Towards Food Sovereignty

Reclaiming autonomous food systems

Michel Pimbert

Reclaiming
Diversity &
Citizenship

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Chapter 7. Transforming knowledge and ways of knowing

"We can't solve problems by using the same kind of thinking we used when we created them"
Albert Einstein (1938)

"….political subversion presupposes cognitive subversion"
Pierre Bourdieu (1982)

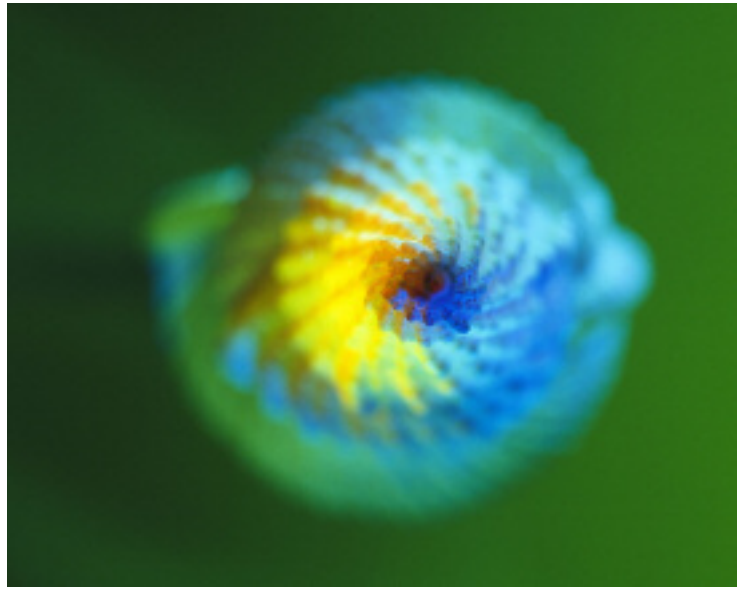
7.1. Introduction

Essentially, knowledge is a form of power that is mediated by *how* evidence is constructed by specific actors for particular purposes, reflecting and reinforcing specific conceptualisations of the world and social commitments (see Feenberg, 2004; Latour, 1987; Levidov, 1986; Ravetz, 1991 and 1996; Young, 1977). Power can be exercised by framing[1] issues in certain ways, by defining the problems that need solutions, or through accounts of reality that promote one vision over others. These politics of knowledge are not only about how different people frame problems and construct reality, but also how they apply evidence in the political decision-making process that shapes the governance of society and the environment. As such, knowledge politics are important in all societies throughout the world. However, they are perhaps becoming more significant today as the world re-organises into a global knowledge society.

For example, scientific knowledge plays an increasingly significant role in the development and management of food

1 Framing "is a way of selecting, organizing, interpreting, and making sense of a complex reality to provide guideposts for knowing, analyzing, persuading and acting" (Rein and Schon, 1991).

systems throughout the world. *"Science mediates our cultural experience. It increasingly defines what it is to be a person, through genetics, medicine and information technology. Its values get embodied and naturalized in concepts, techniques, research priorities, gadgets and advertising"* (Science as Culture, 2007). Scientific knowledge is a major driver of the social, economic and environmental changes in food systems, bringing about sweeping changes that affect everyone living today (see sections 2.1 and 2.2). But despite its huge significance for human well-being and the environment, very few citizens are able to meaningfully control or influence what type of knowledge is produced, *for whom, how, where and why*.



This democratic deficit is apparent in the recent International Assessment of Agricultural Science and Technology for Development (IAASTD). The purpose of the IAASTD was *"to assess agricultural knowledge, science and technology (AKST) in order to use AKST more effectively to reduce hunger and poverty, improve rural livelihoods, and facilitate equitable, environmentally, socially and economically sustainable development"* (Box 7.1). The IAASTD has undoubtedly produced a landmark report that is both timely and remarkable in scope. This is the first independent global assessment which acknowledges that small-scale, low impact farming sustains crucial ecological and social functions. Many of its more progressive recommendations, such as the need for much greater emphasis on agro-ecological approaches, are consistent with the food sovereignty paradigm. However, the analysis and priorities of indigenous peoples, nomadic pastoralists, small farmers, food workers, forest dwellers, and food consumers are largely absent from the IAASTD report.[2] Indeed, this intergovernmental process did not develop any mechanism to directly include the perspectives of local food providers and consumers in discussions and policy recommendations on the future of agricultural knowledge, science and technology.

At both the global and local levels, contestations over knowledge—and who controls its production—are integral to the power relations and struggles of social movements that promote food sovereignty. This is because the endogenous development of food systems based on bio-cultural diversity requires radically different knowledge from that on offer today in mainstream institutions (universities, policy think tanks, donor organisations, trade unions…). There is indeed a need to actively transform and construct knowledge for diversity, decentralisation, dynamic adaptation and democracy.

A fundamentally new paradigm for science and knowledge is thus required to achieve food sovereignty. And whilst this paradigm shift has many dimensions (see Box 7.2), I primarily focus here on transformations in the nature of knowledge and in ways of knowing (the nature of human inquiry).

2 See: http://www.iied.org/natural-resources/media/rethinking-agriculture-research-meet-peoples-needs

Box 7.1. The International Assessment of Agricultural Science and Technology for Development (IAASTD): a wake-up call for the future of food production and the environment

What kind of agricultural knowledge, science and technology is needed to solve the pressing social and environmental problems of global agriculture? After a three-year study designed to answer this question, the recent International Assessment of Agriculture Science and Technology for Development (IAASTD) concluded that "Business as usual is not an option".

The IAASTD was launched as an intergovernmental process guided by a multi-stakeholder, 60-person strong office, under the co-sponsorship of the UN Food and Agriculture Organization (FAO), Global Environment Facility (GEF), United Nations Development Program (UNDP), United Nations Environment Program (UNEP), UNESCO, the World Bank and the World Health Organization (WHO). The project was a major global initiative, developed from a consultative process involving 900 participants and 110 countries from all regions of the world. Civil society groups along with government and private sector representatives participated in both authoring the report and in providing oversight and governance.

Professor Bob Watson (former Director of the Intergovernmental Panel on Climate Change) was appointed IAASTD Director. The IAASTD Bureau then selected 400 scientists from a wide range of relevant disciplines, including biological, biotechnological, environmental and social sciences, who analysed the impact of agricultural knowledge, science and technology (AKST) on the current state of agriculture, food supply and the environment. The invited scientists analysed what roles AKST, trade policies and socio-economic factors had played in the development of agricultural economies throughout the world. They also examined the potential role of AKST on the future development of agriculture, and what structural, institutional, economic and social changes would be needed to *"reduce hunger and poverty, improve rural livelihoods, and facilitate equitable, environmentally, socially and economically sustainable development"*.

In its final report, the IAASTD recognised the difficulties facing world agriculture in delivering nutritious, safe and affordable food without causing irreparable or long-term harm to local communities and the environment, especially in a world facing significant climatic change over the next half century. The IAASTD report recognised the failure of past technological innovations and trade to benefit poor people as well as the harm these factors had caused to the environment. This latter point was further emphasised by Professor Watson during the launch of the IAASTD report on 15th April 2008:

"Agriculture has a footprint on all of the big environmental issues, so as the world considers climate change, biodiversity, land degradation, water quality, etc. they must also consider agriculture which lies at the centre of these issues and poses some uncomfortable challenges that need to be faced. We've got to make sure the footprint of agriculture on climate change is lessened; we have to make sure that we don't degrade our soil, we don't degrade the water, and we don't have adverse effects on biodiversity. There are some major challenges, but we believe that by combining local and traditional knowledge with formal knowledge these challenges can be met."
Professor Robert Watson - Director IAASTD.

The authors of this massive study emphasised the multi-functionality of agriculture in providing not only food, fibre, raw materials and biomass, but also ecosystem services and functions, landscape and cultures. The IAASTD report also acknowledged the key role that the local knowledge of farmers, particularly women, and other small-scale food producers should play in the future in developing appropriate technologies and knowledge systems, as well as their central role in providing global food security. It emphasises that by increasing investments in agro-ecological farming and adopting an equitable international trading framework it is possible to establish more socially and ecologically resilient systems whilst maintaining current levels of productivity and improving the profitability of small-scale farmers. Science must complement local knowledge and support sustainable farming to achieve a "best mix" of economic, social and environmental outcomes. Areas like subsidies, markets, access to land and know-how must take the needs of small-scale producers into account.

These outcomes were summarised in 22 key findings presented in the final IAASTD report, which was approved by 58 governments in 2008.

Sources:
www.agassessment.org/index.cfm?Page=FAQs&ItemID=8
www.agassessment.org/index.cfm?Page=Press_Materials&ItemID=11

7.2. Transforming knowledge

Knowledge is an embodiment of values and is a product of specific social relations and culture (see Merchant, 1980;Young, 1977). As such, the very nature of knowledge—and not just its use or mis-use—often needs to be questioned by the food sovereignty movement. In most settings, the social construction of totally new knowledge is a priority. To paraphrase the philosopher of science, Thomas Kuhn (1962), nothing less than a paradigm revolution is called for to implement food sovereignty in diverse contexts (see Box 7.2). In this regard, transformation in the nature of knowledge is needed in several areas, which I discuss below.

7.2.1. Beyond reductionism and the neglect of dynamic complexity

Much conventional agricultural science and policy implicitly assumes that the environment is stable and indefinitely resilient and that nature can be controlled in predictable ways. But this orthodox, static and equilibrium-centred view of the world has all too often been unable to explain and respond to the complexity, diversity, uncertainty and non-equilibrium dynamics of agri-food systems. The inadequacy of mainstream science and policy is particularly evident in contexts where the majority of small-scale producers and poor people live, in settings that are typically diverse, complex, risk-prone, and with inherent seasonal instability (Chambers, 1991; 1993 and 1996).

Box 7.2. Paradigms and change for food sovereignty

Talking about science and the activities of scientists, Thomas Kuhn defined paradigms as *"entire constellations of beliefs, values, techniques and so on, [that are] shared by a given community"* (Kuhn, 1962). The individual worldviews and collective paradigms that frame the actions of each person at any given moment reflect not just superficial beliefs and opinions held at that time. They also—and more fundamentally—reflect more deeply-held beliefs and values which a person rarely questions or critically reflects upon.

For Guba and Lincoln (1989), these paradigmatic beliefs relate to basic assumptions each person holds about:

- the nature of reality—the nature of nature itself (ontological beliefs);
- the nature of knowledge and how a person can come to know anything (epistemological beliefs);
- the nature of human nature and human values, including ethics and morals, aesthetics and spiritual beliefs (axiological beliefs), and the cognitive processes by which these are generated; and
- the nature of human inquiry and the way in which it relates to how a person actually does things and learns about the world (methodologies); and the way a person goes about his/her work as a researcher, extension agent, educator, policy-maker, NGO operator and citizen.

Developing sustainable agri-food systems and achieving food sovereignty requires a fundamental change in paradigm. In the realm of knowledge and science this amounts to nothing less than a paradigmatic revolution in education, research and extension for food, agriculture and environment.

Sources: Kuhn, 1962; Guba and Lincoln, 1989; Bawden, 2007

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Imzad solo played by Tuareg woman, Hoggar Mountains, Algeria

The science of parts (reductionism), *as opposed to knowledge and ways of knowing that integrate the parts*, has largely failed to guide agro-ecosystem and natural resource management. Narrow lens, universal and reductionist explanatory models have generated a crisis in natural resource management through their inability to come to terms with the dynamic complexity and variation within and among ecosystems (Gunderson *et al.*, 1995; Berkes *et al.*, 2003). Cartesian science (see footnote 6) loses connection with the variability of natural systems because it is reductive, abstracting and interested in immutable components of a phenomenon. Such an approach is not adequate to the task of achieving sustainable agriculture and natural resource management. Moreover, reductionist knowledge has selectively favoured corporate profits as well as control over labour and nature in simplified and standardised production systems. Terminator seeds (GURTS)[3] and the convergence of BANG[4] technologies are the latest flagships in this corporate enclosure of peoples' and nature's autonomy. And for many indigenous and local communities, existing models of landscape ecology and conservation biology usually ignore the critical linkages between biodiversity, culture, spirituality and livelihoods (Posey, 1999).

Understanding the fluid and ever-changing complexity of linked social and ecological systems is a key challenge. Environmental and bio-cultural dynamics are usually long-term and their complexity calls for more holistic and transdisciplinary knowledge which can integrate different traditions of knowledge and multiple sources of evidence. Such knowledge is re-constituted in fundamental ways by blending different disciplinary and vernacular perspectives that combine historical, experiential, comparative and experimental approaches at scales appropriate to the issues.

A more integrative and systemic science of dynamic complexity can help address the multiple social and environmental crises that undermine food systems everywhere (see Chapter 2). For example, a deeper understanding of the principles of organisation that ecosystems have evolved to sustain the web of life can provide a solid basis for the design of autonomous technologies and ecologically sustainable food systems. Agroecological knowledge, ecological literacy and eco-design are

3. Terminator technology is the colloquial name for proposed methods for restricting the free use of genetically modified plants by causing second generation seeds to be sterile. Terminator technology is one form of genetic use restriction technologies (GURT).

4 The term BANG describes the technological convergence of Bits (information technology), Atoms (nanotechnology), Neurons (neurosciences), and Genes (synthetic biology/biotechnology) – a concept becoming entrenched in the science policies of most major governments. The ability to manipulate matter atom by atom is enabling a new fusion of powerful technologies as nanotech, biotech, information technology and neurotechnologies (brain technologies) converge into one common technology platform, - with potentially profound impacts on societies and the environment (see ETC, 2008; What Next seminar, 2008).

cases in point here. Agroecology is key for rethinking agricultural production and human-environment interactions for sustainability (Altieri, 1995; Gliessman, 2006). And more eco-literacy and eco-design are needed to reduce the ecological footprints of other parts of the food system (e.g. food processing, storage units, waste treatment, etc). The challenge here is to develop sweepingly new knowledge in which *"The blending of architecture, solar, wind, biological and electronic technologies with housing, food production, and waste utilisation within an ecological and cultural context will be the basis of creating a new design science for the post petroleum era"* (New Alchemists, 1979). These themes are further explored in the next chapter.

It is also noteworthy that this holistic approach seeks to radically transform knowledge by consciously linking together the ecological, economic, socio-political and cultural realms that have historically been kept apart by mainstream science and policy. For example, the concept of indigenous bio-cultural heritage areas (IBCHAs) explicitly re-unites ecology, spirituality, territory and human well-being as a basis for landscape management and the protection of indigenous peoples' rights in the Peruvian Andes (Box 7.3, and see also Box 4.2).

In addition to creatively integrating theory and practice across disciplines and human experience, this holistic science of complexity needs also to embrace cross-scale research, analysis and action. Indeed, the dynamics of local agri-food systems and livelihoods simply cannot be understood today without looking at both historical and present day interrelationships between individual, household, regional, national and global levels, and their corresponding decision-making arenas. Transforming knowledge for food sovereignty partly depends on making these connections between the local and global by moving out of the narrow disciplinary boxes that define and frame much of today's analysis of food, agriculture and land use. This is key for designing food systems and institutions that meet the challenge for sustainability and equity in the future.

