The conservation of biological diversity in the context of rapid technological change and the commercialization of biological resources raises many fundamental scientific, economic, socio-political and ethical questions.

Most of the world's biological diversity is located in countries in the South. The North and its private industry are using these countries as reservoirs of biological and genetic resources to develop new products such as crop varieties, drugs, biopesticides, oils and cosmetics. The diversity of the living world has become the raw material for the new biotechnologies and the object of patent claims.

There are many contentious issues surrounding biodiversity and different priorities for the many stakeholders involved. This book presents some of the arguments from the leading experts on the issues as well as reflecting the collective learning and debate from the grassroots NGOs, journalists, industrialists and policy makers.

ISBN 1 85339 341 X

WWF

World Wide Fund for Nature (WWF) is one of the world's largest independent conservation organizations. WWF's mission is to achieve the conservation of nature and ecological processes. WWF's ultimate goal is to stop, and eventually reverse, the accelerating degradation of our planet's natural environment, and to help build a future in which humans live in harmony with nature. WWF continues to be known as World Wildlife Fund in Canada and in the United States of America.

SWISSAID Swissaid is a Swiss NGO supporting rural initiatives in developing countries and does information and political work within Switzerland. Swissaid tries to strengthen peoples' capacity in regaining access and control over local resources. Major concerns of Swissaid are: the sustainable use of biodiversity to secure peoples' livelihood, the conservation of biological resources and the acknowledgement of local, informal innovations.

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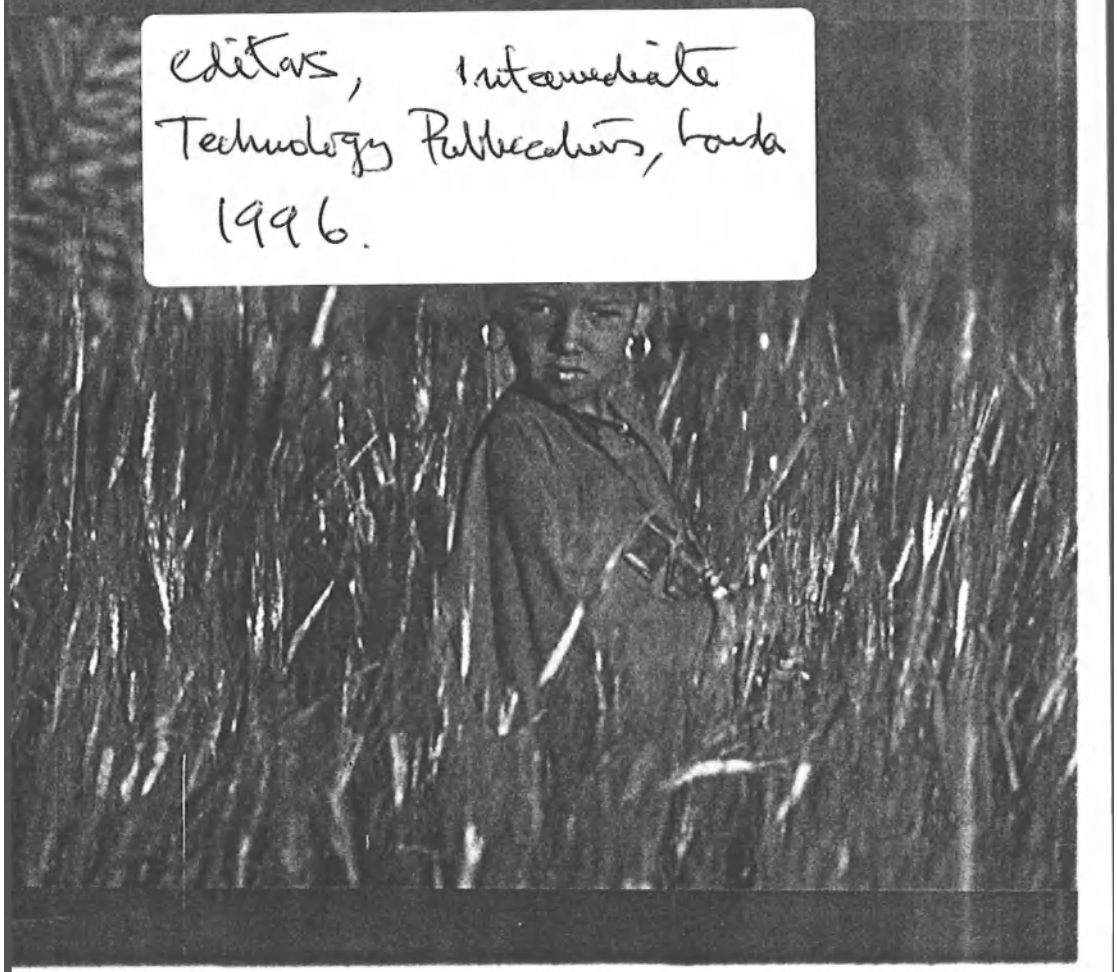
The Intermediate Technology Development Group was founded by the late Dr E.F.Schumacher. Intermediate Technology enables poor people in the South to develop and use skills and technologies which give them more control over their lives and which contribute to the sustainable development of their communities.

