peasant producers are improving biodiversity for food and agriculture, regenerating productive environments, enhancing production, and harvesting and developing innovative approaches in their ecological production and harvesting systems.

¹² Why Hunger. Agroecology: putting food sovereignty into action. Message from La Via Campesina International. 2015. Available in http://whyhunger.org/uploads/fileAssets/6ca854_4622aa.pdf

3.1 Building a sustainable model of production

“Agroecology is a way of life and the language of Nature, that we learn as her children. It is not a mere set of technologies or production practices. It cannot be implemented the same way in all territories. Rather it is based on principles that, while they may be similar across the diversity of our territories, can and are practiced in many different ways, with each sector contributing their own colours of their local reality and culture, while always respecting Mother Earth and our common, shared values. The production practices of agroecology (such as intercropping, traditional fishing and mobile pastoralism, integrating crops, trees, livestock and fish, manuring, compost, local seeds and animal breeds, etc.) are based on ecological principles like building life in the soil, recycling nutrients, the dynamic management of biodiversity and energy conservation at all scales. Agroecology drastically reduces our use of externally-purchased inputs that must be bought from industry. There is no use of agrotocics, artificial hormones, GMOs or other dangerous new technologies in agroecology.”

Declaration of the International Forum for Agroecology, February 2015

CSO campaigns to challenge the industrial model of commodity production coalesce in the food sovereignty movement. Repeated calls for changes in the model of production, and proposed actions have been made, for example in the 2009 Forum for Food Sovereignty Now!¹³ (See Box 3.1)

Box 3.1: What food is produced, how and for whose benefit?

We reaffirm that our ecological food provision – embraced in the food sovereignty framework including the right to food – linking small-scale food providers with consumers actually feeds the large majority of people all over the world in both rural and urban areas (more than 70 per cent).

Our practices focus on food for people not profit for corporations. It is healthy, diverse, localised and cools the planet. The women and men small-scale farmers/peasants, livestock keepers/pastoralists, fisher peoples provide us all with healthier food, while sustaining the environment. Our practices, food systems, health and livelihoods are threatened by the corporations that dominate industrial commodity production, trade and retailing, and the policies that support these interests, which provide little but aim to control more.

1. We commit to strengthen and promote our ecological model of food provision in the framework of food sovereignty. Our practices, because they prioritise feeding people locally, minimise waste and losses of food and do not create the damage caused by industrial production systems including crops, livestock, animal feed, agrofuels, fisheries and aquaculture. They are resilient and can adapt to and mitigate climate change. We insist, however, that food and agriculture be kept out of the carbon market. We will defend and develop our agricultural biodiversity (of all species including crops, livestock, fish and other aquatic organisms, pollinators, predators, soil micro-organisms etc.) in the face of the aggressive commodification of nature, food and knowledge by corporations and that is also being facilitated by the ‘new Green Revolutions’. We call for a global moratorium on GMOs. Our practices require supply management policies in order to secure availability of food and to guarantee decent wages and fair prices. This includes governments protecting and properly regulating domestic food markets. We call for new policy and legal frameworks to support our practices.

¹³ Forum People’s Food Sovereignty Now! Working Group#3 “What food is produced, how and for whose benefit?” Rome, 13 – 17 November 2009.

2. We call for a reframing of research, using participatory methods, that will support our ecological model of food provision. We are the innovators building on our knowledge and skills. We rehabilitate local seeds and livestock breeds and fish/aquatic species for a changing climate. We commit to promote the Findings of IAASTD (International Assessment of Agricultural Knowledge, Science and Technology for Development). We call for accountability by researchers. We reject corporations' control of research and will not engage in forums that are dominated by them. We will promote our innovations through our media and outreach programmes for training, education and information dissemination.

3. We will strengthen our interconnecting rural - urban food webs. We will build alliances within a Complex Alimentarius - linking small-scale food providers, processors, scientists, institutions, consumers - to replace the reductionist approach of the Codex Alimentarius. We commit to shorten distances between food provider and consumer. We will strengthen urban food movements and advance urban and peri-urban agriculture. We will reclaim the language of food emphasising nutrition and diversity in diets that exclude meat provided by industrial systems.

The International Forum for Agroecology reaffirmed this commitment. In a declaration with nine strategies of how to re-establish ecological production, the challenge that agroecology poses to the industrial production paradigm was described as follows:

“The autonomy of agroecology displaces the control of global markets and generates self-governance by communities. It means we minimize the use of purchased inputs that come from outside. It requires the re-shaping of markets so that they are based on the principles of solidarity economy and the ethics of responsible production and consumption. It promotes direct and fair short distribution chains. It implies a transparent relationship between producers and consumers, and is based on the solidarity of shared risks and benefits. Agroecology is political; it requires us to challenge and transform structures of power in society. We need to put the control of seeds, biodiversity, land and territories, waters, knowledge, culture and the commons in the hands of the peoples who feed the world.”¹⁴

These commitments are taking root in many countries worldwide and are promoted by grassroots organizations networks that support local biodiverse and ecological food provision, such as The Latin American Agroecology Movement (MAELA), The Permaculture Network, the Participatory Ecological Land Use Management Association (PELUM) in Africa, The Farmer-Scientist Partnership for Agricultural Development (MASIPAG) in Asia, among others.

Challenging the model of production and consumption requires restoration and maintenance of biodiversity in production systems as illustrated by the examples presented below.

3.1.1 Rainforest production, Guatemala

In the eighties, local communities from San Pablo la Laguna, Guatemala, started to lose agricultural biodiversity. The introduction of coffee monoculture displaced local food systems and led people to cut trees. The losses of local varieties affected annual crops as cassava, maize and beans, as well as herbs and fruit species, such as cherimoya and a shrub called “xulut”. To deal with the lack of food, families started to recover local varieties of maize, as Sajquim, and Salpor; white, red and black beans, as piloy; and wild herbs as xup, mac, tes, lechuguilla, hierva mora and chipilín. They rescued several medicinal species as well. To clean the Antillan Lake waters local people are replanting tul (*Scirpus californicus* and *Typha dominguensis*), an aquatic species that oxygenates the water and serve as habitat for mollusc, crustaceans, insects, fish and water birds. This plant produces a fibre

¹⁴ International Forum for Agroecology, 2015.

traditionally used by the Mayan people to make straw mats and other crafts, being an important income source for many families living around the Atitlan Lake. Gradually, farm diversification is coming back though slowly¹⁵.

3.1.2 Restoring marine biodiversity, Philippines

The Philippines holds a great marine biodiversity distributed in 7,107 islands totalling more than 36,000 km of coastline. Fishery is an important source of food and income for great majority of the population. Creation of Marine Sanctuaries or Marine Protected Areas managed by local communities has been promoted to overcome depletion of fishing stocks due to overfishing and destructive fishing methods. The initiative of Apo Island community is pioneer and it has inspired many other coastal communities in the Philippines¹⁶. After getting aware about fishing stock depletion, the community defined no-fishing zones that served as a nursery, contributing directly to the recovery of fish stocks in the island's fishing grounds. The good results obtained with the sanctuary stimulated the fishermen to set up sustainable management for the fishing grounds and they were no longer compelled to travel far away for fishing.