5 minutes

A Year in the Life of an African Family
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7.2.2. Overcoming myths about people and environment relations

Misleading, simplified, and a-historical perspectives perpetuated by powerful bureaucracies and institutions are a persistent feature of environmental policy-making and interventions. Soil erosion, degradation of rangelands, desertification, loss of forests, the destruction of wildlife and fisheries…all of these problems superficially appear to require intervention to prevent further deterioration, and local misuse of resources is consistently defined as the principal cause of destruction. All too often, *"by depicting resource users (the local ones) as wild, destructive (or illiterate, uneducated, backward or non-innovative), state resource management agencies think they can justify their use of militaristic environmental protection"* (Peluso, 1996).

Box 7.3. Indigenous Bio-Cultural Heritage Areas in the Peruvian Andes

Indigenous bio-cultural heritage areas (IBCHAs) are being set up by local Quechua communities in the mountain areas of the province of Cusco, in Peru. IBCHAs take a community-led and rights-based approach to conservation which ensures local livelihoods. They relate the knowledge, traditions and philosophies of indigenous peoples to the holistic and adaptive management of their landscapes, ecosystems and biological and cultural assets. IBCH refers to a wide range of traditional resources—both tangible and intangible—including land, biogenetic resources, traditional knowledge, customary law, spiritual values and landscapes, which are passed down from preceding generations and confer rights to current ones.

For example, the Potato Park—which is located near the sacred valley of the Incas (Pisac)—focuses on protecting and preserving the critical role and interdependency of indigenous bio-cultural heritage for local rights, livelihoods, conservation and sustainable use of agricultural biodiversity. The park is in an area known as a micro-centre of origin and diversity of potatoes, one of the world's major food crops, which has been protected for centuries by the deeply-rooted local food systems of the Quechua peoples. The Potato Park, as its name denotes, celebrates the tremendous diversity of native potato varieties and other native Andean crops characteristic of Andean food systems.

With the support of a local NGO (ANDES), indigenous Quechua communities in the region of Cusco have become organised into "local platforms" for the adaptive management of mountain landscapes and livelihood assets. Most importantly, an Association of Communities of the Potato Park is responsible for running the park. The Association's members include the traditional head authority of each of the communities, along with representatives of local residents, non-government organisations, traditional authorities, local co-operatives and others. For the Quechua, the ecological, social, economic and cultural realms of human life are integrated through local organisations, institutions, laws and policies that transform assets (natural, physical, financial, human, social, cultural) into livelihoods.

Examples of such indigenous transforming structures and processes include:

- **The development of community-to-community and farmer-to-farmer learning networks based on the principle of *ayni* (reciprocity)**. Exchange is promoted through the sharing of information, practices and learning processes. Local platforms (organisations) of "barefoot technicians" elected

by their own communities network with other communities and create opportunities to share and transfer traditional knowledge and innovations.

- **The consolidation of local grassroots enterprises**. These groups are anchored in Andean principles of reciprocity and a local definition of well-being. The organisations work using the principles of Andean economy to reinforce local food systems within a holistic approach to the adaptive management of bio-cultural landscape.

This local adaptive management of Andean landscapes thus helps sustain the Quechua's collective bio-cultural heritage.

The Potato Park is dedicated to safeguarding and enhancing these food systems and native agro-biodiversity using the adaptive and holistic approach described by the IBCHA model. The epistemological bridges prescribed by the IBCH approach link traditional and science-based understandings of the multiple functions of agricultural biodiversity—including the close interaction between wild and domestic plant and animal diversity—and how they sustain local livelihoods. The traditional knowledge, innovations, and practices of Quechua peoples are showcased in the park for their essentially modern significance and utility including for the purposes of pharmaceuticals, agro-ecotourism activities, and community-based conservation. In terms of the rights-based approach prescribed by the IBCH philosophy, the Potato Park is concerned with indigenous peoples' self determination and securing Quechua people's tenure and rights to agricultural biodiversity, local products, traditional knowledge and related ecosystem goods and services.

As an IBCHA, the Potato Park has been proposed as a sui-generis system for the protection of traditional knowledge (TK) because it aims at protecting TK systems within its cultural, temporal and spatial dimensions using a combination of positive and defensive protection tools. An IBCHA also incorporates the best of contemporary science, conservation models and rights-based governance approaches, including the World Conservation Union's (IUCN) Category V Protected Areas and Community Conserved Areas (CCAs).

Source: Argumedo and Pimbert, 2005 and see Box 4.2.

These neo-Malthusian environmental policy narratives are still used by external actors and bureaucracies to blame people for environmental degradation and to justify imposing on them massive and widespread use of standard environmental management packages (see Leach and Mearns, 1996; Ross, 1998). These myths manifest themselves through the neglect of local people—their knowledge, priorities, management systems, local institutions and social organisation—and denying them the value of local assets (natural, social, cultural…). Thus, powerful actors seek to control the food system and natural resource management through discourse, law, coercion and violence.

These policy (or crisis) narratives are usually robust, hard to challenge, and slow to change. They play a key role in policy and project-level decision-making. They structure options, define relevant data, and exclude other views within bureaucracies and professional circles. And yet, recent research gives the lie to these persistent myths about people-environment interactions (Box 7.4).

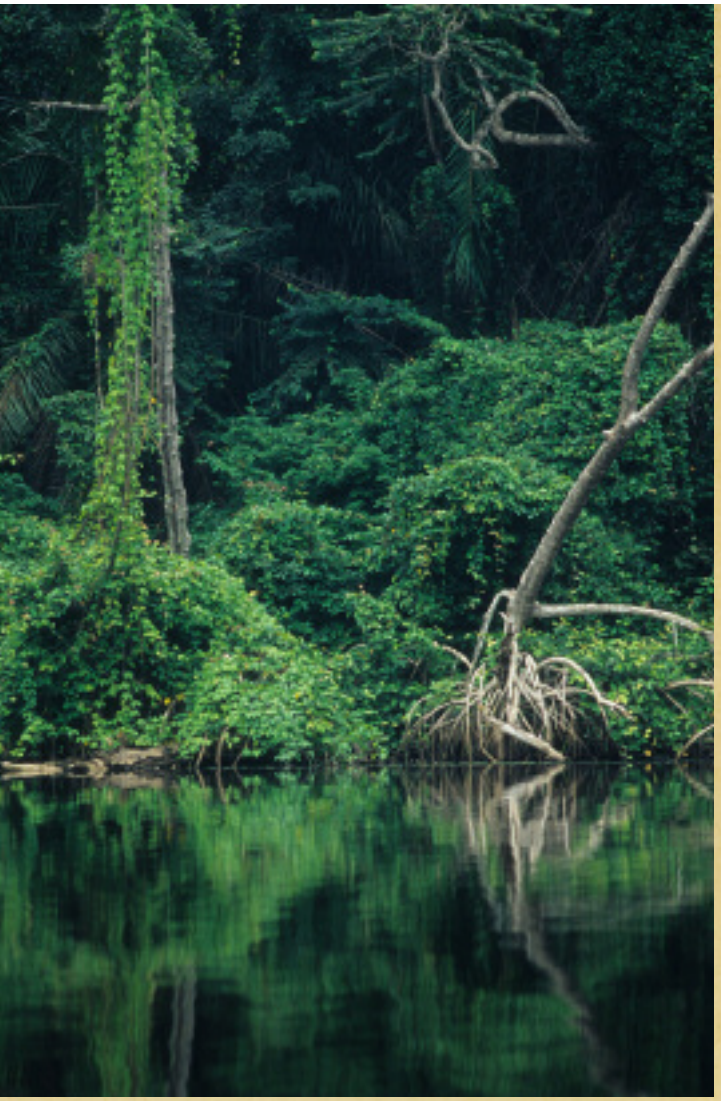
A future challenge will be to bring together the more plural forms of knowledge we advocate within a more comprehensive, power equalising dynamic of participatory learning and action. This approach to transforming knowledge will need to be grounded in empowering pedagogical approaches and decentralised ways of knowing that enable more rural people and other citizens to directly access, produce, negotiate and use knowledge on complex dynamic systems to secure their rights, resources and ecosystems.

Transforming knowledge in this area will also depend on adopting a broad political ecology[5] approach to study the relationships between the environment, politics and society,

integrating the analysis of ecology with the analysis of power. Three challenges stand out here:

1. Efforts to reclaim knowledge for diversity and citizenship will clearly need to focus on micro-scale understandings, experiences and cultural/endogenous conceptions of environmental change, emphasising community rights, participation, people's agency and everyday forms of struggle and resistance to ecological destruction and social exclusion (Peet and Watts, 1996; Vogel, 1995). But at the same time, this citizen-centred production of new knowledge will also need to integrate the dynamics of several actor networks and the multiple layers of politics that extend from the local to international levels. Both public and corporate policies have to be dialectically linked with ecological and social dynamics in political ecology approaches that seek to transform global discourses on environmental governance (Adger *et al.*, 2001; Walker 2006).

5 Political ecology has its roots in Marxist and anarchist political economy (e.g. see Reclus, 1905). It emphasises inequality, hierarchy and power relations in people-environment interactions. Its focus is on the relationships between environment, politics and different groups within society (see Blaikie and Brookfield, 1987; Peet and Watts, 1996; Rocheleau et al., 1996).



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Forest in
Ivory Coast,
birds and insects

Box 7.4. Debunking myths on people-environment interactions

Recent research has fundamentally questioned many of the environmental crisis narratives and received wisdoms on the supposed environmental destructiveness of rural people. A combination of historical analysis, social anthropology, participatory methods to understand local resource users' knowledge and perspectives, and insights from non-equilibrium ecology has challenged some of the environmental knowledge taken for granted by government bureaucracies and donors:

- Contrary to neo-Malthusian assumptions, population increase may not necessarily mean more environmental degradation and less biological diversity. More people can mean more care for the environment, as shown by research in Sierra Leone and Kenya. And biodiversity may be enhanced or even be dependent on the activities of indigenous and local communities in conservation and protected areas.

- Historical research in West Africa has shown dominant deforestation estimates to be vastly exaggerated. Many of the vegetation forms that ecologists and policy-makers have used to indicate forest loss, such as forest patches in savannah, are, according to the knowledge of local resource users and historical evidence, the results of landscape enrichment by people.

- New perspectives in ecology have challenged conventional views of drylands in Africa as stable ecosystems subject to decline and desertification once carrying capacity is exceeded. Rangelands are resilient and less prone to degradation and desertification than once thought. These new findings concord with the knowledge of many local herders and reveal how rangelands are subject to high levels of spatial and temporal variability. Ecological dynamics in these settings are characterised by sudden transitions rather than slow and predictable change.

Sources: Kandeh and Richards, 1996; Fairhead and Leach, 1996; Pimbert and Pretty, 1995; Sullivan and Homewood, 2004; Tiffen *et al.*, 1994.

2. Local understandings of dynamic ecologies, and new scientific insights into non-equilibrium and ecosystem resilience, will often need to be woven into political ecology research done *with*, *by* and *for* people. Many questions have indeed been raised about how effectively political ecology actually deals with ecology (Walker, 2005; Zimmerer and Basset, 2003). Challenging the "scientific" basis of dominant crisis narratives and global discourses on environmental governance partly depends on emphasising more centrally the concepts of dynamic complexity, disequilibria and instability in political ecology research. Ultimately, this kind of knowledge is needed to conceptualise landscape management and governance regimes that can adaptively deal with the dynamic complexity and diversity of linked social and ecological systems.

3. Gender will often need to be included as a critical variable in political ecology approaches. As Dianne Rocheleau and her colleagues point out: *"Environmental science and 'the international environmental movement' have been largely cast as the domain of men. In fact, while the dominant and most visible structures of both science and environmentalism may indeed be dominated by men, mostly from the wealthier nations, the women of the world – and many men and children with them – have been hard at work maintaining and developing a multiplicity of environmental sciences as well as grassroots environmental movements. And while it is the same few who may lay claim to pieces of the living landscape as private or state property throughout the world, women and many men and children have also been busy maintaining and*

developing their own places on the planet through the daily management of the living landscape" (Rocheleau *et al*, 1996). Gender interacts with class, caste, race, culture and ethnicity to shape processes of ecological change, access to and control over resources. Gendered relations of ecologies, economies and politics thus need to be more systematically explored through at least three complementary lenses: i) gendered science, including local environmental knowledge (Keller, 1984; Harding, 1987; Nayar *et al*, 2008); ii) gendered environmental rights and responsibilities (Agarwal, 1995; Rocheleau *et al*, 1996); and iii) gendered environmental politics and grassroots activism (Merchant, 1992 and 1996; Saunders, 2002).

7.2.3. Decolonising economics

Decolonising social imagination from the scientism of neo-classical mathematical economics and neo-liberal economic dogma is essential for transformation towards food sovereignty. Simply put, current knowledge and policies for growth in food and farming are leading to the economic genocide of unprecedented numbers of farmers and rural livelihoods throughout the world (Perez-Vitoria, 2005). As brilliantly argued by Stephen Marglin (2007), most of these policies are underpinned by a science of economics that celebrates the market as a device for regulating human interaction without acknowledging that this perspective rests on a set of half-truths: that individuals are independent, self-interested and rational calculators with unlimited wants and that the only community that matters is the nation state. The foundational assumptions of modern economics justify a world in which individuals are isolated from one another as the deep social and human ties that are constitutive of community are weakened by the shift from reciprocity to market relations (Marglin, 2007).

The need to re-humanise and re-enchant economics has been well stated by Castoriadis (1996):

> *"What is needed is a new creation of the imagination that is of unprecedented importance..., a creation which would put at the centre of human life other meanings than the mere expansion of production and consumption, one which would offer goals in life that are recognized by other human beings as being worthwhile [....] This is the immense difficulty we are faced with. We should want a society in which economic values have ceased to be central (or the only ones), where the economy is put back in its place as a means for human life and not as its ultimate goal, and in which we therefore give up the mad race to consume more and more. This is not only necessary to avoid the final destruction of the planet's environment, but it is also and especially needed to rescue fellow human beings from psychological and moral misery".*[6]

6. My translation

"Learning our way out" partly depends on participatory learning and action that builds on local realities and different indicators of well-being, wealth and the "good life". For example, in Canada collaborative inquiry largely based on the experiential knowledge of farmers has helped debunk the economic myths that have informed agricultural development over the last 60 years (Box 7.5).

Similarly, new knowledge on the economic importance of barter markets in the Peruvian Andes has been generated through participatory research with indigenous peoples whose food security depends on these non-monetary forms of economic exchange (Box 7.6). New barter markets are being consolidated in the Andes because they directly contribute to the survival of peasant families and indigenous communities. They do not entail

Box 7.5. The farm crisis, bigger farms, and the myths of "competition" and "efficiency"

The Canadian National Farmers Union (NFU) and its members took a critical look at the fundamental assumptions that underlie agricultural policy in Canada and in much of the world. The results offer a fresh and original analysis of concepts such as efficiency, competition, economies of scale, the effects of technology, and the allocation of profits within the agri-food system.

Family farms are generally painted as inefficient, and their loss is swept aside as an unfortunate but necessary side-effect of progress. However, overwhelming data show that the family farm sector may be among the most efficient in the entire Canadian economy. Data from Statistics Canada show that over the past 40 years, no other sector has matched the efficiency gains of farmers.

"When you liquidate a population, one of the things that you need to do is to tell lies in order to devalue and marginalize those people. The most pernicious lie told about our family farms during this crisis is that they are 'inefficient'". NFU President Stewart Wells, President of the Canadian National Farmers Union.

