

# Lessons from indigenous knowledge and culture: learning to live in harmony with nature in an age of ecocide

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*'Indigenous peoples have lived in harmony with the Earth for millennia. They have a great deal to contribute to a harmonious relationship with Mother Earth. Harmony and equity with the Earth appear to be unknown concepts in dominant societies. It is something that they must learn and come to terms with.'*

Alberto Saldamando, Indian Environmental Network, Paris, 2015

## Introduction

Today, the threats posed by climate change, food insecurity and shrinking biodiversity are more urgent than ever, but adequate solutions have been slow to come. But while attention has focused on technologies and the need to invest in the development of infrastructure such as renewable energy systems, these are only part of the picture. More fundamentally, the emerging environmental crisis has also raised difficult questions about the growing estrangement of many societies from nature and the reckless exploitation of the planet for development or resource extraction. If this situation continues, then there is a very real threat of environmental collapse in the decades to come.

However, sound environmental stewardship is not something that needs to be learned from scratch. Indeed, for generations this knowledge has governed the lives of countless indigenous peoples across the world. While these practices are often seriously threatened, along with the communities themselves, they have much to teach us about how environmental equilibrium can be restored. By recognizing indigenous traditional knowledge holders and their rights to self-determination, as well as mainstreaming their wisdom, a new bio-cultural paradigm could be developed to guide others on how to live within the Earth's ecological limits.

Paradoxically, indigenous and traditional communities – the very groups which have contributed least to the imminent threats of catastrophic anthropogenic climate change and biodiversity collapse, and whose practices are actually based on a sustainable bio-cultural paradigm – constitute most of those who are at greatest risk. This is in part due to existing social and economic marginalization: globally

the indigenous population, estimated at around 370 million, comprises 5 per cent of the world's population but 15 per cent of its poorest people.

Climate change, colonialism and economic globalization have also left a legacy of other issues, such as environmental damage, land loss and lack of access to basic services, that have not only resulted in ill health and lower life expectancy but also devastated their complex cultural systems. By 2115, it is estimated that between 50 and 90 per cent of the world's 7,000 mostly indigenous languages will have died out. Many encode unique traditions and environmental knowledge that may disappear with them. The loss of these languages is evidence of a constellation of inter-connected processes of killing and destruction inflicted on indigenous communities for centuries: genocidal violence (killing of peoples), linguicide (death of languages), epistemicide (destruction of knowledge systems), cultural genocide (destruction of cultures) and ecocide (destruction of eco-systems).

Despite this repression, indigenous and traditional knowledge remains vital to a large proportion of the world's population, even if it receives little attention in the mainstream. Eighty per cent of the world's biological diversity is found in the 22 per cent of global land area still stewarded by indigenous peoples, with modes of subsistence, consumption and care for nature based on their traditional bodies of knowledge. Furthermore, traditional livelihoods produce 10 per cent of the world's meat and most of the fish that people consume. Small-scale farming based on agro-ecological methods informed by traditional knowledge provides 70 per cent of the world's food needs. Yet despite the clear contribution of indigenous peoples to food security, biodiversity and other issues, there are many serious obstacles to their ability to secure their rights.

## Learning from indigenous wisdom

To learn lessons from indigenous peoples requires recognizing that traditional knowledge systems, languages, cultures, connections with nature and self-determination are intrinsic elements of indigenous bio-cultural paradigms. Disaggregating these, and selecting pieces of

knowledge as raw data and techniques without understanding and respecting the wider context that created them, is merely to learn 'the words but not the music'. Unfortunately, the use of traditional knowledge and know-how without prior informed consent and benefit sharing is a frequent occurrence that breaches the rights of indigenous peoples. To date, most states, multinational corporations, intergovernmental organizations and some non-governmental organizations (NGOs) have barely begun to learn the words, let alone the music.