Intermediate Technology Publications is the publishing arm of the Intermediate Technology Development Group and is based at 103/105

THE LIFE INDUSTRY

Biodiversity, people and profits

Miges Baumann, Janet Bell, Florianne Koechlin
and Michel Pimbert



ligious rights and religious freedom, environmental integrity, cultural heritage rights, neighbouring rights, and customary law and practice, among others.

US lawyer Dinah Shelton suggests that international human rights law may provide the best framework for protection for communities and local environments in the future. Human rights bodies increasingly call for environmental protection because of the connection between human rights violations and environmental degradation. Invoking these rights could introduce more justice into the process of determining access to, and control over, biological diversity and local peoples' knowledge.[4] TRR is a favoured mechanism amongst indigenous people because it is rights-driven, not economically motivated. It goes beyond other *sui generis* models, in that it seeks to protect not only knowledge but also asserts the right to self-determination and to safeguard culture in its broadest sense.[5]

Reclaiming the commons

Both the IPR and compensation mechanisms described above see biodiversity very simplistically and are concerned primarily with the products of biodiversity rather than its more holistic counterpart, which defines it more broadly in terms of systems and relationships (see Chapter 4.4). The dominant world-view cannot accommodate this definition of biodiversity. Addressing the question of biodiversity conservation and management in this context requires more than just tinkering with the current system. A radical shift is required not only to change practices but also to alter the underlying philosophy and value system (Chapter 6.2).

The process of reclaiming the commons involves community empowerment that is explicitly linked with local ecological and economic regeneration. In relation to biodiversity, this means empowering communities, enabling all people to secure their rights and needs. It is through these processes that people are empowered to care for the environment and democratize control over the end uses of knowledge and biological resources.

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6.2. Reversals for diversity – a new paradigm

ROBERT CHAMBERS

In all of history there has probably never been a period as dramatic as the late 1980s and the 1990s for the scale and scope of unexpected and divergent changes in the human condition. In some regions wealth increases and concentrates and consumerism flourishes to excess; in others war, famine and civil disorder bring destitution and death. The communications revolution is touching people's lives and transforming their awareness and aspirations, not only in the centres of prosperity in the North but also in the poor, rural and indigenous communities in the South. Almost everywhere, in different ways and in different directions, change seems to be the norm, and universally the pace of change is accelerating.

While this occurs, a new paradigm has been coalescing. The word 'paradigm' is used here to mean a mutually-reinforcing pattern of concepts, values, beliefs, methods and behaviours. The prevalent or normal paradigm tends towards global homogenization through the interlocking effects of the market, communications, technology and professionalism. The emerging paradigm of 'reversals' turns this normality on its head. It seeks and supports diversity in many dimensions. And it does this as a means to sustainable livelihoods and a good quality of life for all.