3.1.3 Integrating Agroforestry

Tropical Rainforest, Thailand

The simplification of food production systems have led to a reduction in forest cover in tropical regions, causing negative impacts on the ecosystems health, income and household food security. Therefore, restauration of agroforestry system has been an increasing option in many parts of the world.

During the last two decades, Mr Naris Khamthisri from of Kusumal district, Sakon Nakhon province in northeastern Thailand have restored five hectares of agroforestry. Mr Khamthisri's farm is highly productive and provides him yearly 300 kg of longan, 10 t of Sandoricum ('santol') (14 varieties from all over the country), 7 t of jackfruit, 5 t of tamarind and 3 t of mango, rattan, teak, Siamese rosewood, chickens, ducks, quail and fish (from three ponds)¹⁷. Based on his experience he says : *"The answer I got was that agriculture-based countries should have agroforestry systems. This is because of, first, economic security: farmers can earn daily, monthly and yearly incomes. Second, food security; agroforests are very secure. Therefore, it does not matter what happens with the economics, we can survive. This is self-reliance. Besides food security, there is food safety because we produce the food ourselves and see every step, ensuring healthy production...there will be economic security, food security, job security, and the last benefit is health. We will be healthy at the end of the day. Good health is difficult to accomplish and it cannot be bought."*

3.1.4 Pastoralism

Pastoralists developing customary laws, Kenya

¹⁵ Source: Testimony from Edgar Ixcaya Xelemango (Maya Tzutujil indigenous people), COLECTIVO AJ MAYON/MAELA from San Pablo La Laguna, Sololá, Guatemala

¹⁶ Marteen, G. 2005. Marine Sanctuary: Restoring a Coral-Reef Fishery (Apo Island, Philippines). The EcoTipping Points Project. Available in <http://www.ecotippingpoints.org/our-stories/indepth/philippines-apo-marine-sanctuary-coral-reef-fishery.html#update> Access in November 2015.

¹⁷ Finlayson, R. Thai farmers are wealthier and healthier thanks to their agroforests. Agroforestry World Blog, 13th October 2014. Available in <http://blog.worldagroforestry.org/index.php/2014/10/13/thai-farmers-are-wealthier-and-healthier-thanks-to-their-agroforests/>. Access in March 2015.

In Eastern Africa, one third of the rural population lives in areas where livestock predominate over crops as a source of income. Disturbances in the traditional system has been affecting the sustainability of pastoralists' communities. Borana people from the Garba Tula District, Northern Kenya are documenting their customary laws and encouraging the County Council to adopt them as by-laws¹⁸.

3.1.5 Developing Homegardens in Urban and Peri-urban areas

Self-provisioning by growing its own food and rearing animals has been a strategy adopted by local communities in many parts of the world to face food shortages and low monetary income, including in periurban areas. It is an effective option for ensure food security of those living in small plots or landless, both in rural and peri-urban areas. Additionally, home gardens are reservoirs of agrobiodiversity, both for edible and medicinal plants.

Urban food production, Uganda

In the suburbs of Kampala, Uganda, Ms. Harriet Nakabaale, a single mother with 12 kids, has transformed a 50 X 32 feet plot in the Camp Green (less than 150 square meters), a rich and diversified garden with dozens of vegetable and herbal species. As she says, "*My mother was a farmer and everywhere at our farm was very green. That shaped my life, made me love green*"¹⁹. She started planting vegetables in polythene bags, sacks, used car tyres, jerry cans and other different types of recycled containers. She also started to raise chicken. With time, the garden not just produced enough to feed her family but also became an income source to take care of her kids. Her efforts did not stop here. Camp Green became a training site for sharing Ms. Harriet' expertise with her neighbourhood. During her travels and trainings, she also shares seeds with other fellows and she does not rest before she plants the new ones at Camp Green.

3.2 Providing local products for local Markets

Markets are a driving force for promoting or depleting biodiversity. Market concentration increases the distance between producers and consumers, and usually restricts the biodiversity of the production systems which provide foods available for consumption. Lack of markets for non-wood forest products can, indirectly lead to deforestation.

3.2.1 Increasing demand for foods from biodiverse production systems and increasing market opportunities.

Participatory Guarantee Systems (PGS)

Certification has been used as tool to add value and promote local market for organic food. Participatory Guarantee Systems (PGS) has been an alternative for highly costs third-party certification systems and an effective way to develop local markets for food produced in organic or sustainable way. The PGS initiatives started in the early year 2000 and now they are spread in several parts of the world, including the Philippines, India and Brazil²⁰. The certification systems have been applied not only on food, but in forestry and fishery products as well.

¹⁸ IUCN. 2014. Empowering Pastoralists in Garba Tula, Kenya. Available in www.focusonland.com/countries/impact-story-empowering-pastoralists-in-garba-tula-kenya/

¹⁹ Oxfam America. "Camp Green". Online video clip (3m41s). *YouTube*. YouTube, 15th October 2013. Available in www.youtube.com/watch?v=Vdzb64I023E Accessed in March 2015.

²⁰ See for example the scheme as defined by IFOAM www.ifoam.bio/en/value-chain/participatory-guarantee-systems-pgs Accessed November 2015

Government Procurement, Brazil

Governments are important buyers of food and agriculture products. In 2003, the Brazilian Government launched the Food Acquisition Program (PAA) as part of the Zero Hungry Policy. Since then, the Program has reached more than 500 thousand family farmers, forest people and small-scale fisheries in the whole country. In the first year of PAA implementation, acquisitions comprised 56 different products, achieving 374 different items of food products in 2012²¹. The PAA covers food as local seed as well, supporting community seed banks. Therefore, beyond addressing food security issues, the PAA has been an important policy to promote income generation and increasing market for biodiversity products.

3.2.2 Market pressures on economically-valuable wild species

Whether market can have positive synergies with sustainable food production and biodiversity conservation, it could present trade-offs, especially when dealing with non-cultivated species. *Argania spinosa* is an endemic tree species that grows in dry region of Morocco. Beyond its ecological value for the local ecosystem, indigenous Berber tribes rely on the tree for firewood and charcoal for heating and cooking, fodder for livestock, and oil for culinary, cosmetic, and medicinal purpose. In 2004, women created the Toudarte Cooperative to improve production and trade of argan oil through fair-trade markets. Accessing a fair-trade market, the Cooperative improved work conditions and women income using native species²². However, the increase of international market demand led to the expansion of the Argan oil chain and the booming markets at international level increased pressures on this species and over-exploitation of the tree²³. This example shows the important to consider carefully the impact of the market, especially when dealing with wild and non-cultivated species sold as commodities.