"Inefficiency rhetoric is nothing more than a smokescreen: a propaganda tactic deployed against farm families, workers, and rural communities. Only by peeling away the myths and lies can we understand the rural crisis and begin to see <u>who</u> is destroying our farms." Prince Edward Island farmer Ronald MacFarlane.

New evidence shows that poor government policies, defective markets and powerful corporations undisciplined by competition are wiping out family farms. Such citizen-led participatory research can thus successfully deconstruct economic myths of "competition" and "efficiency" that often resonate with, and reinforce, Malthusian and social Darwinist views on survival of the fittest (Lewontin, 1993).

Source: "The Farm Crisis, Bigger Farms, and the Myths of 'Competition' and 'Efficiency'". Canadian National Farmers Union, (2003) w.nfu.ca/briefs/Myths_PREP_PDF_TWO.bri.pdf and www.warmwell.com/03nov26farmcnfu.html

Box 7.6. Barter markets in the Peruvian Andes

The valley of Lares-Yanatile in Cusco (Peru) is rich in biodiversity, containing three different agro-ecological zones between the altitudes of 1,000 to 4,850 metres: *yunga*, *quechua*, and *puna*. Andean tubers and potatoes are grown in the highest zone; corn, legumes and vegetables in the middle area; and fruit trees, coffee, coca and yucca in the lower part. Every week a barter market is held in the middle area of the valley. Here nearly 50 tonnes of goods are traded each market day, ten times the volume of food distributed by the National Programme of Food Assistance. Anyone can participate, and can trade any amount of any crop.

Women are key players in this non-monetary market, which is vital in ensuring that their families have enough food to eat, and that they have a balanced diet. The rainforest supplies vitamin C, potassium and sodium through fruit like citrus and bananas that do not exist in the quechua and puna zones. The middle and high zones supply mainly potatoes and corn, which provide desperately needed carbohydrates to the rainforest zone. Principles of reciprocity and solidarity guide the economic exchange of a diversity of foods, ensuring that the needs of people and the land are met in culturally unique ways. Indeed, recent action research has generated new evidence on the importance of Andean barter markets for:

- access to food security and nutrition by some of the poorest social groups in the Andes
- conservation of agricultural biodiversity (genetic, species and ecosystem) through continued use and exchange of food crops at the markets
- maintenance of ecosystem services and landscape features in different agro-ecological belts along altitudinal gradients and at multiple scales
- local, autonomous control over production and consumption and, more specifically, control by women over key decisions that affect both local livelihoods and ecological processes.

A web of local organisations operating at different scales (from the household to the whole landscape) governs these forms of economic exchange and contributes to the adaptive management of environmental processes and natural resources. In addition to contributing to the food security of the poorest of the poor, this decentralised web of local organisations also enhances cultural, social and ecological resilience in the face of risk and uncertainty.

Sources: Marti, 2005; Marti and Pimbert, 2006.

taking refuge in residual and archaic economic-social formulas. They are instead local choices for autonomy and socio-ecological resilience in the face of increasingly unequal distribution of costs and benefits from economic globalisation (Marti, 2005; Marti and Pimbert, in press).

As substantive economic forms (cf. Polanyi, 1957), barter markets and other non-monetary exchanges can help re-think mainstream economics on the basis of radically different principles (e.g. reciprocity, solidarity, affection, respect, equity, sustainability…) and a diversity of polycentric institutions (e.g. women's collectives, families, communal assemblies, citizen federations, etc.; see Latouche, 1998 & 2003).

In this context, the more inclusive economic arrangements that are proposed by women are particularly important for at least two reasons. First, women are generally more harmed than men by the growing inequalities, insecure employment and social unrest that have marked the last three decades of neo-liberalism (1980-2010). Moreover, the degradation of living conditions in poorer households nearly everywhere has translated into an increase in levels of violence, particularly domestic and sexual violence, of which women are the main victims. For example, as many as 40% of adult women are now subjected to domestic violence in Europe (58% in Turkey…). And it is estimated that in 2002 alone, over 4 million young girls and women were sold for use as slaves, wives or prostitutes throughout the world (Le Monde Diplomatique, 2003; Batstone, 2007).

Secondly—as several feminist economists have shown—the gendered structure of the economy, as well as male bias in national and international economic policies, deeply constrain the institutionalisation of both gender and inclusive participation in development. More specifically, the neo-liberal approach to development and corporate-led globalisation affirm the superiority of "economic efficiency" and the "commodity

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Tuareg women and children singing and chatting, Algeria

economy" to the detriment of a) the "care economy", where women have a predominant responsibility; and b) the many subsistence economies that harbour diverse definitions of well-being and relationships between society and nature.

For many feminist economists, the dominant capitalist economy must be transcended by rejecting the market as the only basis for organising all economic and social life, and by replacing it with the reproductive sphere or care economy (Carrasco, 1999; Guerin, 2003). Attempts to re-conceptualise the economy—including subsistence and solidarity economies—from the perspective of feminist economics are all directly relevant for re-thinking trade, markets and economic exchange for food sovereignty. As such, the contribution of feminist economics in transforming knowledge and "re-enchanting the world" may need much more attention within the food sovereignty movement (for example, see Femmes et Economie Solidaire, 1999, 2002; see also Chapters 6 and 9).

7.3. Transforming ways of knowing

> *"Contemporary societies are constituted as knowledge societies….important aspects of behaviour cluster around the ways in which knowledge is generated, disputed, and used to underwrite collective decisions. It is no longer possible to deal with such staple concepts of democratic theory as citizenship or deliberation or accountability without delving into their interaction with the dynamics of knowledge creation and use" (Jasanoff, 2005)*

The food sovereignty movement is increasingly challenged to actively develop more autonomous and participatory ways of producing knowledge that is ecologically literate, socially just and relevant to context and dynamic complexity. This implies a radical shift from the existing top-down and increasingly corporate-controlled research system, to an approach which devolves more responsibility and decision-making power to farmers, indigenous peoples, food workers, consumers and citizens for the production of social and ecological knowledge. The whole process should lead to the democratisation of research, self-reflective practice and diverse forms of co-inquiry based on specialist and non-specialist knowledge, an expansion of horizontal networks for autonomous learning and action, and more transparent oversight.

7.3.1. Inventing more democratic ways of knowing

New ways of knowing are needed to understand and deal with the dynamic complexity of linked social and ecological systems. More inclusive ways of knowing are required to bring together the partial and incomplete perspectives of different actors faced with uncertainty, diversity and dynamic change. There are also issues of fairness and equity involved here:

> *"The pressing issues associated with concerns about sustainability of agri-food systems are issues that effectively concern every person on earth in one manner or another, be*

> *they matters of food security, food safety, ecological integrity, ecosystem services, landscape, social equity or cultural sensitivity. For this reason alone, all citizens on earth deserve to be as significantly involved in judgments about future developments in agriculture as possible, in ways that historically they have never been. Under these circumstances of participation and deliberation, the need is for the academy to engage* with *the citizenry and not just work* for *it or* on *it or extend out* to *it" (Bawden, 2007).*

This basically means inventing new ways of knowing that enhance democratic governance and citizen control over science and technological research, and the entire process of innovation—both formal and informal. This is a formidable challenge for all societies, not least because it entails reversing current trends towards privatising knowledge and research.

Consistent with a "dual power approach" to transformation, I suggest that the food sovereignty movement needs to actively engage in two distinct (but possibly complementary) ways of knowing:

i. Democratising science and technology research.

ii. De-institutionalising research for autonomous learning and action.

7.3.2. Democratising science and technology research

Despite its emphasis on local knowledge and management systems, the food sovereignty movement also looks to the liberating potential of modern science and technology. This is particularly true with the development of miniaturisation, multipurpose machines, multimedia and computer assisted technology, knowledge in agro-ecology, and efficient renewable energy systems. All of these can enhance local autonomy and ecologies, minimise pollution, and expand the realms of freedom and culture by eliminating needless toil. But local organisations and citizen federations should decide which new innovations are needed, when, where and under what conditions along the food chain and in everyday life. Hence the need to re-embed citizens in the production of knowledge and fundamentally democratise social and natural sciences research organisations and universities. In this process, citizens will inevitably have to challenge the positivist and realist epistemologies of "actually existing" science. And the following observations will help them do this with more confidence (Kloppenburg, 1991):

- Science does not always guarantee objective descriptions of a determinate social or natural world, but often comprises value laden and socially contingent constructions. This insight provides the foundation for a powerful new critique of science. The values of specific actors and socially contingent objectives can be recognised not just in the uses to which science is put, but in scientific facts themselves.

- The inadequacy of criteria for the epistemic demarcation of science as a uniquely legitimate way of knowing means that what we call modern science is itself a historical product of continuous social struggle not only to define science in a particular way, but also to exclude other ways of producing knowledge from that definition.

- If scientists do not have a uniquely privileged capacity to speak authoritatively on society or nature's behalf, then knowledge claims arising outside the institutions of the social and natural sciences can no longer be summarily dismissed because they are non-scientific.

- If science is socially constructed and is therefore subject to social deconstruction, then it must also be amenable to social reconstruction. However, loss of its unique epistemological status does not imply a wholesale invalidation of science. Instead, it calls for the creation of safe spaces for the consideration of competing ways of knowing and modes of knowledge production, which themselves are incomplete and partial understandings of "reality".

The overall aim here is to create spaces and processes that allow for more direct citizen participation and pluralism in deciding on the allocation of funds for research, setting upstream strategic research and development (R&D) priorities, validating knowledge and new technologies, ascertaining risks in the face of considerable uncertainties and framing policies for food and farming. This approach would broaden democratic control over existing public research institutions and universities in order to transform theory and practice.

The democratisation of science and technological research proposed here thus implies a systemic transformation within the existing educational and research establishment. It entails deep changes in academic cultures, in the self-image of researchers and academics, in teaching pedagogies, in research agendas and methodologies, and in the very role that universities and research institutes play in societies throughout the world.

For example, standard approaches to teaching the next generation of researchers in the social and natural sciences will need to be fundamentally changed. It is noteworthy that—as late as 2007—the dominant features of higher education could still be accurately described in the following terms:

"The authoritarian 'banking model' of education through lectures and regurgitation dominates, the asymmetrical relationship between all-knowing professor and the ignorant student is taken for granted, the radical separation of thought/reflection from action/engagement is institutionalized, and the separation of the faculty and students, on one side, from administration and the extra-community constituencies assures that very little change takes place. There are exceptions to this banking model educational panorama: art and architecture studios, laboratory teams with student members, and the few other places where a kind of co-generative knowledge and competency creation take place..... [But] the dominant pedagogy remains the lecture hall, the professional podium, and the silent students" (Greenwood, 2007).

This model of education is largely irrelevant for many people and places, and particularly for non-western cultures. The recent history of indigenous universities in Latin America is noteworthy in this regard (Box 7.7).

Box 7.7. Indigenous peoples' universities in Latin America: mixed results

The creation of indigenous or intercultural universities is a relatively new trend in Latin America. None of the 25 institutions that came together in 2007 to form the first Latin American network of indigenous universities actually existed ten years ago. Since 2004, in Mexico alone, the government created by decree ten intercultural universities, three of which are now open and running. Each of these three universities offers three degrees: indigenous culture and languages, intercultural communication and sustainable development.

However, many of these universities are still based on western definitions of education and values. *"These universities are interested in indigenous peoples but confine them to being students: none of these universities has an indigenous person as head even though many indigenous people could play that role"* says Eduardo Sandoval, an anthropologist from the Autonomous University of Toluca in Mexico. According to Sandoval these universities are designed, created and managed to subjugate indigenous peoples, to deny their unique vision of the world in order to better "integrate" them into western society. For Eduardo Sandoval, only those initiatives that emanate from within indigenous communities can really meet their needs. *"These universities are rooted in indigenous cosmologies. They are designed to help communities realize their goals in life"*. The latter include both the spiritual and material development which indigenous communities define on the basis of their own culture and needs.

In a UNESCO sponsored study (Munoz, 2005), the Columbian anthropologist Professor Manuel Ramiro Munoz presents evidence that further supports the view that many of these universities pay lip service to the real concerns and capabilities of indigenous communities throughout Latin America (Munoz, 2005). However, his study does also identify a few universities in Latin America that are truly working for indigenous communities, respecting their cultural diversity. These genuine indigenous universities are fully aware of the needs of indigenous peoples and their economic, social, ecological and cultural environments (Munoz, 2005). Munoz considers that these indigenous initiatives in higher education are a valid response to the inadequacies and crisis faced by universities in Latin America. Everywhere, students complain about the highly abstract nature of education, and how it is detached from society's real needs. An indigenous leader from Columbia summed up the problem as follows: *"We send our young people to university with a well rounded head. But the rare few who do come back to us have a square head and become a problem for the community"* (Munoz, 2005).

One such truly indigenous learning centre is the University Amawtay Wasi ("the house of wisdom" in Quechua), located

click here

Music of the Guarani-Nandeva of Chaco, Paraguay

Ynambu wasu
'Great Partridge'

in Quito, Ecuador. Its aim is to recover and re-affirm the value of indigenous knowledge, and more importantly its underlying values and principles. The university also aims to offer teaching in Quechua and other indigenous languages, as well as propose a more practical and action-oriented educational programme. According to Luis Fernando Sarango, the director of this indigenous institution, *"The western university is far too theoretical in its orientation. Indigenous peoples are much more practical"*. The curriculum of the University of Amawtay Wasi has focused on agroecology since its creation in 2004. Agroecological learning is field-oriented and experiential, often based on students' own farms and involving specialist holders of scientific and traditional knowledge. From October 2007, two additional courses will be offered: inter-cultural communication and architecture. *"We want to train people so that they are once again able to build in harmony with their environments, knowing how to take into account the influence of the sun, the earth, the locally available materials as well as how to build houses that fit within a community pattern"*. The pedagogy used at the University Amawtay Wasi combines both traditional and modern knowledge. *"We want to retain the best of each tradition. Besides our ancestral knowledge, we are open to other forms of knowledge. We actually thought of calling ourselves a 'pluriversity'"*, says Sarango.

Sources: Munoz, 2005; La Revue Durable, 2007.

Speaking from within one of the most prestigious US universities for education and research, Greenwood clearly identifies the challenges faced by academics and administrators who believe in the transformative potential of co-generating knowledge with, by and for citizens:

> *"….we have little choice but to enter into the struggle to transform a rapidly degenerating higher education system in fundamental ways and resituate it as a partner in the development of more solidarity and liberating societies……. We must actively link multi-disciplinary teaching, research, and direct social action, in concert with extra-university stakeholders of many types and demonstrate our worth through our actions in working with them to solve the most pressing problems. The time for standing on a soap box and proclaiming our self importance is over" (Greenwood, 2007).*

The essence of the reversals for diversity, democracy and decentralisation needed in research and higher education has been well captured by Chambers:

> *"Solutions can be sought through reversals, through turning the normal on its head. Professionally, this means putting people before things... It means permitting and promoting the complexity that poor people often want, presenting them with a basket of choices rather than a package of practices... Bureaucratically, it means decentralising power, de-standardising and removing restrictions. In learning, it means gaining insight less from 'our' often out-of-date knowledge in books and lectures, and more from 'their' knowledge of their livelihoods and conditions which is always up-to-date... In behaviour, it means the most important reversal of all, not standing, lecturing and motivating, but sitting, listening and learning. And with all these reversals, the argument is not for an absolute or 'slot rattling' change, from one extreme to another; rather it is that only with a big shift of weight can an optimal balance be achieved" (Chambers, 1991).*

In research, rather than blame peoples' ignorance or local constraints for the non adoption of policies and technologies, a reversal in explanation points to deficiencies in the policy and

technology and the very processes that generated them. A reversal in learning has scientists and other professionals (project designers, planners, donors and field extension) learning with, by and from rural people in diverse local settings (Box 7.8). Roles and locations are also reversed, with rural/urban people and their environments becoming central, instead of headquarters offices, government departments, scientists and abstract theories. Analysis, choice, experiment, project design, evaluation and the validation of knowledge are conducted by and with people themselves, with outside professionals in a facilitating and support role.