Commentators have variously used the terms 'traditional knowledge', 'traditional environmental knowledge'<sup>1</sup> or 'indigenous knowledge'. The Climate and Traditional Knowledges Workgroup, comprising indigenous people, staff of indigenous governments, academics and other experts, prefers the term 'traditional knowledges':

*'The term "traditional knowledges" is generic and represents multiple dimensions of dynamic knowledge systems and lifeways of diverse indigenous peoples. Traditional knowledges broadly refer to indigenous communities' ways of knowing that both guide and result from their community members' close relationships with and responsibilities to the landscapes, waterscapes, plants and animals that are vital to the flourishing of indigenous cultures. Indigenous peoples' traditional ways of knowing and living have been refined over thousands of years of experiences and relationships with living beings and places.'*<sup>2</sup>

The group asserts, first, that the term 'traditional knowledges' captures the dynamism, plurality and nuanced character of traditional knowledges, embedded as they are in living indigenous governance systems. Furthermore, the concept of traditional knowledges challenges the abstraction of such knowledges from their cultural contexts and the reduction of traditional knowledges to an isolated resource or commodity for potential appropriation by others for profit.

Traditional knowledges-based approaches to agriculture, forest and land stewardship and agro-ecology as well as sustainable fisheries are premised on a worldview that is reflected in governance practices that privilege production for use, minimal waste, modest water use and

**Right:** Maasai traditional knowledge helps sustain cattle farming in Kenya. *Stephanie C.*

sustainable use of local biodiversity to ensure food security. These are key elements of the paradigm shift required to get humanity off its current ecocidal trajectory. Evidence of this trajectory can be found in the inter-connected phenomena of extreme weather, human conflict, genocides and mass migration, arising at least in part from catastrophic food insecurity and water scarcity.

### **An ecological rift? Forgetting traditional knowledges**

What has been described as the 'ecological rift'<sup>3</sup> between human beings and nature, now reaching ecocidal dimensions, has arisen from fossil fuel-charged modes of production and consumption that have ignored the Earth's ecological limits. The result is bio-cultural disequilibrium.

The epoch of the Earth's evolution, when global equilibrium was sustained, has been labelled the Holocene. Traditional knowledges evolve from accumulated observations of the biophysical environment and natural resources made by indigenous peoples and local communities – over millennia in some cases. But scientists are now debating the markers for a new epoch: the Anthropocene, dominated not by natural forces but by profound and negative impacts of humans on Earth's fragile inter-connected systems – especially climate variability and the current collapse of biodiversity dubbed the 'sixth extinction'.<sup>4</sup>

Proponents of the argument for the epochal shift into the Anthropocene cite as their evidence a constellation of unprecedented geophysical phenomena, warning that humanity is increasingly jeopardizing the stable functionality of Earth systems that provide planetary stability for all life.<sup>5</sup> The most cited of these phenomena is the concentration of carbon dioxide (CO<sub>2</sub>) in the Earth's atmosphere. While this gas was measured at 300 ppm (parts per million) during the Holocene, levels have now reached 400 ppm. This threatens to raise global temperatures significantly and, in the process, endanger much of the world's biodiversity, as well as cause significant harm to human populations.



Consequently, at the 2015 Paris Climate Change Conference (also known as COP21 or the UN Framework Convention on Climate Change [UNFCCC] 21st Conference of Parties), indigenous peoples called for global temperature rise to be kept at or below 1.5°C, and not the 2°C that has generally been discussed by governments, in order to mitigate catastrophic climate change and related biodiversity collapse.

There is compelling evidence that signs of the Anthropocene can be traced to the early seventeenth century and the European invasion of the Americas. This led to the deaths of 50 million indigenous people, the unprecedented inter-continental exchange of flora and fauna between Europe and the Americas, the importation of food from the Americas and diseases from Europe, as well as the emergence of the coal-based industrial and agricultural revolutions.<sup>6</sup> Today, the Anthropocene culture of appropriation and consumption, besides its continued destabilization of the environment, still marginalizes indigenous communities and devastates their traditions.

### **Genocide and epistemicide**

Indigenous peoples are principally place-based peoples whose governance paradigm is bio-cultural, meaning they aim to live within the ecological boundaries of their territories through reciprocity and exchange. Since the fifteenth century this has placed indigenous peoples continuously on a collision course with the Euro-American paradigm of continued growth.

Territorial and resource accumulation has been a constant feature of capitalism in its many guises – from overtly violent conquests by imperial and colonial powers to the more opaque economic violence of neoliberal globalization. Accumulation by dispossession is needed for ever-more access to cheap land, labour and capital as well as knowledge. Crucially, the beneficiaries of this paradigm – local elites, governments, international corporations – have effectively been subsidized by passing on the ecological costs of this growth elsewhere. As a result, while capitalist actors enjoy the most profit for the least effort and investment, the true cost of their destructive actions is felt by indigenous peoples and their distinctive cultures.