3.2.3 Ethical purchasing, Europe

With the rise in transport costs and the growing interest of consumers for local products, short circuit food distribution turns out to be a winning opportunity, for both producers and consumers. It also creates the opportunity to conserve food culture and diverse crops and livestock as well as decrease the carbon footprint of agriculture. The NGO Friends of Earth has documented initiatives in Spain, Italy, France, Czech Republic and Hungary²⁴. In Palencia, Northern Spain, local chicken farmers and consumers created the Avicultura Campesina. They have also organized themselves to buy their own slaughterhouse, so that they can guarantee the whole production process, from the farm to the consumer.

In Italy, Ethical purchasing groups, known as GAS (Gruppi di Acquisto Solidale) first appeared in the 1990s. Over the last 10 years (2004–2014) the number of GAS schemes in Italy has grown rapidly and it is estimated that there are now about 2,000 groups across the country, with a total turnover of €90 million annually. In 2007, Hungarian food lovers and activists published a

²¹ Porto, S.I. et al. 2010. Programa de Aquisição de Alimentos (PAA): dez anos de uma política pública múltipla e inovadora.

²² Fairtrade Connection. GIE Targanine Testemonies – Morocco. Available in <http://fairtradeconnection.org/targanine-video/>

²³ Lybbert, T.J. et al. 2011. Booming markets for Moroccan argan oil appear to benefit some rural households while threatening the endemic argan forest. *PNAS*, 108 (34): 13963–13968.

²⁴ Friends of the Earth Europe. 2015. Eating from the farmer: the social, environmental, and economic benefits of local food systems. Available at www.foeeurope.org/sites/default/files/agriculture/2015/eating_from_the_farm.pdf

‘Culinary Charter’. The document was signed by the country’s famous chefs and restaurant owners, as well as academics, writers and journalists. They called on the state and the Hungarian public to support agricultural producers, chefs and restaurateurs.

3.3 Reclaiming Access to Land and Waters

“When natural resources are valued as money, the fertile sea is raped and beaten, and then sold by those who have access to it with more capital and power. Even sadder, they never think of sustainability when using our seas. For us southern fisher folk women, we live with the sea – it is not only a tourist attraction or a food source. We love the sea as much as our family. We are in the kitchen and know that everything our family eats comes from the sea. It is also our home”.

(Declaration of Southern Female Fisher folk Network, 2008)

Keeping territorial integrity is the main struggle of thousands of local communities’ around the world so that they can protect biodiversity, their culture and livelihoods.

3.3.1 Retaining mangroves under collective control, Honduras

The Gulf of Fonseca’s occupies 3,200 km² on the borders of Honduras, Nicaragua and El Salvador. It is an important area for coastal biodiversity and an important source of food and income for coastal communities. Since the 1970s, 70,000 hectares, equivalent to half of Gulf of Fonseca’s mangrove forests in Honduras, have gone from community ownership to private concessions. The government proposed to privatize fishing in the region, presenting a new legislation based on Individual Transferable Quotas (ITQ), the Law of Fisheries and Aquaculture Act. In 2013, the Association of Fishermen of the Gulf of Fonseca (APAGOLF) launched a campaign targeting the media and members of parliament and succeeded in halting the process. The campaign argued that typical market driven responses to environmental problems are yet another threat to small-scale fisheries²⁵. Despite their effort, the new law has been approved in February 2015²⁶.

3.3.2 Community controlled Coastal Ecosystem, Senegal

In West Africa, capture and trade by the artisanal fisheries provide a ‘food security net’ for the poorest populations. Women play an important role in the whole chain; they are the backbone of the family in African artisanal fishing communities. Since the 2000s, several grassroots organizations members of the Confédération Africaine des Organisations Professionnelles de Pêche Artisanal – CAOPA, have implemented participatory monitoring projects to warn officers about illegal fishing operations. This proved a means effective and inexpensive to improve surveillance and the fight against illegal fishing²⁷.

The Community Conserved Area of Mangagoulack, in Casamance, Senegal comprises eight villages with 12,000 inhabitants. Worried about the decline in fish stocks, in 2008 local communities decided to create the Association of Fishermen of the Rural Community Mangagoulack. APCRM has established an Indigenous and Community Conserved Area (ICCA) named Kawawana with a set of rules to protect local fish stocks. Kawawana derives from the Djola expression "Kapooye Wafolal Wata Nanang" meaning "Our patrimony, for us all to preserve. Therefore, a conservation area was demarcated and rules have been put in place to fight against free access to coastal waters, against the use of destructive methods, against the resulting high pressure

²⁵ World Forum of Fisher Peoples (WFFP). The struggle for Coastal Sovereignty in the Gulf of Fonseca, Honduras.

²⁶ Many other cases on resistance to ‘ocean grabbing’ can be found at: www.tni.org/files/download/the_global_ocean_grab.pdf

²⁷ Available at www.comhafat.org/docs/11182013112550AM.pdf

on the stocks of local fisheries resources. In 2010, APCRM obtained the statutory rights of management of the coastal zone for Kawawana, including a preferential right to fish on the local coastal strip. In Senegal, Mangagoulack is the first local community to have received such devolution of management rights of coastal fisheries²⁸.

3.3.3. Restoring Pastoralists' Access to Resources

*"We call on governments, governing agencies of the United Nations, other relevant international and regional organizations, research institutes and our own customary leaders to support us and to ensure the equal rights of pastoralist women and recognize their key role in society. This includes the recognition of the work of women pastoralists as a valid profession and as a fundamental component of pastoralism."*²⁹

Pastoralism, notably mobile pastoralism, is the most viable form of production and land use for most of the world's fragile drylands. Yet pastoralism is under increasing legal, economic, social and political threat. These threats are often focused on restricting the mobility of people and livestock. The resistance of pastoralist organisations therefore often focuses on the importance of ensuring mobility in order to keep this important production system alive. This means that access and use of lands and territories must be assured and that important services such as health, education and veterinary services must be mobile.

Pastoralists are increasingly organised at local, national and international levels. The establishment of the World Alliance of Mobile Indigenous Peoples in 2003 was a milestone as it is the largest global platform for pastoralists worldwide. Despite being increasingly organised at the international level, most efforts are focused at the national level.

3.3.4 Recognising Customary Organisations, Iran

Pastoralists in Iran have focused on the key problem which the tribes themselves identified: *"the social management vacuum in the tribal communities"*. As a result, they decided to revive their customary social institutions at the level of tribal confederacy, tribe, sub-tribe and clans. The Iranian NGO Cenesta has collaborated with nomadic pastoral tribes to strengthen the social and economic institutions of nomadic pastoralists by assisting them to register their customary organisations as community-based organisations. In March 2010, the leaders decided to unite into one national platform (UNINOMAD) of all tribal councils.