A move from a teaching to a learning style has profound implications for higher education and research institutions. The focus is less on what we learn, and more on how we learn and with whom. The pedagogic goals become self-strengthening for people and groups through self-learning and self-teaching, and *"the role and action of the researcher is very much a part of the interactions being studied"* (Russell and Ison, 1991). Systems of participatory learning and action, therefore, imply new roles for academics and research professionals, and these all require a new professionalism with new concepts, values, methods and behaviour (Pretty and Chambers, 1993). The challenge here is to make the shift from the old professionalism to the new (Table 7.1).

Box 7.8. Some farmer views on higher education and research

"I believe the academic sector can play an important role, as long as it makes an effort to understand and relate to campesinos….It's very difficult for academics to forget their type of language, or ways of understanding things, because it's not for nothing that they've spent a lot of years in spaces like these [universities], and really sometimes it makes it very difficult for them to relate with people…. I think that what we have to do is [figure out] how we can bring academics to community development without disturbing what the communities are already doing — because this is the problem: that often academics want to change, or to introduce things without thinking about the consequences. They have to make an effort to pull at least one foot out of academia in order to really feel what it is to be campesino, what it is to be a person who has lived for many years in difficult conditions. It makes me sad, because many of the agronomists who are coming out of the university in Mexico are children of campesinos — but once they've studied agronomy, they no longer understand campesinos despite being of campesino origin."
Jesus Leon Santos, 2006

"Research and innovation as presently practised also constitutes a considerable obstacle to sustainable development. Public sector research is clearly focused on intensive farming; if researchers want to move up in the INRA (National Institute for Agronomic Research) hierarchy, they must work on projects breaking new ground for them, such as biotechnology or breeding plants adapted to chemical inputs. [...] However, three INRA plant breeders did decide to work with small farmers on participatory breeding programmes and, for the last three years, I have been working with one of them on durum wheat. The aim is to create a hardy variety adapted to organic farming practices. We are beginning to get good results; about a dozen researchers are now working on my farm on various projects. This participatory research, in which the small farmer (or small farmers) plays a crucial role, is undoubtedly a real innovation helping to achieve the aim of creating genuinely sustainable farming. [...] However, if only some 20 researchers in total (plant breeders, ethnologists, agronomists and sociologists) are officially involved in such projects for the whole of metropolitan France, while there are 8000 researchers engaged in public sector research in the country, raising awareness will take a very long time."
Jean Jacques Mathieu (2006)

"We campesinos have what is called the school of life, knowledge of life. We have the imagination and the ability to know what to do, but not the capacity to translate all of this in writing, or to technically support all of this. So there should be integration between the capacity of technical professionals from the universities and the everyday, practical knowledge that we have accumulated over generations as small farmers. We should try to integrate these different capacities."
Alberto Gomez Flores (2006).

Sources: Cohn *et al.*, 2006; Pimbert *et al.*, 2006.

Table 7.1. Changing professionalism from the old to the new in education and research

	From the old professionalism	To the new professionalism
Who sets priorities?	Social and natural scientists, as well as other professionals, set priorities	Local people & professionals set priorities together, including upstream strategic research priorities
Science, knowledge and methods	Scientific method is reductionist & positivist, with a strong natural science bias; complex world split into independent variables and cause-effect relationships; scientists' categories and perceptions are central	Scientific method holistic & post-positivist; local categories of knowledge and perceptions are central; subject-object and method-data distinctions are blurred
Strategy and context of intervention	Professionals know what they want; pre-specified research plan or project design; top-down approach. Information and results are extracted from controlled situations; context is independent and controlled. Blueprint-oriented	Whilst clear about the need for sustainable food systems, professionals do not know where projects will lead; it is an open-ended learning process. Understanding and focus emerges through interaction; context of inquiry and intervention is fundamental. Process-oriented
Assumptions about reality	Assumption of singular, tangible reality	Assumption of multiple realities that are socially-constructed
Relationship between all Actors in the process	Professionals control and motivate client from a distance; they tend not to trust people (farmers, food workers, indigenous and rural people etc.) who are simply the object of inquiry or intervention	Professionals enable and empower in close dialogue; they attempt to build trust through joint analyses and negotiation; understanding arises through this engagement, resulting in inevitable interactions between the investigator and the "objects" of scientific and professional interventions
Mode of working	Single disciplinary — working alone	Multidisciplinary and trans-disciplinary — working in groups
Attitudes to food & agricultural policy, technology or services	Rejected policy, technology or service assumed to be fault of local people or local conditions; centrally designed policy and technology first	Rejected policy, technology or service is a failed or dead end innovation; people first
Career development	Careers are inwards and upwards — as practitioners get better, they become promoted and take on more administration	Careers include outward and downward movement — professionals stay in touch with action at all levels

Source: modified from Pretty and Chambers, 1993.

In short, these profound changes amount to nothing less than a paradigmatic revolution in education, research and extension institutions.

> *"Key to all this is a commitment, by these institutions, to critical engagement which can be nothing less than a critical and conscious commitment to transformation; not just of ways of 'doing things in the world about us', but also of ways of 'viewing that world' and 'of coming to know, understand and value it' in all of its complexity, as pre-requisite for responsible action to change circumstances in it." (Bawden, 2007).*

In this context, a range of institutional and methodological innovations based on citizen deliberation and inclusion may help re-constitute knowledge and technologies for ecological sustainability, social justice and human liberation. The following innovations in particular can act as important levers for change when combined in mutually supporting ways:

1. Open up decision-making bodies and governance structures of education and research organisations to allow a wider representation of different actors and greater transparency, equity and accountability in budg*et al*location and decisions on R&D priorities. Throughout the world, there is a dire need for much wider and more gender balanced representation in these institutions by different citizens: small farmers, tribal people, forest dwellers, fisherfolk, healers but also farm workers, small food processors, retailers and consumers. These bodies set upstream strategic research priorities in the natural and social sciences as well as the agenda for the design of food and farming technologies. They are immensely powerful in that they broadly decide which policies and technologies will ultimately be developed, why, how and for whom. And yet the governance of higher education, science and technological R&D is presently largely dominated by men who are increasingly distant from rural realities and moving closer to corporations (Beder, 2006 a&b; Martin, 1996).

2. Use regular citizen panels, consensus conferences, citizen juries, future scenario workshops and referendums to capture the full diversity of interests and values in deciding on upstream strategic research and funding priorities in the social and natural sciences, the allocation of resources and technological risk assessments (see chapter 5). Citizens' commissions for science and technology futures should be set up to guide and connect research, training and policy institutions. These deliberative and inclusive democratic procedures will clearly need to be linked into the formal policy process through appropriate reforms that allow citizens to more directly frame policies and regulations. Recent experiences also suggest that these forms of participatory democracy can help re-frame policies on the future of food and farming to reflect broader social interests and goals rather than narrow corporate interests and elite expertise (see Boxes 7.9 and 7.11). Similarly, methods for multiregional processes of citizen deliberation and inclusion can be used to allow citizens to rethink and redirect research for the public good. By creating a network of safe citizen spaces for communication and action, the international initiative described in Box 7.9 is exploring ways of transforming food and agricultural research for food sovereignty and democratic governance.

   As Jasanoff (2003) argues, there are a number of compelling reasons why such citizen engagement is necessary: to uphold the standards of democratic society where such engagement should be the rule rather than the exception; to continually assess and contest the framing and direction of expert-led decision-making processes; to critically subject institutional interests and biases to public scrutiny; to establish culturally appropriate bases on which knowledge and decisions are assessed and validated; to enhance citizen capacities to reflect

Box 7.9. Citizens rethinking food and agricultural research for food sovereignty

Throughout the world, publicly-funded research shapes the choices that are available to farmers, to food workers and consumers, and the environments in which they live and work. There is an increasing need to explore ways of democratising the governance of science and technology, ensuring that it continues to serve the public good rather than narrow economic interests. A series of conversations with farmers, pastoralists, indigenous peoples, policy-makers and representatives of social movements between 2005-2007 has led to a major multi-country initiative in which citizens can exercise their democratic imagination to decide on the kind of food and agricultural research they want—focusing in particular on transforming knowledge and ways of knowing for food sovereignty. This deliberative process therefore looks at the role of citizens (producers and consumers) in building an agri-food research system that is democratic and accountable to wider society. More specifically, the methodological approach seeks to facilitate the participatory design of alternative, farmer and citizen-led agricultural research. Both non-specialists and individuals with specialist knowledge are encouraged to develop an alternative agri-food research system for food sovereignty.

This participatory policy process was initiated in 2008 to create safe citizen spaces in three regions, with one country acting as host for each region: West Africa (Mali), South Asia (India) and the Andean region in Latin America (Bolivia). There are plans to further extend these citizen deliberations to two other regions, including Europe.

In each setting, this action research explicitly aims to strengthen the voices of small-scale producers and other citizens in setting agendas for scientific and technological research as well as in framing policies for food and agricultural research. The initial framing of topics for deliberation and the precise methodology used in each case study have been jointly developed with local partners and co-inquirers. However, each site-specific research process adapts and combines the following key elements to ensure a competent, fair and trustworthy deliberative process:

- The use of participatory approaches and methods to include diverse actors in deliberative processes and safe spaces, including citizens' juries, consensus conferences, citizen panels, scenario workshops, deliberative polling, multi-criteria mapping, visioning exercises and other culturally appropriate fora for deliberation and inclusion.

- A set of carefully-designed safeguards to ensure the quality and validity of the knowledge and actions generated. Such safeguards are needed in collaborative inquiries where the political stakes in the outcome of this way of knowing are high. Safeguards are being combined in mutually reinforcing ways to ensure that deliberative processes are broadly credible, trustworthy, fair and not captured by any interest group or perspective.

- A mechanism for linking formal decision-making bodies and processes with spaces in which expert and experiential knowledge are put under public scrutiny, by engaging relevant social actors and coalitions of interest.

Some of the issues on which citizens are deliberating and making recommendations include: i) the control and allocation of funds for scientific, technical and socio-economic research; ii) non-specialist and citizen involvement in agenda setting for research and in defining strategic priorities and science policy upstream; iii) ways of knowing and doing research based on extended peer communities and different traditions of knowledge and practice,

including autonomous learning and action mediated by horizontal networks of citizens; and iv) governance, oversight and inclusion in the production and validation of knowledge embedded in policies and technologies for food, farming and the environment. Actors involved will also identify the policy and practical implications of setting up broad, multi-actor platforms for democratic oversight of funding, priority setting and conduct of R&D that links both formal and informal innovation systems to serve the public good.

Over the next three years, it is anticipated that both national level and international processes will be initiated with different partners on the transformation of the agri-food research system for food sovereignty in different settings. A key assumption here is that power and countervailing power can be exercised through discursive accounts of reality, by promoting one future vision over others. New story lines can often bring together actors into coalitions. *"Political change may therefore well take place through the emergence of story lines that re-order understandings"* (Hajer, 1995).

Sources: Pimbert, 2007; http://www.iied.org/NR/agbioliv/ag_liv_projects/ReclaimingDiversityandCitizenship2.html

on and respond to the broader changes of modernity and globalisation (see also Radical Science Journal, passim; Science as Culture, passim).

3. Re-organise conventional scientific and technological research and education to encourage participatory knowledge creation and technological developments that combine the strengths of citizens (farmers, students, skilled workers, men and women…) and scientists in the search for locally-adapted solutions. Effective and interdisciplinary co-inquiries and partnerships are needed to link natural and social sciences with indigenous and citizen knowledge to address needs and problems in specific local settings that are typically marked by complex and dynamic change. This calls for new systems of learning that emphasise the interactive participation of all actors. Transforming ways of knowing in this context must draw on the many long-established traditions that have put participation, gender inclusion, action research and adult education at the forefront of attempts to liberate and emancipate disempowered people (see Bradbury and Reason, 2001; Chambers 1992a; Freire, 1970 and 1976; Fals Borda, 1987; Fals Borda and Rahman, 1991; Participatory Learning and Action, passim; Pretty, 1995; Nayar *et al*, 2008; and Box 7.10).

Box 7.10. Alternative systems of learning for change

There has been in recent years a rapid expansion of alternative systems of learning and innovation. These have drawn on many long-established traditions that have put participation, action research and adult education at the forefront of attempts to emancipate disempowered people. These approaches represent a significant departure from standard practice in the social and natural sciences. Methods are being used not just for local people to inform outsiders, but also for people's own analysis of their own conditions (see Action Research, passim; Bradbury and Reason, 2007; Chambers, 1992a&b; Pretty and Chambers, 1993).

Despite the different ways in which these approaches are used, there are important common principles uniting most of them (Fals Borda and Rahman, 1991; Pretty, 1994; Borrini *et al.*, 2007). These are as follows:

- *A defined methodology and systemic learning process*: the focus is on cumulative learning by all the participants and, given the nature of these approaches as systems of learning and action, their use has to be participative.

- *Multiple perspectives*: a central objective is to seek diversity, rather than characterise complexity in terms of average values. All views of activity or purpose are heavy with interpretation, bias and prejudice, and this implies that there are multiple possible descriptions of any real-world activity.

- *Group learning process*: all involve the recognition that the complexity of the world will only be revealed through group learning.

- *Context specific*: the approaches are flexible enough to be adapted to suit each new set of conditions and actors, and so there are multiple variants.

- *Facilitating experts and citizens*: the methodology is concerned with transforming existing activities to try to bring about changes which people in the situation regard as improvements. The role of the "expert" is best thought of as helping people in their situation carry out their own study and so achieve something. These facilitating experts and citizens may be stakeholders themselves.

- *Leading to sustained action in the face of dynamic change*: the learning process leads to debate about change, including confronting others' constructions, and this debate changes the perceptions of the actors and their readiness to contemplate action. Action is agreed, and implementable changes will therefore represent an accommodation between the different conflicting views. This action includes local institution-building or strengthening, so increasing the capacity of people to initiate change on their own.

The methods are structured into five classes, namely those for group and team dynamics, for sampling, for interviewing and dialogue, for visualisation and diagramming, and for citizen deliberation and negotiating agreements on the roles, rights and responsibilities of different actors. It is the collection of these methods into unique approaches, or assemblages of methods and processes, that constitutes systems of learning and action for change.

Source: modified from Pretty, 1994; Borrini Feyerabend *et al.*, 2007.

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Tuareg driving flock of goats, family calling, Algeria

An important goal of new forms of co-inquiry between scientists and citizens is to ensure that knowledge, policies and technologies are tailored to the diversity of human needs and the situations in which they are to be used. This must be on the basis of an inclusive, and decentralised, participatory process in which the means and ends of R&D are primarily shaped with, by and for citizens through conscious deliberation and negotiation.