During the fifteenth and sixteenth centuries, four genocides and inter-connected epistemicides / linguicides<sup>7</sup> took place that still reverberate and are reproduced in power relations that perpetuate the elimination of the 'Other'. The beneficiaries have been capitalist institutions of the global north and the European knowledge system. By the seventeenth century this knowledge system, based on a rationalist paradigm often characterized as western scientific knowledge, had become central to the globally hegemonic capitalist economic growth model. Consequently, most other forms of knowledge, denied recognition, became increasingly invisible and applied only in local contexts. Even in the twenty-first century, and all over the world, indigenous peoples are routinely murdered for defending their lands, languages, knowledges and cultures.

### Knowledge systems in collision

A comparison between western scientific knowledge and traditional knowledges illustrates how different they are. Western knowledge systems privilege the quantitative and are learned in formal educational settings where knowledge is divided into a multitude of scientific specialisms. Humans are separate from eco-systems. As western scientific knowledge is positivist and results from an empirical methodology claiming to generate objective and replicable scientific truths, it is therefore asserted to be of universal application and is communicated through peer-reviewed publication. Discoveries cannot

be owned, but most of the products of western scientific knowledge are susceptible to being commodified – owned and traded by inventors or corporations – as private intellectual property rights.

By contrast, traditional knowledges flow from a holistic view in which human and eco-systems are one. Traditional knowledges have co-evolved from fine-grained observation and local experience. They are communicated orally, often through gender-specific communication, in the form of stories, rituals and traditional practices. Traditional knowledges are learned by observation, listening, doing and experience, and are normally shared inter-generationally within particular kin groups as they are encoded in local languages. No one owns this knowledge. Hence traditional knowledges and the cultural property of indigenous peoples are not congruent with the global intellectual property rights regime of the capitalist growth paradigm, reflected in the World Intellectual Property Organization (WIPO) and the World Trade Organization (WTO). As a result, the intellectual property rights regime has afforded them little protection. The misappropriation of traditional knowledges-based genetic resources and know-how without indigenous peoples' prior informed consent or benefit sharing is well documented. Table 1 gives a glimpse of products derived from biodiversity-rich eco-systems for which local peoples have seen little direct benefit.

The spoils of bio-piracy come from a reservoir of traditional knowledges and know-how that

is being exploited by modern multinationals. Profits from traditional knowledges thus represent a 'subsidy' by indigenous peoples to these corporations. Furthermore, the intellectual property rights regime treats culture and knowledge and nature as commodities or as commodifiable.

For instance, climate mitigation measures translate 'nature' into 'eco-system services' and the mechanism of 'payment for eco-system services' (PES) is increasingly used to incentivize mitigation and adaptation behaviour. The reduction of the emission of greenhouse gases like carbon dioxide into the atmosphere is addressed by carbon trading. A controversial PES scheme paying states for avoided deforestation is the United Nations (UN) REDD+ scheme (reduce emissions from deforestation and forest degradation). This scheme has pitted many indigenous forest peoples against states, the World Bank, international organizations like the UN Development Programme (UNDP), and NGOs as it has been used by outside agencies to usurp indigenous use and stewardship of their forest territories without adequate respect for their rights to forest tenure, prior informed consent and other safeguards. Even when addressing environmental management and protection, then, indigenous communities all too often find their knowledge excluded.

### Learned ignorance: international law

In spite of the collision of knowledge systems, 'traditional knowledge' is referenced with varying degrees of specificity in a patchwork of international law and an even more eclectic array of state law provisions for the recognition of traditional knowledges and customary law, most of which are 'honoured' in the breach by states.

Indigenous peoples have at least since 1992 (outside the Rio Earth Summit) attempted to assert their rights and articulate their bio-cultural worldview. For instance, they staked out shared positions in the Kari-Oca Declaration and the Indigenous Peoples Earth Charter in 1992; the Mataatua Declaration on Cultural and Intellectual Property Rights of Indigenous Peoples in 1993; and the Cochabamba Protocol in 2010. Recently, indigenous peoples followed up the 1992 declaration with Declaration Kari-

Oca 2 outside the 2012 Rio+20 Sustainable Development summit, critiquing the goals of the so-called 'Green Economy' proposed at that conference by the UNDP.