3.3.5 Resisting Land Grabs, Tanzania

In East Africa, the Maasai people, holding an ancient pastoralist cultural, has been constantly facing land grabbing. In Tanzania, they have been threatened of losing their homelands to the Dubai Royal family, who are negotiating with the government to take over possession of the land in a deal that will be highly lucrative for the government³⁰. Maasai Elders called a community meeting to discuss the dispute, which has been attended by thousands of people that came from across the region. The

²⁸ IICA. Association Kawawana (After interview with Salatou Sambou and Christian Chatelain on the 31st of August 2012). Available in <http://www.iccaregistry.org/en/sites/26>

²⁹ Mera Declaration from the Global Gathering of Women Pastoralists, Mera, India, 21-26 November 2010 (women pastoralists from 31 countries gathered for the first ever global meeting of women pastoralists, organised by the World Alliance of Mobile Indigenous Peoples, WAMIP).

³⁰ Cultural Survival (2014). Continued Land Grabbing from the Maasai of Kenya and Tanzania. www.culturalsurvival.org/news/continued-land-grabbing-maasai-kenya-and-tanzania

participants sang their lament “We cry for our lost land. We beg you leaders: defend our rights and return our land”. The Massai say “It not just about land. It is about our existence”³¹.

3.3.6 Defending Forests

“In places where there are people and territories with rights, there will be forests and life for all.” (Alberto Pizango, Pueblo Kampupiyawi, Peruvian Amazon)

Securing Forest Biodiversity through Local

Peru indigenous population comprises around 330 000 people, from 60 ethnic groups and 17 language families. Indigenous people land protection are an important step to safeguard forestry biodiversity and socio-diversity integrity. Peruvian Amazon encompass around 70 million hectares, from which 20% have been officially recognized as indigenous people land. However, other 20 million of indigenous people land are not protected yet.

A documentation of local initiatives published recently highlights the efforts of indigenous people from Peru to ensure forestry biodiversity conservation through a better community-based governance³². The Achuar, Wampis, Kechwa, Chapra, Awajún and Kadosi living in the Datem Region as well as the Shiwilo, Kukama, Kampu Piyawi and Kandosi living in the upper Amazon developed participatory processes to define the use and territorial occupation. The techniques employed includes territorial mapping, minutes of boundary with neighboring and life plans to determine the sustainable use of natural resources.

The Shipibo people living in the Ucayali River established 23 management groups to prevent entry of intruders that use toxic to fish. The Kampu Piyawi, Kechwa and Awajún implemented a community monitoring of borders and expelled intruders. The Nahua people expelled 150 illegal loggers from their territory and established a community control gate to protect their territory. Kechwa y Kukama people have implemented monitoring activities by their own to evaluate environmental damage caused by oil activities, including spills and contamination of water and soil. The Harakmbut and the Ashaninka people have considered the creation of protected areas in part of their land to ensure legal protection for their territories. Then Harakmbut has also implemented a pilot project to recover 20 ha of forest devastated by gold mining.

Demarcation of Tropical Forests, Brazil

In Brazil, the struggle to protect forestry territories includes not only indigenous people, but also forest people and other traditional communities. In the late seventies, Chico Mendes led a movement to protect the Brazilian Amazon. This movement gave visibility to the forest people or “*extrativistas*”, those people that rely their livelihood on harvesting forest products, especially non-wood forest products. This struggle takes his life and Chico Mendes could not see the approval in year 2000 of a federal law establishing “*Reservas Extrativistas - Resex*” as one of the categories recognized by the Brazilian protected areas system. Now, *extrativistas* living in the Brazilian Savanah are pushing for recognition and demarcation of their territories as a way to stop land grabbing by plantation and mining companies. After decades of struggle, in October 2014 local communities from north of Minas Gerais State obtained the recognition of their land rights through the creation of “Reserva de Desenvolvimento Sustentável Nascentes Geraizeiras”. Now, local

³¹ Al Jazeera English (2013). Tanzania tribe evicted from ancestral land
www.aljazeera.com/video/africa/2013/04/20134309749467675.html

³² Valqui, M.; Feather, C; Llanos, R.E. 2014. Haciendo visible lo invisible: perspectivas indígenas sobre la deforestación en la Amazonía Peruana. Lima: AIDSEP/FPP.

communities can continue their farming systems that combines agriculture, cattle grazing and harvest of tree fruits. Moreover, the maintenance of forest coverage will protect important water sources and Brazilian savannahs biodiversity as well³³.

3.3.7 Protection of Sacred Sites from Mining, South Africa

Venda, in South Africa, is the home of the Venda people, known as the 'Rainmakers'. Much of the ecological knowledge which guides the Venda people is held by women, known as Makhadzi. Many of the Makhadzi are also custodians of sacred natural sites and are responsible for the associated community practices and rituals to keep order in the community and the ecosystem. Venda people representatives have been struggling for the protection of their sacred sites since their cultural and ecological diversity are increasingly threatened by land grabbing, development projects, tourism and now mining.

"Minerals and metals are the heart of the Earth. They are there for a reason. If we remove the minerals and materials like coal or gold, it is like removing a person's heart. Minerals and metals are the heart of the Earth. They are the Earth, especially in our Zwifho, our sacred sites, they will die if minerals or metals are removed. Their life force will be drained. If we do this we will kill Mupo, our Mother Earth" says Dzomo la Mupo (Voice of the Earth), custodians of the network of sacred sites in Venda, South Africa³⁴.

3.4 Ensuring Collective Control over Biodiversity for food and agriculture

Ensuring collective control is essential for regenerating biodiversity for food and agriculture. As the examples in this sub-section show, diverse approaches to defending territories and the biodiversity in these are being implemented at local levels.

3.4.1 Getting trees and forests back under local control

Developing Biodiverse Agroforestry, Central America

In Central America, agroforestry is flourishing³⁵. Mr. Francisco Xape, a local chief of Quiche people, an indigenous people from Guatemala, describes that community agroforestry systems optimizes small individual land plots. In the area of San Martin Jilotepeque, 16 indigenous communities are developing agroforestry systems combined with coffee and annual crops such as maize and beans. In Nicaragua, local farmers organized themselves in a small cooperative to produce cacao in agroforestry systems. Beyond the positive impact on families' income, Ms. Brenda Salazar says that agroforestry has contributed to protect and recover community water sources. She highlights that *"Streams and rivers were getting dry and now we have recovered water. We are better now; people are saying that the river is not getting dry anymore. And the fertile layer of the ground is getting better"*.