The normal

To appreciate reversals, we must first understand what is meant by the 'normal' paradigm and its dominant concepts, values, beliefs, methods and

behaviour. Appreciating reversals means learning to be open to the realities as seen by the majority (but seldom heard) population, rather than the dominant minority. In the normal paradigm, which continues to dominate our world, four dimensions stand out as common and powerful:

- Bureaucracy – tends to centralize, standardize and control.
- Professionalism – creates and works in controlled environments with precise measurements, using reductionist methods which tend to generate standard and simple packages and solutions.
- Capitalism and markets – tend to homogenize all aspects of life, appropriating diverse resources and exploiting them in uniform, capital-intensive ways, and seeking a unified global market.
- Development/conservation – rely on blueprint planning and top-down control-orientated implementation, with targets and regimented actions at the local level. They distrust people and participation and result in the ring-fencing of projects, national parks etc.

These four dimensions have been mutally reinforcing. They have combined in many ways through centralization, standardization, control, reductionism and the appropriation of resources by the wealthy and powerful. Centralization, standardization and uniformity have always been inherent in the structure and dynamics of large bureaucracies and of the state: in the classical Fordist mass-production line; and in the practical universality of Newtonian science, with its applications in engineering, medicine and other fields which deal with physical things in predictable environments. In agriculture, this generated the Green Revolution packages in which environments could be controlled to fit standard, high-yielding genotypes. Henry Ford is reputed to have said that Americans could have their mass-produced Model T Ford car in any colour they liked as long as it was black. Transfer of technology packages and large-scale cultivation of uniform moncultures are biological analogues of the Model T.

These tendencies link in and resonate with patterns of North–South dominance. North and South are used here in their literal sense and also as metaphors. Many relationships can be seen as North–South, as magnets generating their own mutually reinforcing fields (Fig. 6.1). The Norths, or Uppers, dominate the Souths, or Lowers. Each magnet, or person, reinforces the field through dominance and instruction, North to South, or submission and compliance, South to North. It is then difficult for any one magnet to flip round against the force of the pervasive magnetic field.

Chain reactions of dominance pass downwards. Let us assume that a World Bank staff member puts pressure on an official in a country in the