In this regard, the historical contributions, value and depth of experiential knowledge based on the careful observation of social phenomena and environmental dynamics needs much greater recognition and inclusion by disciplinary scientists than is the case today. For example, networks of French farmers involved in participatory plant breeding programmes are bringing radically new experiential knowledge on heredity and plant behaviour into their co-inquiry with scientists. In turn, the scientists working with the farmers are challenged to fundamentally rethink the epistemological basis of plant genetics and their own ways of doing research (Box 7.11).

The example of the *Réseau Semences Paysannes*, and others mentioned here (Boxes 7.12 and 7.13), emphasise that the issue is not merely about "using" participation to make research more "effective" or "efficient". Instead, the transformative process envisaged here is much deeper in scope and intent. "Participation" is all about ensuring greater "cognitive justice" between fundamentally different knowledge systems and ways of knowing. As Visvanathan argues, cognitive justice is *"the constitutional right of different systems of knowledge to exist as part of a dialogue and debate"* (Visvanathan, 2005). Cognitive justice thus seeks to advance democratic practice by recognising the claims of communities, groups and networks in decisions that fundamentally affect people's lives. Such demands do not represent an anti-science agenda, nor are they necessarily against modern technology. Instead, the idea of cognitive justice emphasises the right for different forms of knowledge and their associated practices, livelihoods and ways of being to coexist. *"The opposition of expert and layperson disguises to a certain extent the opposition between science and alternative sciences. One needs instead a parliament of epistemic debates, but also the ecologies that would let these forms of knowledge survive and thrive not in a preservationist sense but as active practices"* (Visvanathan, 2005).

Box 7.11. Farmer networks transforming the theory and practice of plant breeding in France

From the early 1970s onwards, there have been many local initiatives aimed at conserving and using traditional varieties of fruit trees and vegetables in France (Marchenay, 1987; Pimbert, 1988). In 2003, the *Réseau Semences Paysannes* (the Peasant Seeds Network) was created in France by the *Confederation Paysanne*, the National Coordination of Defenders of Farm Seeds, and several organic farmers' associations. The *Réseau Semences Paysannes* is made up of 26 member organisations and builds on the earlier work of French seed savers, focusing not only on vegetables and fruits but also on cereals, oilseeds and grapevines. The main objective of this network of French growers is *"to regain total autonomy over seeds, which means being able to do our own plant breeding, and select plants in our own fields"* (Personal communication Guy Kastler, 6 May 2004). In this context, selecting and producing one's own seeds not only represents a fundamental rejection of the "commercial and industrial productivist system", but is also a quest for autonomy, peasant identity and meaning.

Farmers who grow crops in low external input systems or under organic farming conditions are keen to find seeds adapted to their specific cultivation practices. They complain about the fact that commercial varieties are not adapted to poor soils when no chemical fertilisers and pesticides are used. Moreover, farming with no or very few external inputs reveals the heterogeneity of their farming environment and the corresponding need for diversity in their crop varieties. And they have many different needs and uses for their crops: farmers rearing animals and crops in mixed farms need long stem cereals which provide more straw; farmers practising permaculture require early sowing or deep rooting crop varieties; and farmers who produce their own bread are especially interested in the taste, colour and nutritional quality of the bread they make from their own cereals. The standard, industrial farming varieties offered by public and private plant breeding programmes fail to meet the diverse needs of these farmers and their land. This largely explains why members of the *Réseau Semences Paysannes* (RSP) have initiated their own plant breeding based on traditional crop varieties.

Since 2003 the RSP has worked with a small group of plant breeders from INRA, the French National Agricultural Research Institute. Participatory plant breeding work has so far primarily focused on wheat, maize and crucifers. This process of co-inquiry between scientists and farmers has generated a number of tensions, as well as new opportunities for meaningful change:

- In sharp contrast with mainstream science, the RSP farmers clearly reject the reductionist, utilitarian and mechanistic view of the living world. Their concepts and categories of knowledge do not sit well within the quantifying-instrumental approach of conventional plant breeding. This has created tensions with well-meaning researchers from INRA, whose

language—and its implicit assumptions—reflects and reinforces an instrumentalist view of nature. For example, in the early phases of participatory plant breeding work, farmers criticised researchers for using such terms as "genetic material", "weeds" and "quantifiable selection criteria". In contrast, when describing their relationship with their crops, farmers see them as *living* plants and companions, and they never view the plant as an *object*. They have a strong emotional attachment to plants and see them as a source of knowledge and inspiration, provided one has a friendly and empathising relationship with them. *"If you know how to dialogue with her, really allow her to enter inside you and speak to you…..Because I do not know anything about wheat, it's the wheat plants that teach me everything"* (J.F. Berthelot, 2006).This emotional bond with plants is seen as a key source of knowledge and it clearly positions farmers outside the positivist scientific paradigm that values a cool "objective detachment" in the pursuit of knowledge. Moreover the farmers reject the studies of heredity based on experimental analysis and instead value a more holistic and phenomenological approach to understanding their interactions with plants and the living environment. As a distinct tradition of knowledge, phenomenology takes the intuitive experience of phenomena (what presents itself to us in phenomenological reflection as its starting point and tries to extract from it the essential features of experiences and the essence of what we experience.[a]

The farmers' ways of knowing are thus radically different from the epistemological norms of mainstream plant genetics and breeding. Yet as this process of co-inquiry with scientists unfolds, it is becoming more apparent that the farmers' experiential knowledge and phenomenological understanding of the living world resonate with new insights from modern genetics and biology. This is true, for example, in the areas of fluid genomes and indeterminate relations between genes and the environment (Commoner, 2002; Mae Wan Ho, 2003); non-linear dynamics, plasticity and the emergence of new forms; epigenetic effects in which the environment modulates genetic expression and leads to heritable phenotypic changes; metamorphosis and process transformation in growth, development and evolution; emergent properties and the self-organisation of the living world (Pouteau, 2007a&b). Ultimately, new forms of plant breeding based on a more holistic science of dynamic complexity and participants' engagement with the living world may grow out of these conversations between farmers and scientists as they generate plant varieties suited to a diversity of unique situations and needs. This would amount to nothing less than a paradigm revolution in genetics, plant breeding and modern biology.

Sources: Réseau Semences Paysannes, 2004; www.semencespaysannes.org.
For personal communication of JF Berthellot see Bonneuil, 2007; Nature et Progres *et al*., 2007.

a Phenomenology as conceived by Edmund Husserl began as a criticism of the following views which were widely accepted in the 19th century: i) that the only genuine knowledge of the world open to humankind is that obtained by the methods of the natural sciences; ii) that philosophical systems, therefore, in so far as they are not a synthesis of scientific theories, can be nothing but personal or group fantasies that have no objective validity. In his *Phenomenology of Perception* (first published in French in 1945), Merleau-Ponty perceives the essences of the world existentially, as opposed to the Cartesian idea that the world is merely an extension of our own minds. Consciousness, the world, and the human body as a perceiving thing are intricately intertwined and mutually "engaged". The phenomenal thing is not the unchanging object of the natural sciences, but a correlate of our body and its sensory functions. Things are that upon which our body has a grip, while the grip itself is a function of our connaturality with the world's things (Farber, 1943; Wikipedia, accessed in November 2007).

7.3.3. De-institutionalising research for autonomous learning and action

Historically, a great deal of knowledge has been produced by individuals and communities who did not have any professional scientific training. For example, agriculture has had many "revolutions" throughout history, from its birth 8-11,000 years ago, to the renowned 17th to 19th century agricultural revolution in Europe. Given that formal scientific research institutions did not exist at the time of most of these agricultural revolutions, the innovators and creators of new social and technical knowledge were mainly farmers, pastoralists, fisherfolk, forest dwellers and artisans.

Even today in advanced industrial societies, ordinary citizens are engaged in the production of knowledge on a significant scale. People without specialised professional training are increasingly involved in generating and validating scientific knowledge in many different areas: victims of pollution developing a people's epidemiology, scientific activism by citizens affected by HIV/AIDs or other illnesses, involvement of amateur naturalists and gardeners in national surveys or biodiversity conservation plans, contributions of computer game players to the enrichment and design of new games, the open source community developing non-proprietary software and internet programmes, etc. (Irwin, 1995; Callon *et al.*, 2001; Charvolin *et al.*, 2007). In the UK, one of the longest biological data sets on the relations between weather patterns and the phenologies[7] of plants and animals has been largely established and maintained by a decentralised network of amateur gardeners and "citizen scientists", from 1736 till today

(Lawrence, 2007; http://www.naturescalendar.org.uk/science/). From using home computer downtime to search for extraterrestrial life and designer drug molecules, to amateur experts tracking comets with their back garden telescopes, the "public" is increasingly involved in a huge range of surveys and experiments, with entire websites describing the activities of these amateur scientists and knowledge producers (e.g. see http://www.bbc.co.uk/radio4/science/citizenscience.shtml).

Many terms are currently used to describe these forms of citizen engagement in the production of knowledge: citizen science, participatory research, social redistribution of expertise, civic epistemology, etc. But whilst they share several similarities, in the context of this chapter, the distinction needs to be made between:

7. Phenology is the study of the times of recurring natural phenomena especially in relation to climate. In Japan and China the time of blossoming of cherry and peach trees is associated with ancient festivals and some of these dates can be traced back to the eighth century. Robert Marsham was Britain's first phenologist and started recording his Indications of Spring as early as 1736.

1. Initiatives in which citizens act as amateur scientists as part of a willing army of helpers to the scientific community and to "actually existing science". Citizens largely take part in scientific projects in which goals and outcomes are reached more effectively thanks to a mass of citizen contributors who "participate" in surveys or experiments designed by a small number of scientists; and

2. Initiatives that seek to strengthen citizen-led innovation and organise networks of knowledge users on the basis of a more horizontal and egalitarian logic. Many such citizen networks work independently—outside the state and the market. Citizens are part of non-hierarchical "peer to peer" collectives which typically seek to go beyond the concepts, categories, criteria and epistemology of dominant knowledge in the social and natural sciences.

The rest of this section focuses on the latter: citizen-led innovation and socio-cultural networks organised along more horizontal and egalitarian lines, working to produce and transform knowledge, sometimes with, but more often without, the involvement of professional scientists. Some of the defining characteristics of this citizen-centred approach are illustrated through examples taken from different regions of the world.

In Bangladesh, the experience of the *Nayakrishi Andolan*, or New Agriculture Movement, provides an important grounding and practical setting for the development of innovative farmer-centred approaches for learning and action (Box 7.12). As an autonomous network for learning and action, the *Nayakrishi Andolan* builds on rural peoples' systemic art and science of combining and integrating all aspects of life. Its holistic orientation seeks to re-unite those *"dimensions that civilisation has systematically broken into institutional and social silos, including livelihood (labour), wealth (capital), reciprocity*

(market), governance (government), spirituality (religious institutions), knowledge (science), aesthetics (arts), love (family) and pleasure (sex and entertainement)" (Mazhar *et al.*, 2006).

In the Peruvian Andes example (see Boxes 4.2 and 7.3) Quechua communities are linked through socio-cultural networks for horizontal learning and action. Platforms of local resource users from the Potato Park reach out to neighbouring indigenous communities, with "barefoot technicians" building new confidence and capacities for the collective production of useful social and ecological knowledge. This endogenous socio-cultural network is thus engaged in learning-by-doing for the local adaptive management of mountain ecosystems and ecological networks. But it is also developing the "soft side" of the land: customary institutions and forms of governance rooted in the concept of indigenous bio-cultural heritage areas (IBCHA). Elsewhere in the Peruvian Andes, indigenous peoples have also formed extensive networks of Nuclei for Andean Cultural

Box 7.12. Autonomous research and learning networks in Bangladesh

Nayakrishi Andolan is a peasant movement in Bangladesh which includes more than 100,000 farmers supported by UBINIG.[a] UBINIG and *Nayakrishi Andolan* are committed to building a "Peasant World University": an "institution" capable of generating new and inclusive learning about agrarian livelihoods through horizontal networks that build on marginalised expressions of living knowledge. This living knowledge is the learning co-generated and distributed in multiple spaces: in farming practices, products, fields, landscapes, and in the village campuses that are made up of men and women, old and young, potters and farmers, artisans and healers, fishers and hunters, leaders and priests, story tellers and musicians.

The *Nayakrishi Andolan* and UBINIG have actively combined efforts to put into practice the art and science of learning-by-doing through a variety of interrelated knowledge producing activities. These include systematic rethinking of agriculture as the art of generating and managing both cultivated and uncultivated space. Innovative practices go beyond mere creation of new technology to include the active discovering of complex ecological interactions embedded in everyday language and rural livelihoods. The living knowledge of rural people cannot be harnessed by writing and conventional linear thinking alone. *Nayakrishi Andolan* thus uses the dynamics of oral culture as the medium of living knowledge. This approach has made it possible for the *Nayakrishi Andolan* to collect and preserve seeds of biodiversity, using oral culture to secure the collective memory on not only the properties of plants (edible wild plants, medicinals, crop varieties…), but also on the combinations of plants and other life forms that can contribute to ecological farming.

The institutional and organisational ramifications of learning innovations of this kind have been far reaching. They include the creation of Nayakrishi Seed Networks, regional Natural Resource Auditing committees, and also a network of birth attendants and medicine women. These strong networks and biodiversity-based farming practices are steadily expanding because of their productive capacity and ability to meet households' various needs. Household and village level seed huts develop and share the specialised knowledge of women farmers. The huts act as spaces for the exchange of seed and knowledge and as living monographs of particular farming strategies. Field experiments based on these seed collections are organised by UBINIG Centres located in all major ecological zones of Bangladesh, in co-operation with national scientists and plant breeders. These experiments allow farmers to directly test Green Revolution claims about the inherent inferiority of local seeds in comparison with the few varieties that make up the commercial seed system. They enhance the capacity of farmers to resist the monoculture imposed by techno-scientific and commercial paradigms of food production. The findings of these and other experiments are shared by farmers through regular regional exchanges. They are also celebrated nationally and locally in biodiversity festivals linking the act of seed saving to the spiritual practices of Bengal through poetry, song and the living knowledge of wandering musicians. Lastly, the knowledge co-generated by the farmers of Nayakrishi Andolan and UBINIG is contributing to a national discourse on ecological agriculture and is informing debates on global issues from the perspective of peasants.

More inclusive ways of knowing and new knowledge are thus being generated through a collective process of learning that unfolds in living experience.

a. UBINIG is the abbreviation of its *Bengali name Unnayan Bikalper Nitinirdharoni Gobeshona*. In English it means Policy Research for Development Alternatives. UBINIG is a policy advocacy and research organisation which also implements the ideas that come out of research and its living interaction with local communities.

Source: Mazhar *et al.*, 2006;
http://membres.lycos.fr/ubinig/about2.htm




Affirmation (NACAs) in which knowledge is renewed and shared (Box 7.13). Holistic and phenomenological understanding of a complex dynamic reality emerges and is widely shared throughout such networks. The knowledge produced participates in the cycles of regeneration of the ecology, economy, culture and spirituality of the "life world" of indigenous communities. In this process, the foundational assumptions of scientific disciplines such as economics are often found to be thoroughly and utterly inadequate (Box 7.13).