In Costa Rica, Agroforestry systems have been effective to improve food diversity in small plots of land, generating income and ecological benefits. Coproalde Network (*Coordinadora de Organismos*

³³ ASA. RDS-Nascentes Geraizeiras: o processo de luta para criação da reserva extrativista que garante modos de vida da população Geraizeira no Norte de Minas Gerais. *O Candeeiro*, no. 8 (1606), mar/2015. Available in <http://www.asabrasil.org.br/Includes/Sistematizacao.asp>

³⁴ Venda, South Africa - Venda Communities say No! to Coal Mining. Available at: <http://www.gaiafoundation.org/venda-south-africa-venda-communities-say-no-to-coal-mining>

³⁵ ACICACOF. Casos Exitosos de Agroforestería en Centroamérica. *YouTube*. YouTube, 28 June 2012. Available in <https://www.youtube.com/watch?v=gpjr1YrEtvI>

no Gubernamentales con Proyectos Alternativos de Desarrollo) started in 1988 joining NGOs, peasants and indigenous people organizations from Costa Rica working on alternative development projects³⁶. Five years ago, Coproalde members started to implement successional agroforestry systems. This initiative was motivated after exchanging experiences between peasants from Costa Rica and Bolivia through the “*campesino a campesino*” (farmer-to-farmer) methodology. The agroforestry systems produce food mimicking forest ecological conditions. These systems have provided great food diversity in small plots of land. In 2,000 square meters is it possible to plant 85 species for food and medicinal purpose and wood as well. Consequently, families can ensure their food and nutritional security and extra income with surplus commercialized in the local markets. Additionally, the agroforestry systems contribute to carbon sequestration, contributing to improve environmental conditions at global level.

Restoring Community Forests, India

In India, local communities living in Chitravas, a tribal village Located in the southern Aravali ranges, Rajasthan, took initiative to regenerating and restoring community forests and reducing soil degradation. The community devised its own system for protecting forest patches³⁷. To face problems related to forest and land degradation, they created The Village Forest Protection and Management Committee and agreed to protect and manage the 217 hectares of forestlands through the arrangement of Joint Forest Management. After having tried out different protection mechanisms, the community devised its own system rotating the protection tasks every day from house to house across the various settlements. Improvement in local governance resulted in 100% increment in the biomass with 301.62 t/ha in the protected plots as against 140.43 t/ha in case of unprotected plots. It also contributes to soil improvement with evidences of increasing Organic Carbon (OC), Nitrogen and Potash. Ground water was positively affected as well. Prior to this initiative 40 of the 50 open wells in the village were dry. After 10 years of community forest management, only 10 wells were without water.

3.4.2 Defending livestock diversity and the biodiversity of grazing lands

Grazing to sustain biodiversity, Libya

Local communities living in dryland regions of many part of the world rely on extensive grazing on rangelands for livestock production. Worldwide there are an estimated 300 million pastoralists who are guardians of the biodiversity in the world's arid regions. They have been playing a key role shaping the human occupation of dry ecosystems. An eight-year study about the Kel Tadrart pastoral community, in Tadrart Acacus Mountains, in the southwest corner of Libya, reveals their adaptation to patchy natural resources and arid climate³⁸. The grazing system involves a mixture of different animal species and a sophisticated landscape knowledge, which guides their decision about the campsites and selection of pasture areas in the different periods of the year.

Reindeer Herding, Arctic Tundra

³⁶ Source: Testimony from Juan Arguedas Chaverri, Red COPROALDE, Costa Rica.

³⁷ FES. 2014. Collective action to reduce land degradation. *Agricultures*, 16(3): 21-23. Available here <http://www.agriculturesnetwork.org/magazines/india/landscapes>

³⁸ Biagetti, S. Desert pastoralists: the Kel Tadrart Tuareg from southwest Libya. *Pastoralism* 2015, 5:6. Available in <http://www.pastoralismjournal.com/content/5/1/6> Access in March 2015.

Reindeer herding in the Tundra ecosystem is another relevant example of pastoralism. Reindeer meat is the traditional food of Saami people, an indigenous people that inhabits the arctic region across the north of Sweden, Norway, Finland, and Russia. Traditionally, Saami people move thousands of reindeers between interior grazing lands during the winter and higher altitudes to graze in spring and summer. Their option to keep a diverse herd structure - with respect to factors such as age, sex, build, size, colour, traits and temperament, ensures genetic diversity and more options for herd management.³⁹ The castrated bulls play important role on the herd. Its calmer temperament influences positively the rest of the herd other animals, herd. It also help with fighting off predators or breaking through ice and snow-cover, aiding the access of other reindeer in the herd to locked-away pasture resource. In Sweden, about 3,000 Saami still herd reindeer as their primary source of income.

3.4.3 Sustainable fishing to restore fish stocks

Demonstrating the value of locally-determined fishing techniques, Central America

CoopeTárcoles is a local cooperative created in 1985 by small fishers from Tárcoles, Pacific Coast, Costa Rica. To face the problem of fish stock reduction, the Cooperative members started to develop a Responsible Fishing Code⁴⁰. In 2005 the Coopetárcoles started to monitor species caught monthly. This information was used to persuade the government to create the Responsible Fishing Marine Area in the region⁴¹. Finally, in 2011, the Instituto Costarricense de Pesca y Acuicultura (INCOPECA) recognized the Responsible Fishing Marine Area. CoopeTárcoles members continue collecting data about fish stocks and sharing information with Incopecsa, bringing more evidence on the effectiveness of sustainable fishing methods. Similar initiatives have been implemented in other coastal communities of Costa Rica, such as the Responsible Fishing Marine Area in la Isla de Chira⁴².

3.4.4 Securing Access to Diverse Seeds

“Seeds are an essential part of life; they are the result of the collective work of thousands of generations of farmers, since ancient times. They created the vast rainbow of colours, shapes and flavours that came into our hands, so we can deliver them to future generations. For farmers, indigenous and afro-Colombian people, seeds have been the foundation of their culture and their production systems. That is why farmers are entitled to free access to production, to save exchange and sell seeds. Native and Creole seeds constitute an important insurance in the context of climate change.”
(Manifesto released in 2012 by the *Free Seeds Network Colombia*)

Sustaining diverse seeds, Madagascar

Crop diversity is an important element of small-scale food provider strategies. Small-scale farmers who practice agriculture, animal husbandry, and forestry are the main inhabitants of the Betsileo area, Fianarantsoa city, Southern part of the Madagascar Highlands. A survey carried out in the

³⁹ Reinert, h. & Benjaminsen, T.A. (2015). Conceptualising resilience in Norwegian Sámi reindeer pastoralism, Resilience: International Policies, Practices and Discourses. Available in <http://www.tandfonline.com/doi/pdf/10.1080/21693293.2014.988916>

⁴⁰ Cooperativa de Pescadores de Tárcoles R.L. CoopeTárcoles R.L. Nuestro Código de Pesca Responsable. Available in http://www.coopetarcoles.org/images/boletines/codigo_pesca_final.pdf

⁴¹ Tárcoles: al ritmo del mar. Youtube. 1 Nov 2011. <https://www.youtube.com/watch?v=jS0Q0J2X-D8>

⁴² Available in <https://www.youtube.com/watch?v=QQP9vFHUsGM>

region found great diversity of crops and varieties. Despite the introduction of commercial seeds by governmental programs, farmers did not give up using their own varieties. The genetic base of their landraces is broad and their seeds are common and widespread⁴³.

Diverse Home Gardens, South Asia

Sri Lanka holds an ancient tradition of diversified home gardens that combine vegetables and trees. Home gardens have played an important role in the post-conflict period as a major source of food for war-affected people. According to some studies, urban home gardens produce an estimated 50-60% of the leafy vegetables and 20% of all the vegetables consumed by the households⁴⁴.