In addition, indigenous lawyer Mick Dodson has researched and reported to the UN Permanent Forum on Indigenous Issues, identifying a host of international human rights, biodiversity and trade instruments that theoretically recognize the right of indigenous peoples to protect and enjoy their traditional knowledges and culture or other relevant human rights.<sup>8</sup>

Yet despite this growing recognition, states and international bodies still seem reluctant to implement these rights in practice – as reflected in the continued loss of traditional knowledges to corporate patents, for example. Indeed, much national and international legislation still appears to support the appropriation of traditional knowledges.

### Climate change: traditional knowledges and the UNFCCC

The climate crisis has led to a rediscovery of the importance of traditional knowledges by scientists on the Intergovernmental Panel on Climate Change (IPCC). The Fourth Assessment Report (AR4) noted that indigenous knowledge is 'an invaluable basis for developing adaptation and natural resource management strategies in response to environmental and other forms of change'.<sup>9</sup> The Fifth Assessment Report (AR5) in 2014 went further and critiqued the neglect of traditional knowledges as impairing the effectiveness of adaptation measures.<sup>10</sup> In 2014 the UNFCCC's own Subsidiary Body for Scientific and Technological Advice (SBSTA) and the IPCC's AR5 expressed an ambitious vision for mainstreaming traditional knowledges: for example, to enable the recognition, participation and engagement of local communities and holders of local, indigenous and traditional knowledges at different levels of climate adaptation plan design and implementation.

However, the UNFCCC process made no mention of indigenous peoples or traditional knowledges until 2015 when, for the first time, the Paris Agreement made five explicit references to indigenous peoples, indigenous knowledge

Table 1: Products derived from biodiversity-rich ecosystems

Pharmacy	Industry	Agriculture and food
Anti-cancer drugs: the vinca alkaloids	'Wild' relatives of plantation and other species for	'Wild' relatives of crops for 'improvement'/ protection
Tranquillizers and heart drugs: reserpine	'improvement'/ protection	Beverages, sugar, natural sweeteners: coffee, tea, cocoa,
Birth control: Dioscorea (source of many steroidal drugs)	Exudates: latexes, waxes, resins, tannins, dyes, insecticides (neem, pyrethrins, rotenone)	sugar cane, thaumatin
Anaesthetic and surgical aids: cocaine, teterodoxin	Fibres and canes: rattan, bamboos, jute, sisal, kapok	Beans
	Edible and industrial oils	Roots and tubers: cassava, yam

and traditional knowledge. Notably, Article 7(5), in spite of the repeated proviso as to appropriateness, states:

*Parties acknowledge that adaptation action should follow a country-driven, gender-responsive, participatory and fully transparent approach, taking into consideration vulnerable groups, communities and ecosystems, and should be based on and guided by the best available science and, as appropriate, traditional knowledge, knowledge of indigenous peoples and local knowledge systems, with a view to integrating adaptation into relevant socioeconomic and environmental policies and actions, where appropriate.*

Yet these references depict indigenous people as vulnerable victims rather than partners, and their traditional knowledges as a supplementary rescue technique rather than fundamental to humanity's capacity to combat climate change. Moreover, explicit reference to the 'rights of indigenous peoples' was relegated to the aspirational preambular paragraphs.

The fight over wording in Paris reflects the continuing denial of indigenous peoples' status and knowledge. While stronger recognition of indigenous peoples' rights and the importance of their bio-cultural wisdom was supported by, for example, Chile, Costa Rica, Guatemala, Peru, Tonga and Vanuatu, such references were removed or diluted by action led by Australia, the European Union, Norway and the US. It was even suggested that their opposition arose because they feared litigation by indigenous peoples that these states might lose should their mitigation measures fail to meet agreed standards. The surviving references in the Paris Agreement are at least a modest rhetorical breakthrough, although they fall far short of a wholehearted endorsement of the importance of traditional knowledges and the key role indigenous peoples have to play in mitigating climate change and protecting biodiversity. Indeed, the holders of traditional knowledges are expert observers and interpreters of natural phenomena who bring fine-scale assessments of climate change impacts, such as biodiversity changes, loss of ice cover in the Arctic and desertification in sub-Saharan Africa.