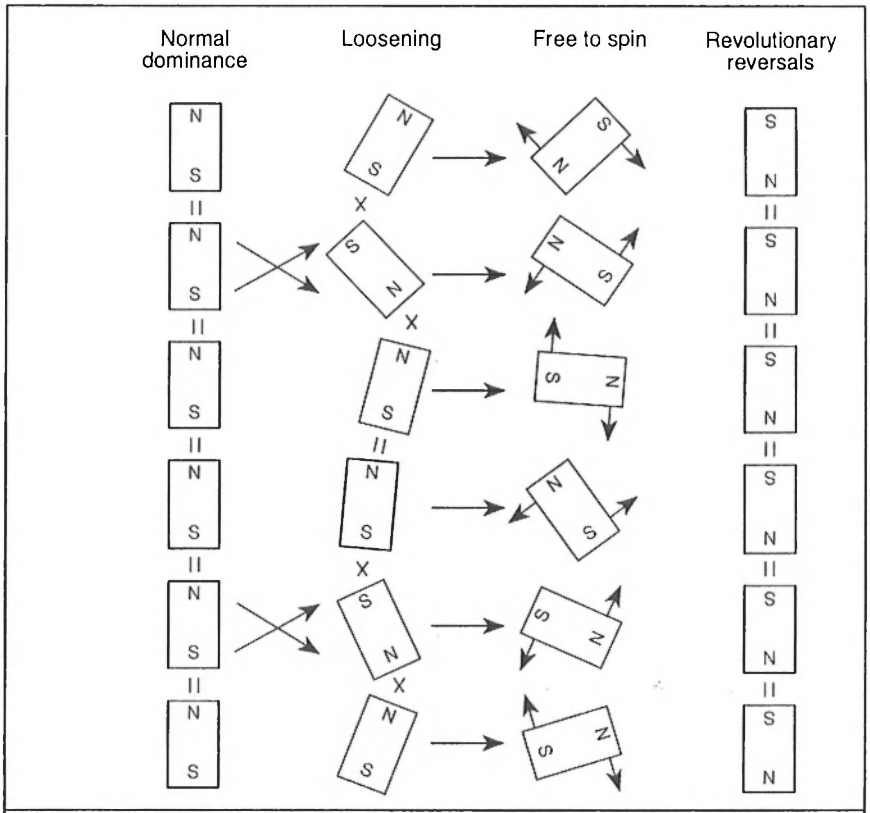

Figure 6.1 Dominance, reversals and freedom

South, who then pressurizes a subordinate, who does the same to another lower official, who turns on a field worker, who goes home in the evening and takes it out on his wife, who shouts at the children, who go out and throw stones at the dog which, conceivably, chases a cat . . .

Bureaucracies, professions and markets can be thought of as mutually reinforcing. Their normal North–South dominance standardizes and simplifies, generating and transferring monocultures and Model Ts. The challenge is to weaken the magnetic field which sustains

these; to offset and neutralize the patterns of dominance. It is not to cause complete flips from South to North, for these repeat the paradigm, reproducing the old patterns with different actors on top – as with Robespierre after Louis XVI, Lenin after Tsar Nicholas, Mao after the Chinese emperors, or Mengistu after Haile Selassie. It is rather to replace the old paradigm with a new one; to loosen the relationships so that people are free to spin and relate laterally as well as upwards and downwards in an egalitarian and open manner.

Whose reality counts?

The reality which those who are central and powerful seek to construct is universal, simplified, standardized, stable, controlled and measurable. The concept of poverty is an example: in the usual economist's definition, poverty is reduced to the measurable, a single dimension which is either low income or low consumption. But deprivation as experienced by poor people is multi-dimensional, including vulnerability, isolation, physical weakness, powerlessness and humiliation. But what has been measured – as income-poverty or consumption-povery – masquerades as the much larger reality. Poor people have many other criteria of well-being (Fig. 6.2). But normal economists define poverty not by the many dimensions of the experience of the poor, but by their own reductionism to a single measurable scale. It is then not the needs of the poor, but the needs of powerful professionals, which construct the dominant reality of poverty.

The contrasting reality of the livelihoods and farming systems of poor people is local, complex, diverse, dynamic and difficult to control or measure. Although normal professionals often fail to understand this, many poor people seek to complicate and diversify their livelihoods and farming systems. They add enterprises to increase production and reduce risk. Farming systems, like natural ecosystems, tend to be more resilient the more complex they become. So farmers create and protect micro-environments in which they cultivate greater biological diversity. They add to their enterprises, multiplying linkages on- and off-farm, for example through aquaculture, composting, agroforestry, adding to livestock species, and so on. By complicating and diversifying their farming systems and livelihoods they buffer themselves against bad times and shocks. Their motto, as coined by Porter *et al.*[2] is 'More diversity for more certainty'. A recent estimate[3] is that there are almost as many people in the world who depend for their food on these complex, diverse and risk-prone (CDR) farming systems as on the simpler, more standardized and more controlled Green Revolution farming.