In Northeast India, a study carried out in 181 home-gardens from 38 villages in the three districts of the Barak Valley, Assam, found high plant diversity, with 161 tree species identified from 47 families. Home-gardens were also found to maintain considerable conservation value as repositories of many underutilized, wild, and rare plant species⁴⁵.

Seed Guardians, Colombia

Networking is one of the main strategies used by Colombian grassroots organizations to recover and maintain seed diversity. The strategic location and diversity of ecosystems make Colombia one of the greatest centres of biodiversity in the world. Maize is an important crop and thanks to its strategic location and cultural diversity, this country hosts a great diversity of maize varieties. This crop has been grown for centuries in almost all Colombian ecosystems. In 2008, Colombian grassroots organizations joined efforts to launch the Seeds of Identity Campaign. After mapping the situation of the on-farm conservation of local varieties, the Campaign started to support custodians and seed guardians at local, regional and national levels. The objective is to recover and conserve the great diversity of local varieties of maize and to ensure farmers autonomy on seed supply⁴⁶. Since 2012, the Colombian Campaign has joined the Free Seeds Network, an initiative that brings together several seeds network from Latin America.

Community Seed Banks, Brazil

In Brazil, since the seventies community seed banks has been an important of peasant families living in semiarid regions. It started with the support of Catholic Church to ensure poor people autonomy on seed supply⁴⁷. In the eighties, non-governmental organizations working on agroecology started to support and disseminate this community initiatives to conserve local varieties. In year 2014, the Community Seed Bank Network from Paraíba State, Northeast Brazil, joined 161 community seed banks that involved 3,000 families and storage seed of 36 local varieties, mainly

⁴³ Radanielina, T. et al. 2014. Origins, Functions, and Persistence of Crop Biodiversity in the Betsileo Highlands, Madagascar. *Economic Botany*, XX(X), 2014, pp. 1–14.

⁴⁴ Pushpakumara, D.K.N.G., Marambe, B., Silva, G.L.L.P., Weerahewa, J. and Punyawardena, B.V.R. (2012). A review of research on homegardens in Sri Lanka: the status, importance and future perspective. *Tropical Agriculturist*, 160. 55–125.

⁴⁵ Das, T. & Das, A.K. 2015. Conservation of Plant Diversity in Rural Home-gardens with Cultural and Geographical Variation in Three Districts of Barak Valley, Northeast India. *Economic Botany*, XX (X), 1-15. On line edition.

⁴⁶ Source: Campaña Semillas de Identidad – Colombia / Fundación Swissaid – Colombia (Testimony from Colombia).

⁴⁷ Almeida, M.P. & Cordeiro, A. Semente da paixão: estratégia comunitária de conservação de variedades locais no semiárido. *Esperança: AS-PTA*, 2002. 71p.

maize, beans and cowpea⁴⁸. The network was created in 1999 and since then has been influencing seed policies at State and Federal level. Because of the network's success, in March 2015, the Brazilian Government launched a program to support the creation of 640 community seed banks in the Brazilian semi-arid region. The Program will be implemented in partnership with *Articulação no Semiárido Brasileiro - ASA*, a national coalition that joins thousands of grassroots organizations.

Yam diversity, West Africa

Yam is an important staple food in West Africa. Multi-variety cropping is a common practice of small farming in Benin. Women play an important role, bringing varieties that meet food preparations of their choice and do not always exist in her husband's family. The inheritance, marriage, migration, mutual aid and provision of services between peasants are the foundation of geographical movement of varieties of yam⁴⁹.

Potato Park, Peru

"Papa Ayllu" or the Potato Park is located in the Inca Sacred Valley, in Cusco, Peru, an area known as a microcenter of origin and diversity of potatoes. This is one of the world's major food crops, which diversity is deeply rooted in local food systems of Quechua people. The Potato Park was created in 1998 to protect and preserve the indigenous biocultural heritage (IBCH), safeguarding and enhancing these food systems and native agrobiodiversity through the adaptive and holistic approach. It celebrates the tremendous diversity of native potato varieties and other native Andean crops characteristic of Andean food systems.

The Potato Park covers 10,000 hectares inhabited by more than 6,000 people in six Qeswa communities: Sacaca, Chawaytiri, Pampallaqta, Paru Paru and Amaru, that holds around 1,500 potato varieties⁵⁰. The Potato Park Communities Association represents these communities and is in charge of the Park's management. The Association also defines the Park's internal rules and regulations regarding the use and management of the natural resources applying the Andean principles of duality, reciprocity and balance. To protect indigenous people's rights and the potato center of origin and diversity, the Park's communities promote sustainable agriculture.

3.5 Democratising Research and Technology for Food Sovereignty

"The diverse knowledges and ways of knowing of our peoples are fundamental to agroecology. We develop our ways of knowing through dialogue among them (diálogo de saberes). Our learning processes are horizontal and peer-to-peer, based on popular education. They take place in our own training centers and territories (farmers teach farmers, fishers teach fishers, etc.), and are also intergenerational, with exchange of knowledge between youth and elders. Agroecology is developed through our own innovation, research, and crop and livestock selection and breeding."

⁴⁸ Londres, F. As sementes da paixão e as políticas de distribuição de sementes na Paraíba. - Rio de Janeiro: AS-PTA, 2014. 83 p. Available in <http://aspta.org.br/wp-content/uploads/2014/05/Caderno-ANA-Sementes-ASA-Para%C3%ADba.pdf>

⁴⁹ Baco, M.N. 2014. Les pratiques de gestion de la diversité variétale de l'igname au Bénin. Agridape, 30 (1): 11-13. Available in <http://www.agriculturesnetwork.org/magazines/west-africa/agrobiodiversite>

⁵⁰ Source: http://www.parquedelapapa.org/eng/02somos_01.html

3.5.1 Democratising Food and Agricultural Research

CSOs call for a new research paradigm that supports peasant and indigenous food production systems, enhances biodiversity for food and agriculture as well as knowledge and local research capacities. In 2007, partners in South and West Asia, the Andean region of Latin America, West Africa, and Europe launched an international initiative called Democratising Food and Agricultural Research. This multi-regional initiative uses a decentralised and bottom-up process to enable small-scale farmers and other citizens to decide what type of agricultural research needs to be done to ensure peoples' right to food; and to influence and transform agricultural research policies and practices for food sovereignty⁵¹.

3.5.2 Evolutionary Plant Breeding

Participatory research in Iran has led to the wide-scale adoption of a strategy for rapidly increasing on-farm biodiversity: Evolutionary Plant Breeding. Farmers cultivate very diverse mixtures of hundreds or thousands of different varieties/populations and allow them to evolve and adapt to their local conditions. These evolutionary populations are living gene banks in their own fields.