Importantly, synergies between traditional

knowledges and western scientific knowledge are leading to the use of indigenous and traditional community-based approaches to reduce the massive volume of greenhouse gases produced by biomass burning, notably in the savanna and grasslands worldwide. Indigenous traditional knowledge-based methods, known as the *waru-waru* system and comprising raised beds and water channels, and modern agro-ecology have for some years been restoring crop fertility to Andean mountainside farming at low cost. Traditional knowledges, rather than being an alternative or in opposition, can in fact complement broader-scale western scientific knowledge-based research. In sum, indigenous and traditional practices, as well as their coping strategies for adaptation, are a crucial foundation for learning by the rest of humankind. Whether the UNFCCC and most state parties will afford these greater recognition is an open question.

#### **Biodiversity collapse: traditional knowledges, the Convention on Biological Diversity and the WIPO**

The 1992 UN Convention on Biological Diversity (CBD) remains the key international convention addressing the protection of traditional knowledges, despite its muted and permissive language in Article 8 (j):

*Each contracting Party shall, as far as possible and as appropriate:*

*Subject to national legislation, respect, preserve and maintain knowledge, innovations and practices of indigenous and local communities embodying traditional lifestyles relevant for the conservation and sustainable use of biological diversity and promote their wider application with the approval and involvement of the holders of such knowledge, innovations and practices and encourage the equitable sharing of the benefits arising from the utilization of such knowledge innovations and practices.'*

Protracted attempts have been made by the WIPO Intergovernmental Committee on Intellectual Property, Genetic Resources, Traditional Knowledge and Folklore (IGC) since 2000 to devise a way of expressing Article 8(j) in intellectual property law terms. To date no

agreement has been achieved, but text-based negotiations are set to continue until 2017.

#### **Learning from traditional knowledges**

The principal lesson that can be learned from traditional knowledges is the need to rediscover a bio-cultural paradigm for living within the Earth's ecological limits. Bundles of raw data about specific pieces of knowledge and techniques will not teach much on their own, and the appropriation of such elements of traditional knowledges but without authentic partnership with indigenous peoples, their prior informed consent or benefit sharing will amount to bio-piracy.

#### **Forest stewardship**

Much of the Earth's biodiversity is located in those forests still controlled by indigenous peoples and managed according to traditional knowledges. These forests represent pharmacies and habitats for plants and animals, and regulate the climate. Indigenous peoples are key to reducing deforestation and forest degradation, which is possibly causing as much as 20 per cent of CO<sub>2</sub> emissions each year. While tropical forests absorb as much as 1 billion tons of carbon each year, this resource is steadily diminishing; since the beginning of the twenty-first century, 600,000 square kilometres of tropical forests have already been cleared.<sup>11</sup> In this context, indigenous models of forest and land stewardship offer essential lessons for effective forest stewardship.

However, to support this, greater respect and attention to the issue of indigenous peoples' land tenure is needed – an area afforded far too little attention by many states. The Rights and Resources Initiative (RRI) analysed the extent to which indigenous and local community-held tenure of forests and land is recognized in the 64 states that claim sovereignty over 82 per cent of global land area, including forests, grasslands and agricultural lands. The results are discouraging. RRI found that only 47 of the 64 states submitted Global Baseline Reports for the 2015 Paris Climate Change Conference outlining their 'intended nationally determined contributions' (INDC) to greenhouse gas emissions. Of these, only 5 (11 per cent) covered indigenous and community land tenure substantively, while 16

(34 per cent) mention this type of tenure in passing and 26 (55 per cent) did not reference indigenous or community land tenure and management at all. This suggests that indigenous peoples' self-determination enabled by the formal titling of indigenous lands remains a low priority for most states.<sup>12</sup>

Neither the UN's own scheme to incentivize states to reduce deforestation and forest degradation – the REDD+ scheme – nor the World Bank's Forest Carbon Partnership Facility (FCPF) explicitly promotes increased indigenous and traditional peoples' forest and land tenure. The FCPF enables developing countries to sell carbon emissions reductions like REDD+. Perversely this scheme has created new forest carbon property rights that states would like to own and control, rather than empowering forest peoples to sustain their stewardship by recognizing their existing customary and statutory tenure rights.