The Andean indigenous communities' cosmology and mode of being express themselves more fully in such horizontal networks. In turn, this enables ways of knowing that are radically different from the epistemological norms of western science. Unlike the anthropocentric nature of modern science, Andean epistemology and its underlying cosmology is *Pachacentric*. The Pacha is not only the mother of the land but is a person experienced as the mother of the community of humans (*runas*), the community of deities (huacas) and the natural community (*sallqa*). The whole *Pacha* is a community of interconnected living beings in which the community of relatives (humans, plants, animals, minerals, the wind, the soil…) is regenerated cyclically. Respectful conversations, emotional and spiritual bonds with plants, animals, ecosystems, landscapes and human communities are viewed as legitimate sources of knowledge and ways of knowing (Rivera, 1998). Knowledge is generated through conversations between the *runas*, the *huacas* and the *sallqa* in a brotherly atmosphere of profound equivalency. The essence of this mode of being and knowing has been well expressed by Grimaldo Rengifo Vasquez:

2 minutes

Asociación Andes
click here

Box 7.13. PRATEC and the NACA's network: indigenous people regenerating knowledge in the Peruvian Andes

The NACAs (Nuclei for Andean Cultural Affirmation) are indigenous community-based organisations. They are committed to a long-term relationship with the indigenous communities they accompany in their efforts for cultural affirmation. PRATEC—the *Proyecto Andino de Tecnologias Campesinas* (Andean Project for Peasant Technologies)—has been accompanying the activities of the NACAs in the Peruvian Andes since 1987.

In a recent co-inquiry the NACAs, PRATEC and indigenous farmers explored the following questions: What is the relationship between highland Andean communities and wild spaces? How does this relationship manifest itself in concrete community activities that could be strengthened? The co-inquiry aimed to describe the local cosmovision of wild spaces and how they are nurtured by the communities living in the Andean highlands. This is interesting given that the conceptual framework of the Millennium Ecosystem Assessment[a] (MEA) centres on the services offered by ecosystems for human well-being, but overlooks the care that humans currently give to ecosystems.

The NACAs' approach involved closely accompanying and supporting the peasant nurturers of agricultural biodiversity, their families and mutual help groups (or *ayni*). Most of the NACAs have a long acquaintance with the communities, who consequently trust them, allowing for secrets and intimate beliefs to be shared. This proved important in this co-inquiry because the wild spaces or commons are very sacred places for these communities and are approached with the utmost respect.

In these communities, the regeneration of traditional knowledge occurs on a daily basis while peasants tend their *chacras* (or cultivated fields). It also occurs in the *ayni*, groups in which peasants nurture plants and animals and exchange seeds. These sustenance activities have given rise to the largest agricultural biodiversity known on the planet. At the communal level, community regeneration (the *ayllu* or extended family that includes community deities and natural entities) occurs while caring for common land, such as the areas of pasture and communal crops known as *sallqa*, and during the rituals and festivities that periodically renew the community's commitment to nurturing life. Moreover, Andean indigenous communities make no distinction between "wild" and "cultivated". Both are nurtured. It is only the nurturer who differs. The wild is cared for by, or in charge of, the wakas or deities. This is the reason why every activity related to the *sallqa* requires the deities' permission. But the *chacra* also requires *Pachamama*'s, or Mother Earth's, permission and help to cultivate. A central characteristic of the Andean cosmovision is the idea of incompleteness or interdependence. Just as humans need the deities' help to cultivate their chacras, so too the deities need the participation of humans in the regeneration of the *sallqa*. The process of regeneration at the inter-communal and interregional levels hinges on the farmer to farmer exchange visits that Andean peoples have undertaken following the paths of seeds and knowledge. These visits re-create and reinforce the webs of affection and protection that gather communities together in a larger organic unit.

This co-inquiry with indigenous peoples highlighted radical differences between the techno-scientific cosmovision of "wild spaces" and the Andean cosmovision of the *sallqa*. Technical personnel trained in the university system and the Andean farmers had strongly differing understandings of how to conserve the diversity of native cultivated plants and ecosystems. For example, the economics used by the scientists failed to define a way to ensure the participation of the Andean communities in the care of the sallqa and the conditions needed

for the continued provision of good quality ecosystem services. Economics misses the communities' basic motivation for conserving such conditions when suggesting that compensation mechanisms would maintain the communities' commitment. Mainstream economics neglects the fact that the highland Andean communities have an intrinsic interest in preserving the harmony of the world as a precondition of their own well-being.

a. The Millennium Ecosystem Assessment (MEA) was an important scientific collaborative initiative under the auspices of the United Nations (2000-2005). Its aim was to study ecosystems at different levels with the specific intention of providing decision-makers with information and criteria for the incorporation of environmental variables in their decisions. The results are a synthesis of the state of knowledge on world ecosystems. The Millennium Ecosystem Assessment (MEA) held a meeting in March 2004 in Alexandria, Egypt, on the possibility of bridging epistemologies (local or traditional and techno-scientific) and levels (ranging from global to local). In the meeting, the dearth and inadequacy of knowledge of local epistemologies was evident (Salas, 2005).

Sources: PRATEC and SwedBio, 2007; http://www.pratec.org.pe/videos.htm

"One characteristic of every regenerative act is the equivalence and affection between the members of nature and not the separation and hierarchy between the natural and human communities….For we Andeans, the Andes is a world of affectionate conversationalists because it is love for the world which allows life to flow….A pre-requisite in this nurturance is that we all be disposed to listen perpetually and in each circumstance to the 'speaking', to the sign of each one……In the conversation each member of the Pacha is recognised as a sensible organism in constant speech. Here language is not only a human attribute but one belonging to all members of the Pacha and communication takes place through the senses – which are like the 'windows' of life. It is through them that one converses with everyone. The common senses are amplified in rituals; the person who participates in them 'sees' more. The profound and intense moments of the organicity of the Pacha are expressed in the intimacy of the ceremonies. In these moments one can and does know and live with plenitude the life of the other members of the Pacha, relate intimately with nature…. Conversation is thus an attitude, a mode of being in unison with life, a knowing how to listen and knowing how to say things at the appropriate moment" (Rengifo Vasquez, 1998).

Many farmer and citizen networks also selectively incorporate modern innovations and technologies as part of their process of cultural affirmation and self determination. In the Indian state of Andhra Pradesh, collectives of women dalit farmers are using modern digital video technology to document and share their knowledge of bio-cultural diversity and insight into their lives. Autonomous film and radio also enable them to express their own visions for the future of food, farming and development. In so doing they are transforming knowledge and ways of knowing for themselves and others inspired by them (Box 7.14).

The political economy of knowledge in horizontal networks is radically different from that of mainstream scientific institutions and research. This is true for citizen networks in developing countries like Peru, India and Bangladesh, as well as in highly industrialised countries like the USA and Japan. The Réseau Semences Paysannes in France is particularly noteworthy in this regard (Box 7.15, and see also Box 7.11).

In sum, these citizen networks and others described in recent literature (e.g. Basset, 2004; Callon *et al.*, 2001; Charvolin *et al.*, 2007) typically share the following defining characteristics:

1. Networks for autonomous learning and action value experiential knowledge. Intimate knowledge of places where one lives and works matters, and so does the tacit knowledge that comes from learning by doing. The farmers and other citizens involved in this way of knowing rely on their senses (smell, sight, taste, touch, hearing…) to perceive and interpret phenomena. Observations and sense-making activities are carried out in real life situations—in the field and *in vivo*. Unlike in the experimental sciences, citizens are involved as full and whole human beings, with all their senses engaged in a relation of empathy with living beings, minerals and the wider environment. Careful observations and inclusive conversations help map, analyse, understand and

5 minutes

The Alternative Public Distribution System of DDS
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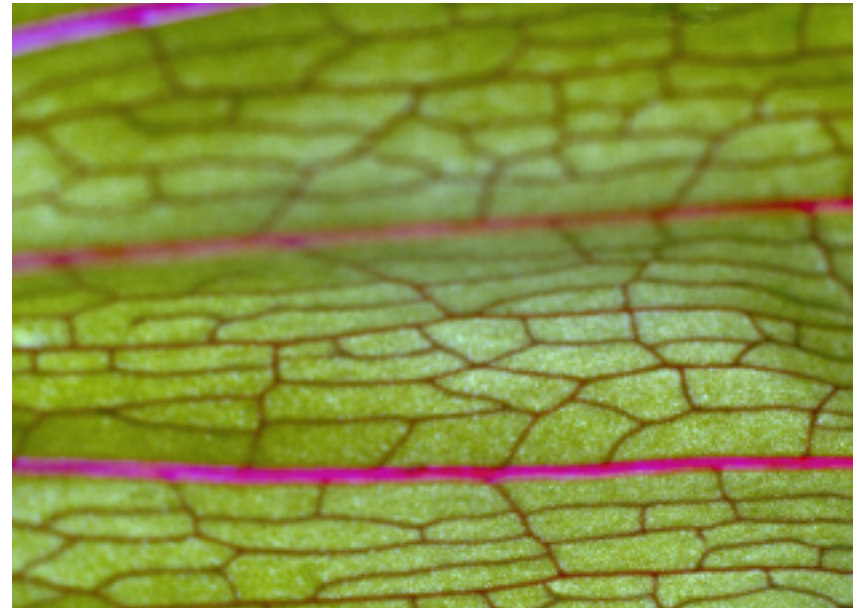

Box 7.14. Autonomous film and radio: the Community Media Trust in South India

The Community Media Trust of the Deccan Development Society (DDS) was created in October 2001 in direct response to the demands of thousands of very poor, low caste women who wanted their unrecognised voices to be heard and acknowledged by the world outside. It works in about 80 villages with women's *sanghams* (voluntary village associations of the poor) in the Medak District of Andhra Pradesh. Here the official media was seen to be dominated by commercial and political actors whose interests conflict with those of rural communities and their environments.

The CMT is mandated to hand over the microphones and cameras to marginalised rural women to produce their own images and authentic voices. Moreover, it strives to take these images and voices to the wider world and create an alternative media that can be accessed and controlled by local communities, especially those that suffer continued exclusion. The CMT comprises 20 women, 17 of whom work with video and three with radio. The video group uses digital video cameras, portable edit recorders and computer-based editing facilities to make their films.

The women film makers have together made more than 100 short films on various issues of concern to them and their communities. They have brought fresh perspectives into film making. Whilst the primary engagement of the CMT lies in a horizontal communication with their own communities, their members have also produced dozens of films for other groups and agencies on environment and development issues. These include films about the future of food and farming; the bitter harvest of genetically engineered agriculture; water; lives and livelihoods; women's control over media; environment and agricultural biodiversity. Several of these films have been broadcast as news items on national television channels. They have also been shown in international farmer exchanges for mutual learning, and in film festivals.

Participatory video has also been used as an integral part of action research on the regeneration of diverse food systems and decentralised forms of governance. The Community Media Trust has documented this action research process through the eyes of marginalised women farmers and small farmers. In this way:

- Video transforms the lives of the people involved. But it also transforms the research process in which university trained professionals and non-literate, marginalised people are co-inquirers, producing new knowledge that challenges the dominance of western science and learning approaches.
- Video empowers marginalised people—especially women—and facilitates social and ecological change.
- Video travels across borders and boundaries to inspire a younger generation of scholars and practitioners to find better ways of doing research with, by and for people, not just on people.

Through their films and ways of working, the women of the Community Media Trust have engaged with their own communities and other actors in debates over food and seed sovereignty; and control over natural resources, market and media. Through participatory communication processes, they have facilitated and recorded critical evaluations of state policies and programmes. They have also established relationships of solidarity with local communities in South Asia and other regions of the world, helping them to develop their own, locally controlled, autonomous media.

Sources: The Community Media Trust *et al.*, 2008; www.ddsindia.com and www.diversefoodsystems.org

respond to complex and ever-changing natural and social phenomena. In these safe spaces for communication and action, theory and interpretive frameworks are built from knowledge that echoes and reflects the *sensuous* and *sensitive* qualities of human beings.

2. Farmers and other citizens engaged in this transformative way of knowing rarely work alone. They are usually enthusiastic members of a collective of peers, an affinity group, a coalition or an association. People involved in this way of knowing participate in the joint production of *collective* knowledge. And this production of knowledge is intimately linked with the creation and nurturing of human relations and social existence in the networks and ecosystems within which citizens are embedded. Citizens are thus involved in a deeply sense-making activity, generating meaning both for themselves and for the knowledge they are co-creating. This peer group not only creates a space for conviviality and meaningful exchanges of opinion, it also plays a key role in validating new knowledge.

3. All members of such networks of knowledge producers and users effectively act as an "extended peer community". As active participants they introduce "facts" and sources of knowledge which scientists working in standardised and idealised research conditions simply cannot "factor in" and/or assess. The subsequent cross-checking of opinions, joint analysis of information collected, citizen deliberations and peer to peer reviews are all involved in the *in situ* validation of useful knowledge. This possibility of "extended peer review" is a formidable asset at a time when citizens and their communities are faced with the open ended uncertainties of a fast changing world (environmental and climate change, spread of new diseases, unstable markets, political change....). These autonomous networks for learning and action contribute to the emergence of a

Box 7.15. The political economy of knowledge in the *Réseau Semences Paysannes* in France

Members of the *Réseau Semences Paysannes* (RSP) are organised into horizontal networks that link many people and different places throughout France (see also Box 7.10). This decentralised network reflects the farmers' strong wish to regain control over plant breeding activities which had become highly centralised and under the control of professional plant breeders from the 1950s onwards. The polycentric and diffuse character of the network not only prevents hierarchical relations and the accumulation of professional power at the centre; it also displays considerable resilience to outside disturbance and interventions by actors who might wish to destabilise or co-opt it. Moreover, the network arrangement enhances the efficacy of co-ordinated actions and the extent to which valuable face-to-face relationships are possible. Lastly, from a biodiversity conservation perspective, this decentralised network helps lower the costs of seed conservation (time, money, use of space…), encourages more local level adaptation and generation of genetic diversity in a wide range of environments, and also helps minimise the risks of biodiversity loss. It also ensures dynamic forms of *in situ* and on-farm conservation in contexts where cultivated biodiversity is valued along with the knowledge, skills, uses and identity of farmers who nurture these plants.

It is particularly notable that money-based market relations are frowned upon by members of the RSP: the sale of large quantities of seeds is rare and is strongly disapproved of within the network. Instead, members of the RSP exchange seeds among farmers and other citizens who have the capacity to observe and experiment, who show a caring relationship with plants and who are sincere in their motivations. The farmers exchange seeds as gifts in the sense defined by Marcel Mauss in his classic work *The Gift* (1990). This gift exchange leads to a mutual interdependence between giver and receiver. The giver does not merely give an object but also part of himself, because the object is indissolubly linked to the giver: *"the objects are never completely separated from the men who exchange them"* (Mauss, 1990). Because of this bond between giver and gift, the act of giving creates a social bond with an obligation to reciprocate on the part of the recipient. It is the fact that the identity of the giver is invariably bound up with the object given that causes the gift to have a power which compels the recipient to reciprocate. According to Mauss (1990), solidarity is achieved through the social bonds created by gift exchange.