Farmers and villagers in two villages in Rajasthan in India were asked to determine their own categories and criteria of changing economic status; they named 38 criteria. Comparing data from fieldwork in the 1960s and 1980s, Jodha[1] found that the 36 households which were more than 5% worse off in per capita real incomes were on average better off according to 37 of their own 38 criteria. (The one exception was milk consumption, as more was being sold outside the village). The improvements included quality of housing, wearing shoes regularly, less dependence in the lean season, and not having to migrate for work. Several of the criteria reflected greater independence:

Indicator of well-being	% of households	
	1960s	1980s
One or more members working as attached or semi-attached labour	37	7
Residing on patron's land or yard	31	0
Taking seed loans from patrons	34	9
Taking loans from others besides patrons	13	47
Marketing farm produce only through patrons	86	23
Family members seasonally out-migrating for work	34	11
Selling >80% of their produce in post-harvest period	100	46
Making cash purchases during slack-season festivals	6	51
Adults skipping third daily meal during scarcity period	86	20
Women and children wear shoes regularly	0	34
Houses with only impermanent traditional structure	91	34
Houses with separate provision for humans and animals	6	52

(Source : Jodha, 1988)

The reality of these income-poorer villages contrasts sharply with a normal economist's reality. The economist sees them as poorer, but in their own terms they were on average much better off.

Figure 6.2 For richer or poorer – whose reality?

Resilient and adaptable small CDR farmers have often found themselves at odds with the normal paradigm. They have been encouraged to adopt technologies developed for the standardized and controlled conditions which they do not have. What they want is not a Model T package of practices, certified by bureaucrats and scientists, for transfer to controlled and uniform conditions, but a basket of choices from which they can mix and match the combinations to enhance adaptability, reduce risk and increase returns for their particular needs and environments.

The normal and new paradigms can be contrasted (Fig. 6.3). The *normal* focuses on things, blueprints and planning, the *new* serves people through process and participation. Linked with these are contrasts between modes of intervention and interaction – between dominating and facilitating, 'motivating' and enabling, controlling and empowering. The normal is more the paradigm of the powerful, dominant and wealthy; the new reflects more the conditions and needs of the weak, subordinate and poor.

	NORMAL	NEW
Analytical assumptions and methods	Reductionist Universally applicable	Systems Locally chosen, adapted or invented
Working environment	Controlled Predictable	Uncontrollable Unpredictable
Technology	Standard package 'Model T'	Basket of choices 'Toyota'
Interactions with local people	Dominating 'Motivating' Controlling	Facilitating Enabling Empowering
Dominant orientation	Things Blueprints Planning	People Processes Performance
Diversity	General	Cultural

Figure 6.3 Two paradigms contrasted

	NORMAL TENDENCIES	NEEDED REVERSALS
PROFESSIONALISM	Things first Men before women Professional set priorities Technology transfer – packages Simplify	People first Women before men Poor people set priorities Technology choice – baskets Complicate
BUREAUCRACY	Centralize Standardize Control	Decentralize Diversify Enable
CAREERS/BEHAVIOUR	Tying down (family) Inwards (urban) Upwards (hierarchy)	Also releasing Also outwards Also downwards
MODES OF LEARNING	From 'above' Rural development tourism Questionnaire surveys Measurement and statistics Extractive	From 'below' Rapid, relaxed and participatory appraisal Ranking, scoring, judgement Empowering
ANALYSIS BY	Us	Them

Figure 6.4 Reversals for diversity and realism

The challenge is to move from the normal to the new; for the powerful to ask themselves how normal professionals and centrally-placed bureaucrats construct their reality and how this contrasts with the reality of those who are local and poor. The questions then are 'Whose reality counts?', 'Whose reality *should* count?' and 'How can the reality of those who are local and poor count more?'

Reversals

The paradigm of reversals answers these questions by turning the normal on its head, and reversing imbalances and power (Fig. 6.4). It puts people first, seeks to redress gender balance by putting women before men, and seeks to enable poor people to set their own priorities and to make their own choices. Sustainable livelihoods are an equalizing focus of reversals.[4] For the rich, sustainable livelihoods mean much lower consumption. For the poor, sustainable livelihoods require choices, adaptability, versatility, participation, enhancing capabilities, and supporting cultural, biological and ecological diversity.