#### **Soil and biodiversity stewardship**

Industrial agriculture and the related food system contribute up to 50 per cent of greenhouse gas emissions if change in land use and deforestation, as well as transportation, storage and food waste, are all taken into account. Indigenous and traditional peoples, on the other hand, who cultivate between 10 and 15 per cent of land under cultivation, apply traditional knowledge-based methods including no-till farming, retention of crop residues and the cultivation of cover crops to increase carbon density in the soil. Carbon sequestration and biodiversity preservation is achieved through rotation of crops and land uses. Indeed, this method of cultivation is crucial for the conservation of crop genetic resources and allows for trees of diverse ages and species.

Further, it is estimated that 30 per cent of soil carbon is managed by 200 million pastoralists. Nomadic or semi-nomadic pastoralism is based on traditional knowledges about the sustainable use of dryland and grassland eco-systems. These agro-ecological methods increase depleted soil carbon reserves, produce far less greenhouse gases than industrial agriculture, and are not dependent on costly inputs of fossil fuels. Traditional knowledges are also a key source of knowledge



Left: Mapuche woman in Chile.  
Alessandro Caproni.

(floating gardens) and the Inca *waru-waru* water distribution system – are still in use in parts of Bolivia, Mexico and Peru. Traditional knowledges also inform the complex systems that sustain Saami reindeer in the Arctic, Maasai cattle in Kenya, yaks in Tibet and many other pastoralist herds worldwide, as well as the underground systems (*qanat*) of Central Asia and oasis-based cultivation in arid regions of North Africa and the Sahara.<sup>13</sup>

### The destruction of indigenous food systems and land grabbing

However, instead of learning lessons from the GIAHS, land grabbing is continuing to take place on a massive scale, distorting and putting major obstacles in the way of local agro-ecological food systems. Multinational corporations providing food to consumers in the global north demand year-round supplies of luxury vegetables such as asparagus, grown on irrigated land and depleting local water supplies needed by subsistence farmers in Peru. The westernization of food systems – displacing local foods and replacing these with dependency on imported, expensive, less nutritious substitutes with high levels of fat and sugar – has had disastrous consequences. Among Pacific Island peoples and Inuit in Canada, for example, the incidence of diabetes and obesity has soared as a result.

Many states view land as a commodity vested in the state, thereby justifying the usurpation or denial of the customary tenure rights of indigenous and traditional peoples, with a corresponding loss of traditional knowledges and bio-cultural diversity. The International Land Coalition's Land Matrix Project, covering the period 2000–12, estimates that deals have been made for over 203 million hectares. Logically, the most fertile irrigable land near infrastructure has been targeted for sale, necessitating the dispossession of the local smallholders, indigenous and other traditional knowledge-based farmers.<sup>14</sup> Of the land thus grabbed, 78 per cent has been for agriculture, three-quarters of which has been devoted to mono-crop plantations of biofuel crops such as palm oil.

Most land deals are for large-scale, intensive production dependent on pesticides and other environmentally damaging substances.

Alongside the land grabbing there has been a global assault on the rights to access seed. Local seeds and locally devised cultivars are an intrinsic feature of the adaptability and resilience of traditional knowledge-driven agro-ecological farmers worldwide. Yet corporations like Syngenta, Bayer, Du Pont Pioneer, Dow and Monsanto – which together control 75 per cent of the plant-breeding sector – wish to further expand their control over the market in seeds. This control has been institutionalized by requiring state membership in the International Union for the Protection of New Varieties of Plants (UPOV), and is buttressed by an array of so-called free trade agreements, such as the WTO's Trade Related Intellectual Property Agreement.

### *Buen Vivir*: away from a fossilized and ecocidal paradigm?

The former UN Special Rapporteur on the right to food, Olivier de Schutter, has identified agro-ecology as a solution to the crises of food security and climate change.<sup>15</sup> The call for a paradigm shift away from industrial agriculture and food systems towards small agro-ecological farms now comes from UN bodies such as the FAO, UN Environment Programme (UNEP) and UN Conference on Trade and Development (UNCTAD).<sup>16</sup> Similar calls for more agro-ecological approaches have also been made by many others, including the Oxford Real Farming Conference in 2016 and many scientists.<sup>17</sup>

Traditional knowledges lie at the centre of agro-ecology, and agro-ecology forms the foundation for sustainability within the ecological limits of the Earth. Traditional knowledges are not just a bundle of techniques for complex small-scale biodiverse farming, but the lynchpin of the bio-cultural paradigm, with vital lessons that need to be rediscovered and scaled up. Together these can inform a new agro-ecological paradigm with systems for producing and consuming food that are adapted to particular eco-systems, avoid synthetic modification of nutrient flows and are sustained by knowledge sharing, active participation and inclusion. At

for the adaptive stewardship of plants for food and medicine, animals and eco-systems.