In Philippines, during the last 20 years Masipag has promoted farmer-researchers partnership for rice seed improvement. Masipag approaches encourages farmers to take an active part in the breeding process. Seeds are continually improved with the work carried out in a way that empowers farmers. Currently, there are 67 farmer rice breeders in Masipag network and it has collected maintained 1,313 traditional rice varieties. The major part of farmers involved in sustainable agriculture program promoted by Masipag grow several varieties of rice. In the case of full organic farmers it means an average of 4.8 rice varieties⁵².

3.5.3 Seed and Knowledge network in Europe

The construction of knowledge through peer to peer exchanges is another key element of bridging knowledge networks on biodiversity for food and agriculture. One of the points of this seed movement. With the support of the European Union's Leonardo Da Vinci Training Programme, in 2006 and 2007 French farmers of Réseau Semences Paysannes (RSP) visited similar experiences in Portugal, Spain, Italy, Hungary, Romania and Bulgaria. These exchange meetings have shown that approaching seed problems, there are many other issues that are raised. In fact, through actions of agrobiodiversity conservation, farmers maintain and share their traditional knowledge and the cultural heritage associated with local varieties. Some farmers still speak of local varieties as part of a collective memory. These exchanges consolidated the initiatives of the groups on the conservation of agricultural biodiversity in Europe and helped them to have a common ground. Convergences have emerged around the European legislation as well as on farmer-based participatory breeding programmes, which allow the potential development of common strategies.

3.5.4 Local innovation on water management in Brazil

The Brazilian semi-arid covers an area of almost 1 million square km. It is the land of 21 million people, the most populated semi-arid region in the world. Local communities had to develop local strategies to deal with cyclical drought periods. In the opposite way of big projects, grassroots organizations developed cheap technologies to collect and store rainwater combined with selection of local varieties and breeds adapted to water scarcity. In the late nineties, local

⁵¹ Democratising Food and Agricultural Research. Available in <http://www.excludedvoices.org/about>

⁵² Bachman, L. et al. 2014. Food security and farmer empowerment: A study of the impacts of farmer-led sustainable agriculture in the Philippines.

organizations from nine Brazilian States joined in the Articulação no Semiárido Brasileiro – ASA, a national coalition for policy advocacy. Based on their achievements on water management, ASA managed to influence policy makers to scale up local initiatives in a national program. In 2001, ASA started to implement the “One Million Reservoirs Program” to provide local infrastructure to store water at household level⁵³. ASA strategy includes documentation and dissemination of local knowledge on water management and other sustainable farming systems practices that sustain lives in the Brazilian Semiárido⁵⁴. The initiative has been recognized as a key factor for the achievement of the Millennium Development Goals in Brazil.

⁵³ Neves, R. et al. 2010. Programa Um Milhão de Cisternas: guardando água para semear vida e colher cidadania. *Agriculturas*, 7 (3): 7-11. Available in <http://aspta.org.br/revista/v7-n3-agua-nos-agroecossistemas-aproveitando-todas-as-gotas/>

⁵⁴ More information about ASA www.asabrasil.org.br/portal/Default.asp

3.6 Including peasant voices in policy formation

“We want local food producers to be at the heart of a participatory, inclusive decision-making process. We must defend collective rights; change laws and discriminatory policies, and develop new legal frameworks that respect and protect Farmers' Rights to use, save, exchange and sell seeds and livestock breeds, putting the control of biodiversity and knowledge back in the hands of peasants. Policies need to value local knowledge, and give us the opportunity to share our knowledge.” (Declaration of the International Forum for Agroecology, Nyéléni, 2015)

Governance at all levels should include a wide range of voices of peasant communities, enabling them, at a time of increasing social, economic, environmental and political threats, to continue to conserve, enhance and use a wide range of biodiversity in their territories, and it should not be distorted by monopoly power.

CSOs have been engaged in influencing decision making processes, looking to change imbalances in power that have served monopoly interests which threaten biodiversity and peasant livelihoods. The strategy includes information dissemination, campaigns, demonstrations, coalitions at national and international level, lobby and advocacy in local, national and international forums.

Box 3.2: Key Governance Issues

Policy advocacy by the organisations of small-scale food providers strives to:

- Ensure territory rights of indigenous peoples and local peasant communities.
- Ensure that fishing communities play the most central role in controlling marine and inland waters. Similarly, ensuring pastoralists have control over grazing and migration routes.
- Protect, respect and ensure the stewardship by peasants of all biodiversity for food and agriculture.
- Enable peasants to take back control of seeds and reproductive material and livestock breeds and implement producers' rights to use, exchange and sell their seeds and animal breeds.
- Strengthen local (biodiverse) markets and decentralization of food systems providing diverse, nutritious, local foods.
- Support agroecology as the most effective strategy for sustaining, regenerating and developing biodiversity for food and agriculture.
- Establish sustainable management of productive landscapes and watersheds, pastures and grazing lands, forests, fisheries and other natural resources for resilience to threats such as climate change.

- Grassroots organizations are campaigning to keep their territorial integrity all over the world. Fighting against land grabbing has been an important issue for social movements in Asia, Africa and Latin America. In West Africa, convinced that the implementation of several human rights and the acquisition of food sovereignty must go through a fair and equitable distribution of land and water, grassroots organizations decided to create the "*Convergence of struggles for land and water*" to work together against corporate and government stranglehold on natural resources⁵⁵. A Global Convergence has been built since 2014, and launched a Declaration on these issues at the World Social Forum in Tunis in March 2015.
- Engagement in processes to implement democratically-based agreements, for example Voluntary Guidelines on the Right to Food, Land Tenure, National Seed Policy Formulation, Small-Scale Fisheries.
 - The consortium "Too Big To Ignore" is working with its partners to implement the Voluntary Guideline on Small-scale Fisheries. It is a research network and knowledge mobilization partnership established to support small-scale fisheries (SSF) and to develop research and governance capacity to address global fisheries challenges. The initiative involves three components, including the development of the Information System for Small-Scale Fisheries (ISSF), research efforts on major issues defined with a broader set of actors, including members of fishers' organizations.⁵⁶
- Seeds are a key issue of concern for CSOs and social movements. The seed defense efforts of, for example, Via Campesina, have been focused on three major strategies: encouraging peasants around the world to save their own seeds and organize themselves to select and safeguard them; challenging laws that are stripping peasants of their rights regarding seeds, including Biopiracy through patenting and other Industrial Property Rights systems; and stopping the production and use of GM crops.
 - *"As long as you do not ban all bio-pirated patents, as long as farmers do not have a right to keep, use, exchange and sell seeds from their own harvests then we will not collaborate with research and gene banks that serve the multinational seed companies."*⁵⁷
 - The campaigns against GM crops and livestock, as well as synthetic biology and other technologies, bring together a wide range of rural and urban groups. In many of the campaigns, collective actions are taken which, at the least, can stall the commercialisation of these technologies, which directly or indirectly (through associated agrochemicals and restrictive contracts), erode biodiversity for food and agriculture.
- Campaigns to counter the loss of pollinators are prevalent in many industrialised countries, with potentially good political outcomes in Europe and the USA.
- Climate change campaigns focus on the adaptive capacity of peasants' biodiverse production systems. Participatory processes to realise these abound in many countries. They are

⁵⁵ Accaparement des terres: une convergence d'actions pour eradiquer le mal. Available in <https://www.youtube.com/watch?v=yVWfBar9v-o>

⁵⁶ Too Big To Ignore: a global partnership for small-scale fisheries research. See <http://toobigtoignore.net/about-tbti/>

⁵⁷ Message from 136 farmers' organisations, seed networks, social movements and other Civil Society Organisations to the International Seed Treaty (IT PGRFA), 2015

supported by campaigns against the ‘false solutions’ proposed by the industrial sector that would invest resources into ‘low-carbon’ industrial commodity production, such as Climate Smart Agriculture.