By affirming the importance of reciprocal exchanges of seed and knowledge among members of their network, the RSP is in effect developing a solidarity-based economy that is clearly distinct from the anonymous and ephemeral nature of commodity exchanges that prevail today. This solidarity based moral economy thus creates an autonomous space in which the de-commoditisation of seeds and farmer knowledge becomes possible. Indeed, RSP not only rejects the modern forms of enclosure that increasingly privatise and commodify seeds and farmers' knowledge—for example, the new EU seed regulations, WTO compatible intellectual property rights legislation (patents and plant breeders rights) and transgenic technologies (e.g. GURTs and terminator technology)—but it is also actively working to develop seed legislation, policies and practices that are compatible with the secular rights of farmers to freely save and exchange seeds and knowledge. The farmer network's understanding of "good" economics is thus radically different from the neo-liberal model of commodity exchange which is, implicitly or explicitly, an integral part of the normative framework adopted by most professional plant breeders, research institutes and policy-makers.

Sources: Réseau Semences Paysannes, 2004 and 2008; www.semencespaysannes.org; Nature et Progres *et al.*, 2007.

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Walking in the Neo-tropical rainforest, Peru

"post-normal science"[9] (Ravetz, 1971; Funtowicz and Ravetz, 1994). Post-normal science is the sort of inquiry in which the facts are uncertain, values are often in dispute, stakes are high and decisions are urgent. Its core ideas include an "extended peer community" and the recognition of a plurality of legitimate perspectives on every issue.

4. There are many kinds of people involved in such de-institutionalised forms of research: men, women and teenagers, elderly people, different ethnic groups, disabled and sick people, formally educated and non-literate etc. And it is striking that these diverse actors usually share a strong commitment to ensuring that knowledge, genetic resources, computer software and other innovations remain *accessible to all*. This is seen as a basic condition for *economic* democracy and the exercising of human rights, including the right to food and participation. The enclosure and privatisation of knowledge in particular is seen as incompatible with the ethos of sharing that characterises many horizontally-organised networks of farmers and other citizens. Indeed, new forms of corporate-led enclosures

9. Post-normal science expresses three key insights: 1) these times are far from "normal": uncertainty now rules political and environmental affairs; 2) "normal" puzzle solving science is now thoroughly inadequate as a method and a perspective for solving the great social and environmental issues of our times; 3) extended peer communities of citizens can no longer be relegated to second class status, and their special knowledge can no longer be dismissed as "unscientific", inferior or bogus (see Ravetz and Funtowicz, 1990).

deeply undermine the collective nature of "peer to peer" knowledge production and exchange among citizens. For example, patents on seeds make it illegal for farmers to save and exchange seeds. Decisions to issue industrial patents on knowledge embodied in products and processes (seeds, software etc.) and national intellectual property rights (IPR) legislation are based on western concepts of property and around the notion of the author as an *individual*, solitary and original creator. Western IPRs overlook or ignore the *collective* nature of innovations and the contributions of custodians of culture and medical knowledge or peasant cultivators of valuable seeds, for example (Bellagio Declaration, 1993; Crucible Group, 1994; GRAIN, 2007). This theme is further discussed in Chapter 9.

5. Depending on history and context, de-institutionalised ways of knowing unfold in different ways. Some networks for autonomous learning and action clearly demarcate themselves from the state and rely on self mobilisation and self-financing. But most citizen networks seem to consciously adopt a dual power approach to transform established knowledge, policies and practices. For example, their members engage with formal scientists in participatory research on the basis of clearly negotiated roles, rights and responsibilities, while also maintaining a decentralised network of safe spaces for more autonomous and plural ways of knowing (experiential, local, tacit, feminine, empathising, phenomenological, etc). Less frequent to date, multiple lines for engagement can also be used to create intercultural dialogues that link local and global epistemologies. Multiple lines of engagement may also be relied on to promote greater cognitive justice and equivalence between different knowledge systems, asserting the legitimacy and complementarity of plural sources of knowledge in democratic decision-making.

Grounded in a quest for autonomy and solidarity, this way of knowing seeks to strengthen citizen-led innovation and organise networks of knowledge users on the basis of a more horizontal and egalitarian logic. According to Illich (1970; 1975), such endogenous knowledge creation by and for the people means: 1) taking responsibility for one's own learning process; 2) having unrestricted access to learning tools; and 3) addressing issues that relate to people's aspirations and lives. This has the potential to fundamentally transform knowledge and help give birth to many possible worlds. *"Against the constant and pressing need for expert knowledge to catch up with the industrial development future, endogenous knowledge proposes to 'celebrate the awareness' of the social construction of knowledge and science, and to take the responsibility to 'create' alternative futures"* (Finger and Asun, 2001).

De-institutionalising research for autonomous learning is thus seen as a way to move from "communes of resistance" to sustainable communities which confederate into larger food sovereignty networks, and in which citizens participate in a direct and democratic way.

7.3.4. Re-enchanting the world through self-reflective and holistic ways of knowing

Transforming ways of knowing for food sovereignty is an explicitly value-oriented activity that combines learning with action. This action-oriented research process seeks *"to change practices, social structures, and social media which maintains irrationality, injustice, and unsatisfying forms of existence"* (McTaggart, 2002). Its purpose is to *"understand better, change, and re-enchant our plural world"* (Fals Borda, 2001).

In order to contribute to this transformation, research professionals and other producers of knowledge (e.g. farmers, citizen networks, *gono gobeshoks*[10]....) need to develop particular qualities to help them better recognise which values become embedded in new knowledge and technologies; *why, for whom and with what* possible social and ecological consequences. This calls for a more self reflective practice of action research[11] in

10. *Gono gobeshoks* are people's researchers in Bangladesh. Research Initiatives Bangladesh work with thousands of villagers who are *gono gobeshoks*, for whom participatory research has "sharpened their minds" and helped them develop self-reliance (Wadsworth, 2005).

11.'Action research' is a participatory process concerned with developing practical knowing in the pursuit of worthwhile human purposes. It seeks to bring together action and reflection, theory and practice, in participation with others, in the pursuit of practical solutions to issues of significance concerning the flourishing of human persons, their communities, and the wider ecology in which we participate (adapted from Reason and Bradbury, 2008). Moreover, action research involves a whole range of powerless groups of people – the exploited, the poor, the oppressed, the marginal – as well as the full and active participation of the community in the entire research process. The subject of the research originates in the community itself and the problem is defined, analyzed and solved by the community. The ultimate goal is the radical transformation of social reality and the improvement of the lives of the people themselves. The beneficiaries of the research are the members of the community. The researcher is a committed participant and learner in the process of research, i.e. a militant rather than a detached observer (modified from Hall, 1997).

which researchers open up their own purposes, assumptions, sense-making and actions to critical reflection (Marshall, 1999; 2004). Researchers are invited to engage fully in self reflective practice to enhance quality and validity in ways of knowing. They are invited to be *fully* human in the act of knowing, as awake, choiceful and reflective human beings. This is a particular challenge for professional scientists who—as researchers—all too often cast themselves as "scientifically objective" and detached actors who rely on value-neutral concepts and techniques to generate "truth". Indeed, given today's huge social and ecological crisis, *"scholarly detachment, creating knowledge that denies or suppresses our embodied, connected being in the world, seems ill suited to the issues of our times"* (Marshall and Reason, 2007).

The need to pay simultaneous attention to researchers' sense-making and their actions calls for a more self reflective practice and reflexivity which is both alive and disciplined. Marshall and Reason (2007) describe this process as *"taking an attitude of inquiry"*. They suggest that the following qualities enable *"taking an attitude of inquiry"*: curiosity, willingness to articulate and explore purposes, humility, participation and a radical empiricism that relies on multiple sources of evidence. Enacting these qualities requires a disciplined practice of inquiry that infuses the entire research process in both subtle and powerful ways (see Box 7.16).

Transforming knowledge for food sovereignty depends on adopting such a self reflective and critical way of knowing. "Taking an attitude of inquiry" can help researchers and other citizens go beyond dominant frameworks and assumptions that obscure alternative ways of organising social life and our relationships with nature. For example, Richard Lewontin offers a good example of the new insights which a more reflexive way of knowing can generate in his discussion of the public health hazards of environmental pollution and their causes:

"We must distinguish between agents *and* causes. *Asbestos fibers and pesticides are the agents of disease and disability, but it is illusory to suppose that if we eliminate these particular irritants that the diseases will go away, for other similar irritants will take their place. So long as efficiency, the maximisation of profit from production, or the filling of centrally planned norms of production without reference to the means remain the motivating forces of productive enterprises the world over, so long as people are trapped by economic need or state regulation into production and consumption of certain things, then one pollutant will replace another. Regulatory agencies or central planning departments will calculate cost and benefit ratios where human misery is costed out at a dollar value. Asbestos and cotton lint fibres are not the causes of cancer. They are agents of social causes, of social formations that determine the nature of our productive and consumptive lives, and in*

5 minutes

Shaping a Mask of Leaves for Do
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Box 7.16. Taking an attitude of inquiry

Drawing on 25 years of experience doing action research with a wide community of co-inquirers, Marshall and Reason (2007) suggest that the following can help us to engage in research that is both disciplined and alive as well as self reflective and holistic:

Pay attention to framing and its pliability

- Increase awareness of the frames you are employing and how these affect your sense-making and action;
- Foster an ability to move flexibly between frames;
- Question how system boundaries are being drawn and by whom;
- Test assumptions;
- Welcome paradox and contradiction;
- Engage actively with the perspectives of others;
- Develop a sense of self-irony, playfulness and lack of ego attachment.

Enable participation to generate high quality knowing, working actively with issues of power

- Engage actively with all those who might be seen as relevant actors in the matters at hand, and build capacities for inquiry;
- Question the boundaries of the system and review who counts as a relevant actor;
- Explore the different kinds of power involved in the research context;
- Attempt to create mutuality—"power with"—so that others participate on equal terms in the research engagement;
- Attend to and moderate your own "power over" which derives from unearned, or earned, privilege.

Develop capacities for working with multiple ways of knowing

- Increase the amount and range of "evidence" brought to bear on what is going on;
- Expand your range of attention to include empirical, observational, emotional, behavioural, embodied knowledge;
- Seek to uncover and articulate that which is usually tacit;
- Process and present evidence through a range of different presentational forms (e.g. written text, audio recordings, video, theatre….).

Engage in, and explicate, research as an emergent process

- Pay close attention to the process of engagement with the issues and with others, as well as the content;
- Attend to the continuing process of learning as well as to outcomes;
- Be aware of the evolving choices you and others are making about frames, about who is included and excluded, about positions taken, about evidence employed and so on;
- Be willing to act in circumstances of radical uncertainty;
- Develop discernment about what/how much can be achieved whilst retaining a sense of the urgency and importance of the work;
- Be willing to start from where you are without necessarily knowing where you are going.

Source: Marshall and Reason, 2007

the end it is only through changes in those social forces that we can get to the root of problems of health. The transfer of causal power from social relations into inanimate agents that seem to have a power and life of their own is one of the major mystifications of science and its ideologies" (Lewontin, 1991).

Lewontin's critically reflective "way of knowing the world" is relevant for all areas of food and agricultural research, from risk assessments and the design of farm machinery to social science research used to formulate food and agricultural policies. Indeed, holistic, transdisciplinary ways of knowing which dialectically link different sectors and scales of analysis are urgently needed to re-constitute knowledge and social relations for the design of more ecologically sustainable and equitable technologies and policies.

An important assumption of this holistic and reflexive approach is that knowledge of any system considered at a given point in time is always incomplete, partial and patchy (Kerkhoff and Lebel, 2006). Given the uncertainty and complex dynamics of linked agri-food systems and livelihoods, this holistic view of the world challenges us to learn to feel comfortable with the idea that "we don't know what we don't know" (Wynne, 1992), and with the ambiguity and doubt that comes from different people or organisations framing a problem from contrasting perspectives and values (Stirling, 2006). By acknowledging such open-ended uncertainty and ignorance, this holistic way of knowing is thus open to the view that the experiential knowledge of, say, small-scale producers is as valid a source of expertise and a contributor to decision-making as are forms of official science or accredited expertise (Collins and Evans, 2002). In this sense, transforming knowledge and ways of knowing for dynamic complexity and diversity fundamentally hinge on democratic participation in the production, validation and use of holistic knowledge (see chapter 5).

Participatory forms of inquiry mediated by citizens, their organisations and their federated networks ultimately represent a fundamentally different orientation to the nature of knowledge. This kind of participatory, experiential understanding takes involvement with our surroundings seriously, in all its ecological, social, economic, cultural and spiritual dimensions. The kind of knowledge that emerges from this process of social learning has been well described by James Scott in his book *Seeing like a State* (1998). He speaks of *"forms of knowledge embedded in local experience"* (*mêtis*) and sharply contrasts them with *"the more general, abstract knowledge displayed by the state and technical agencies"*. *Mêtis*, says Scott, is *"plastic, local and divergent…It is, in fact, the idiosyncrasies of mêtis, its contextualities, and its fragmentation that make it so permeable, so open to new ideas"*. As he suggests, *"'mêtis', with the premium it places on practical knowledge, experience and stochastic reasoning, is of course not merely the now superseded precursor of scientific knowledge. It is a mode of reasoning most appropriate to complex material and social tasks where the uncertainties are so daunting that we must trust our (experienced) intuition and feel our way"*(Scott, 1998).

In this context, final objective answers matter less than processes of emerging democratic engagement. The quality and validity of this way of knowing cannot be assessed from the narrow standpoint of positivist science alone. Criteria of validation and quality need to be much broader. One important criterion of quality is whether or not this social learning opens up new communicative spaces for democratic inquiry to take place. Another is whether it has contributed to the emergence of a wide community of inquiry among divergent actors. In many ways, social learning for food sovereignty could help to *"shift the dialogue about validity from a concern with idealist questions in search of truth to concern for engagement, dialogue, pragmatic outcomes and an emergent, reflexive sense of what is important"* (Bradbury and Reason, 2001).

7.3.5. Enabling contexts for social learning and action

"…forms and relationships of knowledge production should have as much, or even more, value than forms and relationships of material production. …The elimination of exploitative patterns at the material or infrastructural level of a society does not assure, by itself, that the general system of exploitation has been destroyed … it becomes necessary to eliminate also the relationship governing the production of knowledge, production which tends to give ideological support to injustice, oppression and the destructive forces which characterize the modern world (Fals Borda, 1987).

All the above "ways of knowing" for food sovereignty need to be attentive to the links between learning, power and organisational change. For example spaces—including citizen spaces—are infused with power relations, affecting who enters them, who speaks with what knowledge and voice, and who benefits. This is particularly apparent, for example, when both professional knowledge and peoples' experiential knowledge are brought together in the same space and discussed. Foresters, agronomists, protected area managers, water engineers, health professionals, architects, land use planners and social scientists all have specialist knowledge that can usefully feed into citizen deliberations and more inclusive forms of participation that strengthen civil society. But the deliberative process, and the political negotiation over what constitutes valid knowledge in a particular context (see Box 7.17), deeply challenges professionals to assume different roles and responsibilities.