A positive outcome of the 2002 Sustainable Development Summit was a scheme to learn lessons from traditional knowledges about agro-ecology. The UN Food and Agriculture Organization (FAO) identified globally important agricultural heritage systems (GIAHS). The criteria for recognizing these, as defined by FAO in 2002, are that they represent 'land use systems and landscapes, rich in globally significant biological diversity, evolving from co-adaptation of a community with its environment, and its needs and aspirations for sustainable development.'

GIAHS are microcosms of the bio-cultural paradigm in action that have provided peoples all over the Earth, living in a variety of challenging landscapes and environments, with food security based on traditional small-scale agriculture and traditional knowledges. Scale too is critical. Covering around 5 million hectares of land worldwide and supporting many millions of small farmers engaged in traditional knowledges-based agro-ecological livelihoods, GIAHS highlight

the value of smallholdings within locally based agro-ecology systems that link cultural diversity and biodiversity conservation to achieve adaptability and resilience.

Key lessons include recognizing the critical role of empowered indigenous women. Indigenous women are commonly custodians of traditional knowledges, and their particular understandings of the cultivation of traditional crops and of biodiversity are often vital to sustaining the bio-cultural paradigm. In Chile, Mapuche women are sharing their agro-ecological traditional knowledges with other urban women to help them overcome poor food production and hunger.

What is also striking is the variety of forms of GIAHS and their adaptability to local environments. This includes terraced mountainside cultivation using complex agro-eco-systems, such as rice terraces with agroforestry for growing vanilla and the rice-fish systems found in large areas of East and Southeast Asia. In the Americas, Mesoamerican water-management systems originally developed many centuries ago – for example, Aztec *chinampas*



Left: Pachamama (or Earth Mother) in Argentina. Carolyn Stephens.

and inter-connected relationship among human beings, other species and the natural environment. It also involves community-based, inclusive and collective approaches to land use and care, forest stewardship and seed nurturing. Above all, the paradigm recognizes that nature or Mother Earth (*Pachamama*) is the basis of existence for human beings and all other living things. *Buen Vivir* principles and the Rights of Mother Earth are enshrined in the Constitutions of Ecuador and Bolivia, and represent aspirational work in progress. Whether other countries, still in thrall to the destructive model of capitalist development, will be willing to learn from the wealth of indigenous knowledge remains to be seen. ■

#### Endnotes

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  - 16 De Schutter, 2013, *op. cit.*
  - 17 Ehrlich, P. and Hartte, J., 'Opinion: To feed the world in 2050 will require a global revolution', *PNAS*, vol. 12, no. 48, 1 Dec. 2015, 1473–7; Montgomery, D.R. and Bikle, A., *The Hidden Half of Nature: The Microbial Roots of Life and Health*, New York, Norton, 2016; Lin, B. et al., 'Effects of industrial agriculture on climate change and the mitigation potential of small-scale agro-ecological farms', *CAB Reviews: Perspectives in Agriculture, Veterinary Science, Nutrition and Natural Resources*, vol. 6, no. 20, 2011, 1–18.

the heart of this approach, however, is a respect for the rights of others – in particular, those of indigenous peoples to their lands and cultural traditions.

Practising traditional knowledges necessitates the internalization of a belief system that gains expression through all levels of governance and social engagement. Two substantially indigenous Andean democracies, Bolivia and Ecuador, have articulated a new paradigm reflecting traditional knowledges – *Buen Vivir/Vivir Buen* ('good life') – as an overarching constitutional ethic. This is an alternative to the neoliberal Washington Consensus development model, based on fossil-fuelled growth and globalized

market fundamentalism, imposed on most people since the 1970s. The so-called 'market failures' of climate change and biodiversity collapse arising from the commodification of nature are among the most pertinent flaws of that model.

*Buen Vivir* contrasts 'the good life' with materialism, and involves the de-colonization of the mind from anthropocentrism and consumerism. The paradigm assumes that biological diversity begets cultural diversity and vice versa, and that bio-cultural diversity benefits everything – and therefore stresses pluri-national and inter-cultural cooperation. It also demands living well with the world around you, stressing the centrality of a respectful, interdependent