Box 3.3: Desired Governance Outcomes

In the framework of food sovereignty, and respecting the rights of the women and men who use, maintain and enhance peasant biodiversity for food and agriculture, the organisations of small-scale food providers seek to :

- strengthen and promote dynamic management of biodiversity based on ecological principles and collective rights over knowledge and resources
- improve access to and control over biodiversity and secure collective rights over the commons; specifically.
- realise seed policies that guarantee the collective rights of peasants’ and indigenous peoples’ to use, exchange, breed, select and sell their seeds
- reinforce our interconnecting rural - urban food webs and local markets so that they sustain biodiversity in their territories
- transform research undertaken by scientists in public institutions so that it is reframed by peasants for the co-creation of diverse knowledges, which shall not be patented
- change the rules that perversely protect policies and practises, which destroy the biodiversity that supports food sovereignty.

ANNEXES



**International Planning Committee for Food Sovereignty (IPC)
Agricultural Biodiversity Working Group**

The contribution made by farmers, pastoralists, forest dwellers, fishers and other small-scale food providers to the conservation, development and sustainable use of biodiversity for food and agriculture

CSO Thematic Study

1. Question list for collecting local experiences

In order to include your experiences in the CSO Thematic Study for the State of the World's Biodiversity for Food and Agriculture (see attached Table of Contents), we would be grateful if you could answer one or more of the questions below.

Name of person filling in the questionnaire	
Organisation and address	
Name of source	
Organisation, community, address	
Date	
References (is the experience you share below documented anywhere?)	
<p>Please answer any or all of the following questions giving details about specific cases, experiences and stories:</p> <ol style="list-style-type: none"> when the event or issue occurred/occurs where it occurred/occurs what type of production system (peasant agriculture, pastoralism, artisanal fisheries...) who was/is involved why it is significant 	
<p>What are the organisations of small-scale food providers and civil society doing to sustain and develop biodiversity for food and agriculture?</p>	
<p>How is the state of biodiversity for food and agriculture changing? What is the situation now?</p> <p>.</p>	
<p>What is causing these changes? (threats to biodiversity for food and agriculture on the one hand and its reintroduction by peasants on the other, in relation to multiple crises: food (food security); climate change (sequestration and/or loss of soil carbon; adaptation); energy (dependence on fossil fuel technologies); social (rural employment, migration, wars)</p>	
<p>What are the challenges faced and actions being taken by the organisations of small-scale food providers and civil society?</p>	

ANNEX 2

2. Sectoral and agro-climatic matrices

ANNEX 2a: CROSS-SECTORAL CLASSIFICATION MATRIX

Food Producers / Production system	Livestock		Crop/Forage (annual/perennial)		Forest		Aquatic/Fisheries	
	Grazing	Landless	Rainfed	Irrigated	Naturally regenerated	Planted	Capture	Aquaculture (fed/ non-fed)
Peasant farmers	X	X	X	X	X	X	X	X
'Landless' food producers (Gardeners, Livestock keepers)		X	X	X				X
Pastoralists	X		X		X		X	
Fishers		X	X	X			X	X
Forest dwellers	X		X		X	X	X	
Indigenous Peoples	X	X	X	X	X	X	X	X

ANNEX 2B: CROSS-AGRO-CLIMATIC ZONE CLASSIFICATION MATRIX⁵⁸

Climate/Production system	Livestock		Crop/Forage		Forest		Aquatic/Fisheries	
	Grazing	Landless	Rainfed	Irrigated	Naturally regenerated	Planted	Capture	Aquaculture (fed/ non-fed)
Humid Tropics								
Humid Sub-tropics								
Dry / Semi-arid								
Temperate								
Boreal and /or highlands								

FAO / SoW-BFA CLASSIFICATION

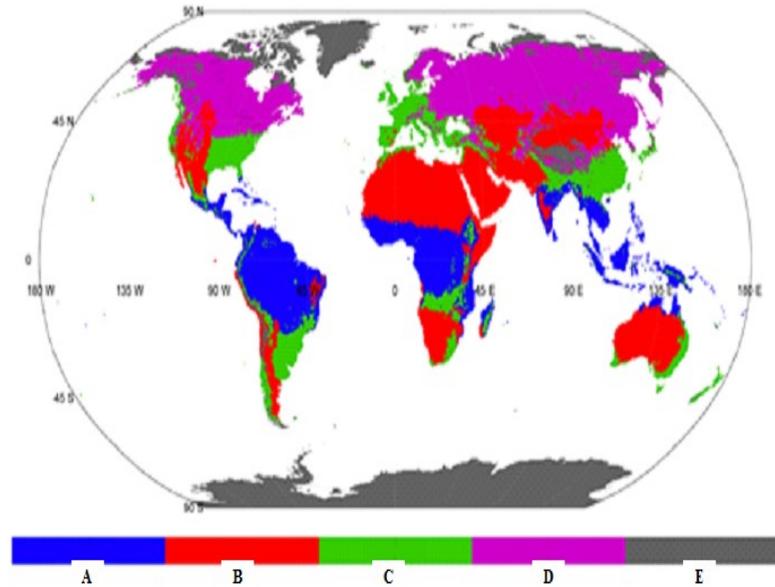
Tropics: All months with monthly mean temperature, corrected to sea level, above 18°C.

Subtropics: One or more months with monthly mean temperatures, corrected to sea level, below 18°C but above 5 °C.

Temperate: At least one month with monthly mean temperatures, corrected to sea level, below 5 °C and four or more months above 10 °C.

Boreal and/or highlands: At least one month with monthly mean temperatures, corrected to sea level, below 5 °C and more than one but less than four months above 10 °C.]

⁵⁸ Source: Adapted to FAO/SoW BFA Classification

ANNEX 2C: KÖPPEN CLIMATE CLASSIFICATION SYSTEM**Köppen Climate Classification System**

- A - Tropical Moist Climates: all months have average temperatures above 18° Celsius.
- B - Dry Climates: with deficient precipitation during most of the year.
- C - Humid Mid-latitude Climates with Mild Winters.
- D - Humid Mid-Latitude Climates with Cold Winters.
- E - Polar / Mountain Climates: with extremely cold winters and summers.

3. References

[Additional references in text and footnotes]

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