In this paradigm, diversity is not a static quality to be preserved through capture and protection, but a function of the permanence of change. Diversity is sustained and enhanced through versatile opportunism, adaptability, and the creation and exploitation of physical and economic niches. There are resonances between the strategies of poor CDR farmers and the precepts of avant-garde, post-modern business management. For example, Tom Peters' *Thriving on Chaos*, which was written as advice for business in the US, stresses diversity, 'becoming obsessed with listening', finding and exploiting transient opportunities, inventiveness and learning from mistakes.[5]

The three 'D's' of decentralization, democracy and diversity underpin the paradigm of reversals. They interlink with and support the capabilities of poor people and their dynamism in relation to the market (Figure 6.6). The challenges to achieve the empowerment of poor people are for bureaucracy to decentralize, for political systems to become more democratic, and for professionals to embrace and contribute to diversity and choices. Together, these can enable poor people in communities to cope better with, and make use of, the market without being dominated by it.

For this local empowerment, four elements stand out:

- *rights, security and territory* to empower local people to resist the drives of capitalist organizations to appropriate territory and resources, to standardize agroecologies, to diminish the biodiversity on which local livelihoods depend, to reduce the security of people, and to infringe their rights

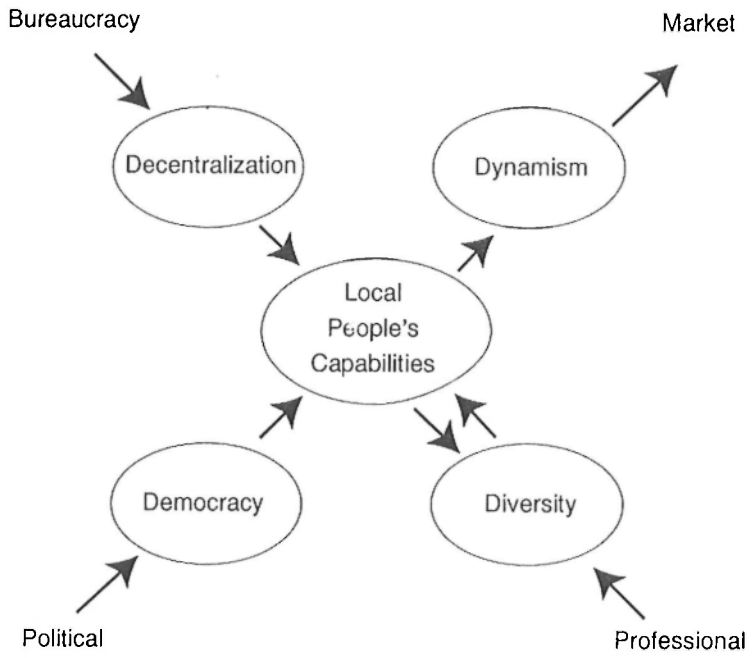

Figure 6.5 Reversing imbalances and power

- *information* to enable people to defend and manage their resources better, and to operate in and gain from the market
- *organization and political action* to countervail centrally-based dominance and exploitation
- *analysis by local people themselves* to enhance their effective command over resources and management of their lives. Local people's analytical capability has been vastly underrated in the past, partly because of the top-down approaches that have been used to 'help' people. New techniques and methods, such as Participatory Rural Appraisal (Boxes 6.5 and 6.6) are building on and complementing earlier approaches to empowerment through participatory appraisal, analysis, planning and action.

Reversals are gaining ground. Increasingly professionals in agriculture and forestry are providing diversity of choice rather than standard packages. Democratic decentralization is a widely-stated political objective in many countries. Many movements seeking to reverse centralizing standardization are achieving success. The challenge now is to establish firm alliances, networks, mutual support and exchange of insights to liberate the magnets from North-South dominance,

Box 6.5: Participatory rural appraisal

Participatory rural appraisal (PRA) is a collective term for a growing family of approaches and methods which enable local people to present and analyse their knowledge, to plan and to act. Appropriate behaviour and attitudes allow outsiders to establish rapport, convene, catalyse, facilitate, watch, listen, learn and respect. Local people's empowerment grows as *they* map, model, interview, quantify, rank and score, inform and explain, discuss and analyse, plan, present and share their knowledge and experience.