In particular, citizens with professional knowledge will often need to shift to new roles that facilitate local people's analysis, deliberations and production of knowledge (see Chambers, 2008). Moreover, the adoption of a participatory culture within organisations, including civil society organisations, and changes in attitudes and behaviour are unlikely to automatically follow when new methods for deliberation are adopted or suddenly

Box 7.17. Some quotes on knowledge and power

"Perhaps we should abandon a whole tradition that allows us to imagine that knowledge can exist only where the power relations are suspended and that knowledge can develop only outside its injunctions, its demands and its interests. Perhaps we should abandon the belief that power makes us mad and that, by the same token, the renunciation of power is one of the conditions of knowledge. We should admit, rather, that power produces knowledge...; that power and knowledge directly imply one another; that there is no power relation without the correlative constitution of a field of knowledge, nor any knowledge that does not presuppose and constitute at the same time power relations....In short, it is not the activity of the subject of knowledge that produces a corpus of knowledge, useful or resistant to power, but power-knowledge, the processes and struggles that traverse it and of which it is made up, that determines the forms and possible domains of knowledge." (Foucault, 1979).

"Contests for knowledge are contests for power. For nearly two centuries that contest has been rigged in favour of scientific knowledge by the established power structures. We should ask why scientific knowledge has acquired the privileged status that it enjoys, why it is that scientists' endeavours are not seen to be on a par with other cultural endeavours, but have come to be singled out as providing the one and only expert route to knowledge and guide to action. We need to confront the question of what kinds of knowledge we want to produce, and recognise that that is at the same time a question about what kinds of power relations we want to support—and what kind of world we want to live in.... A socially responsible science has to be a science that does not allow itself to be set apart from, let alone above, other human endeavours. In our interactions with the world, we are all involved in the production of knowledge about the world—in that sense, there is no single group of experts" (Kamminga, 1995).

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Music of the Guarani-Nandeva of Chaco, Paraguay

Awero pewa 'For the Mask Season'

become fashionable. In the "democratisation of research" approach, the design of appropriate institutional mechanisms and rewards to encourage the spread of a participatory culture and praxis within research institutes and universities is obviously a key priority. This is a vital challenge for the agricultural academy and public research community. But to a lesser extent, civil society organisations and food sovereignty movements that seek to create more safe spaces for "autonomous learning and action" are also similarly challenged to transform themselves. Some ideas about the elements to tackle are offered in Box 7.18.

As power and knowledge are impossible to disentangle, the struggle to involve the full diversity of civil society in the production of knowledge is part of the larger struggle for a more equitable distribution of power. And civil society will often need to understand better which spaces offer the possibility for meaningful voices and shifts in power relations, and

Box 7.18. Organisational transformation for democracy in knowledge production

Key actions for those seeking democratic change and pluralism in organisations that produce social, environmental, economic and technical knowledge (research institutes, universities, government, civil society organisations and federations) include:

- Diversify the governance and the membership of budget allocation committees of public sector planning and research institutes to include representatives of diverse citizen groups. Establish procedures to ensure transparency, equity and accountability in the allocation of funds and dissemination of new knowledge.
- Encourage shifts from hierarchical and rigidly bureaucratic structures to "flat", flexible and responsive organisations.
- Build capacity of technical and scientific staff in the participatory skills, attitudes and behaviour needed to learn from citizens (mutual listening, respect, gender sensitivity as well as methods for participatory learning and action).
- Provide capacity-building and experiential learning for staff/people to develop their ecological literacy and skills in agroecology and ecological design.
- Ensure that senior and middle management positions are occupied by competent facilitators of organisational change with the vision, commitment and ability to reverse gender and other discriminatory biases in the ideologies, disciplines and practices of the organisation.
- Promote and reward management that is consultative and participatory rather than hierarchical and efficiency-led. Establish incentive and accountability systems that are equitable for women and men.
- Provide incentives and high rewards for staff and members of organisations to experiment, take initiatives and acknowledge errors as a way of learning-by-doing and engaging with the diverse local realities of citizen's livelihoods in urban and rural contexts.
- Redesign practical arrangements and the use of space and time within the workplace to meet the diverse needs of women, men and older staff and to help them fulfil their new professional obligations to work more closely with citizens and other actors (timetables, career paths, working hours, provision of paternity and maternity leave, childcare provisions, mini sabbaticals, promotion criteria…).
- Encourage and reward the use of gender disaggregated and socially differentiated local indicators and criteria in monitoring and evaluation as well as in guiding subsequent technical support, policy changes and allocation of scarce resources.

Source: adapted from Bainbridge *et al.*, 2000; Pimbert, 2006b.

which do not—when it makes sense to engage within "invited spaces", and when it is more appropriate to remain outside. Guidelines and criteria for engagement can help citizens and civil society groups decide better whether, when, why and how to engage in policy processes (e.g. PLA Notes, 2002).

The broader idea of "cognitive justice" also provides a useful way of thinking about the wider social and political contexts in which struggles over issues involving knowledge, science and technology take place (Visvanathan, 2005). This is because cognitive justice *"encompasses the legitimacy of struggles to pursue particular ways of life, knowledge, perspectives and practice; to use these ways as ways of building solidarities with others, and for cognitive representation in processes of ... decision making..."* (Leach *et al.*, 2005). Transforming knowledge and ways of knowing depends on this concept of cognitive justice grounded in new forms of actively practised, engaged citizenship. In this transformative process, *"we are left with a restless desire for social engagement, citizenship becoming a form of social and political practice born of the need to establish new solidarities across a range of putative 'communities' as a defence against social changes which continually threaten to frustrate such ambitions"* (Ellison, 1997).

Indeed, in the final analysis, creating safe spaces for democratic participation in the production of knowledge will depend on civil society's conscious social commitment to a politics of freedom, equity and gender inclusion. This is why attempts to transform food and agricultural research to better serve the public good need to be envisioned in the context of much wider social change. The vision of the future presented here recognises that technological fixes are not enough to solve the pressing problems induced by industrial food systems. Rather, it sees science as part of a bottom-up, participatory process of development in which citizens themselves take centre stage. Instead of being seen as passive beneficiaries of trickle down development or technology transfer, citizens are viewed as

knowledgeable and active actors who are centrally involved in both the "upstream" choice and design of scientific innovations, and their "downstream" implementation, spread and regulation. This is all about more direct democracy and citizenship in the governance of science and technological research and the production of knowledge for food and agriculture.

As such, alternative thinking, practices and innovations for widespread transformation towards gender equity and democratic participation need to be actively explored. In this context, all the arguments and ideas presented in an earlier chapter on "reclaiming citizenship" are relevant here (see Chapter 5). But it is not enough to focus on a re-invigorated *political* democracy to ensure that agri-food research serves the public good. Widening *economic* democracy is another key condition for the mainstreaming of citizen participation and deliberative democracy in research for food and agriculture. More specifically, there is a need for policies that offer enough *material security* and *time* for citizens (men and women included) to exercise their right to participate in shaping agri-food research for the public good: what type of research, for whom, with what financial and other resources, how and with what known and uncertain risks and benefits for society and the environment? This implies a commitment to deepening economic democracy and social inclusion. These themes are further explored in chapters 6 and 9.

7.4. Concluding remarks

Attempts to re-constitute knowledge for food sovereignty, endogenous development, and bio-cultural diversity must seek to better link local and global knowledge in respectful conversations and build mutual understanding, solidarity and peace, whilst addressing the pressing social and ecological challenges of the 21st century. This entails the development of more effective, interdisciplinary, citizen engaged and participatory research based on cognitive justice, mutual respect and democracy. It will involve clear shifts in power relations in setting upstream strategic research priorities and in framing policies for food and agricultural science and technology. This transformation implies: 1) cultural values that emphasise more direct citizen participation in determining research agendas, regulations and policies; 2) new professional values, participatory methodologies and behaviour; 3) the adoption of a learning process approach and self reflective practice in the production and validation of knowledge; and 4) enabling policies that offer food providers and other citizens adequate material security and time for democratic deliberation in the context of more localised food systems and economies.

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Planting song, Uganda

Giwaconi wapur dabolo nyong mere beraber, giwaconi wapur murangwa nyong mere beraber

By focusing on the entire research process—from agenda-setting to generating and validating new knowledge—more inclusive innovation systems that link the natural and social sciences with indigenous knowledge may help address the challenges of complex and dynamic change in a diversity of local contexts. Since the boundaries of what we call "actually existing" science are in fact negotiable, they may be redrawn to embrace other ways of producing knowledge, including de-institutionalised research based on decentralised and autonomous learning for change. New combinations with ways of knowing whose essential complementarity is now obscured, may grow out of this process of change. Autonomous learning and action may ultimately give birth to radically transformed knowledge systems whose contours we can only dimly foresee.

But reclaiming knowledge to make "other worlds possible" must be envisioned in the context of wider social change for two basic reasons. First, knowledge broadly reflects and reinforces specific power relations and worldviews in any society. Deep social change is often needed for the emergence of new knowledge paradigms. Secondly, whilst clearly vitally

important, new knowledge alone will not lead to endogenous development in food and farming. Coming to terms with this paradigm shift is a challenge that needs to be vigorously embraced by organisations of small-scale producers, socially responsible researchers and other citizens seeking more autonomy through food sovereignty.

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p.4 Lawrence Lawry / Millennium Images

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p.9 *Sowing sorghum, Goga village, Keita, Niger*
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p.11 *Tuareg men at a well, Sahara Desert, Mali*
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p.14 *The first gardens on a terrace in the middle of the fault (Ira Leb Laden) which leads to the Bagzanes plateau; Bagzane Mountains, Niger*
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Audio References

p. 8 **Imzad solo played by a Tuareg woman, the Hoggar Mountains near Tamanrasset, Algeria**
Single-string fiddle common in north Africa and popular among the Tuareg: the imzad is usually used in accompanying men's songs. This is made by women of the blacksmith caste and played only by women of the nobility. It comprises a resonator made from half a gourd covered with a goat skin; the horsehair string is stretched over a bridge made of two small pieces of wood which form a cross. The bow is made from horsehair knotted to the two ends of a curved stick.

Disappearing World, Granada TV/ITN

p. 15 **Forest in Ivory Coast, birds and insects**
*Halcyon badia: Chocolate-backed Kingfisher – (*Alcedinidae*), with Bush-shrike sp. in background, Tai Forest, Ivory Coast.*

Sound Recordist: Tom Gullick, courtesy of the British Library

p. 21 **Tuareg women and children singing and chatting, Algeria**
Tuareg women singing informally, child joins in, conversation, wind noises. Recorded in the Hoggar Mountains near Tamenrasset, Algeria,

Disappearing World, Granada TV/ITN

p.25 **Music of the Guarani-Nandeva of Chaco, Paraguay**
Ynambu wasu *'Great Partridge'*. Purahei *song with drum accompaniment performed by Agustin Peralta and Pedro Gonzalez (vocal,* japepo mi *drum).* Purahei *is a form of song common in the Chaco. Songs are accompanied by the Chacoan drum* japepo mi. *Two singers evoke the spirit of the Great Partridge. Sung in the evening in the round this music is a pretext for dancing into the night. While today having no direct healing or propitiatory purposes, these songs reveal nevertheless an ancient vision of the world where animal-spirits through the imitating of their song could become omnipresent in everyday life.*

"Paraguay, Guarani-Nandeva and Ayoreo", C 560164, Ocora Radio France

Field recordings by Jean-Pierre Estival.

Ocora Radio France. Bureau 10347. 116, avenue du Président Kennedy. 75220 Paris cedex 16 - France. http://kiosque.radiofrance.fr

P.37 **Tuareg driving flock of goats, family calling, Algeria**
Goats being driven past, men, woman and children speaking, strong wind in background. Recorded in the Hoggar Mountains near Tamenrasset, Algeria.

Disappearing World, Granada TV/ITN

p.51 **Walking in the Neo-tropical rainforest, Peru**
Walking through the Neo-tropical rainforest in the morning, sound of footsteps on muddy, leafy path and cicadas chorusing loudly in sunlight. It is the end of the dry season, it had rained a few days before and this seemed to bring out the frogs and cicadas, no birds are heard. Recorded in Madre de Dios, Tambopata Wildlife Reserve, Peru.

Courtesy of the British Library

p.59 **Music of the Guarani-Nandeva of Chaco, Paraguay**
Awero pewa *'For the Mask Season'*. Purea wasu *(Great Invitation) of the Guarani-Nandeva of Chaco, Paraguay. Various musicians of the community of* Pukujy'yiwa *(Nueva Asuncion) with V.Rollon and Molino on the* mimby *flute. Like much Amerindian music the* Purea wasu *ritual is a calendar feast: also called* Kandaware *(Carnavel) since European contact, it falls in February. Traditionally it always falls at this time of the year, the corn harvest, a season of plenty with sprouting water-melons, beans, squashes etc.* Kawi *(a kind of beer) made from corn and/or water- melon is drunk in large hollowed out tree-trunks. Local groups invite each other for a beer and a feed, a chance for the young to mingle, maybe even settle down and marry.* Mimby *flute and* angua' mi *drum music is performed all day long and into the night, with rotating musicians to accompany the dancing, non-stop throughout the ritual (anything from a few days to several months long). The* roky *is danced in the round by masked young men. The masks (*awero*) are meant to personify ancestral spirits ("the olds",* ndechi ndechi*), come back to check the intercourse, both social and sexual, is working as it should. This grand ritual, still condemned by evangelical missionaries, is now going through a regenerative phase, a testimony to the new found vitality of Guarani-Nandeva culture, now no longer a source of fear and shame to people.*

"Paraguay, Guarani-Nandeva and Ayoreo", C 560164, Ocora Radio France

Field recordings by Jean-Pierre Estival.

Ocora Radio France. Bureau 10347. 116, avenue du Président Kennedy. 75220 Paris cedex 16 - France. http://kiosque.radiofrance.fr

p.63 **Planting song, Uganda**
Giwaconi wapur dabolo nyong mere beraber, giwaconi wapur murangwa nyong mere beraber. *Song for planting beans (*byanjalo*) and plantain (*matoke*), sung in Copi, a dialect of Acholi.*

Solo male singer, male chorus and clapping, female yodeler and 2 single skin drums.

Sound Recordist: Klaus Wachsmann, courtesy of the British Library

Video References

p.10 A Year in the Life of an African Family

The Bamogo Family of Burkina Faso

Preparing a Meal at the Family Home

The Bamogo family are smiths in the towns of Dablo and Pinsa, north of Kaya, Burkina Faso

video by Jacob Bamogo

with sincere thanks to the Bamogo family, Pinsa

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compiled extracts

p.44 Asociación Andes

Sociocultural Networks and Horizontal Learning

compiled extracts

p.47 Affirming Life and Diversity. Rural images and voices on Food Sovereignty in south India.

Autonomy over Food and Seed

Onwards to Food Sovereignty. The Alternative Public Distribution System of DDS.

The DDS Community Media Trust, P.V. Satheesh and Michel Pimbert

Published by IIED and DDS (The Deccan Development Society)

extract

p.54 Creating The God of the Wilderness: Shaping a Mask of Leaves for Do

Men of the Bayer family, Burkina Faso, fashion a mask of leaves to represent Do, the God of the wilderness.

Made in the spring, it is created, performs and is destroyed all in the same day. The mask is made made by Bwa men from Bansie.

with thanks to Yacouba Bonde and elders of Boni

Laughing Dove Films and the Art and Life of Africa Project
http://www.uiowa.edu/~africart

compiled extracts

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Full references for this chapter will appear in the final publication

References

All references cited here can be found at the end of the full book that will be published in winter 2014, *Towards food sovereignty: reclaiming autonomous food systems*. CAFS, IIED and RCC, London and Munich.