In the past, outsiders have been slow to recognize the diversity and complexity of local knowledge, partly for lack of methods for its expression. Now participatory mapping, sequencing, estimating, listing and sorting, and comparing and diagramming, enable local people to present visually an often unexpectedly wide range of detail. Methods such as social mapping, matrix-scoring, seasonal calendars, trend and change analysis, well-being ranking and linkage diagramming enable local people to express relative values, judgements and connections with a wealth of nuance and differentiation. Their past supposed ignorance and inability to analyse have proven to be largely artefacts of the ignorance of outsiders.

It is now common for matrix-scoring of 20 or more trees to be completed by women and men for 10 or 20, or even more, criteria. A group of herders in Somaliland matrix-scored 25 water supplies, before and after improvement, against their own 45 criteria of assessment. Trend and change analysis reveals repeatedly how the environment has changed – in numbers of birds, wild animals, fish, and trees; in water supplies; in cultivated land, numbers of livestock, human population and so on.

Farmers map their farms and then diagram and estimate nutrient flows within their farming systems. In doing this, it is their reality, not a mirror of that of outsiders, which is expressed and shared. Environmental analyses like these have been conducted by local people in countries as diverse as Bangladesh, Bulgaria,[6] Cambodia,[7] India,[8] Kenya, Vietnam and Zimbabwe.

In South India, a local NGO, Myrada, conducted a PRA study with farmers in 1989. The farmers brought up the problem of their having lost in the drought of 1974 a variety of sorghum which was highly valued for its fodder. One farmer described the impact this had on farming practices:

> Our local sorghum variety was wiped out during the earhead stage. Because we couldn't get seed the next year, we were forced to switch to hybrids. Hybrids do not give us as much straw as our local varieties did. Therefore we were forced to extend our cultivated areas to include grazing lands. Because the grazing land was reduced we were forced to graze our cattle in the forests.

The International Crops Research Institute for the Semi-Arid Tropics (ICRISAT) was approached, but could not trace the particular variety, so the NGO arranged a bus for a farmers' expedition to the neighbouring state of Maharashtra, where they found the sorghum variety and brought it back.

Box 6.6: PRA – how it is done

- The learning process is reversed; learning with and from rural people, directly, on site, and face-to-face, gaining from local physical, technical and social knowledge.
- A learning process is employed that is progressive and flexible, allowing for the unexpected and for improvisation, rather than following a pre-set blueprint.
- Biases, especially those of rural development tourism, are offset by being relaxed and not pushy, listening not lecturing, being unimposing instead of domineering, probing keenly and seeking out the poorer people and women to learning of their concerns.
- Trade-offs are optimized, relating the costs of learning to the value of the information. This includes the principles of optimal ignorance (knowing what appears to be *not* worth knowing), and of appropriate imprecision (not measuring more than is really needed – this often involves comparing, estimating or scoring rather than measuring).
- Diversity is sought out. This means seeking variability rather than averages, sampling a range, deliberately looking for, noticing and investigating exceptions, contradictions, anomalies and differences.
- Triangulation is used; that is, applying and learning from a range of methods, types of information, analysts, social groups, locations, and/or disciplinary viewpoints to capture and express diversity and complexity, to cross-check and converge on valid insight, and to enhance credibility.
- Facilitation is the key – local people learn to investigate and analyse, so that they present and own the outcomes, and also learn. This often entails an outsider convening, catalyzing and initiating a process and then sitting back or even walking away; not interrupting, but listening, observing, assessing and quietly supporting the process of analysis, expression and presentation of their reality.
- Being self-critically aware, sensitive and responsible, and ever trying to do better is paramount. This means embracing error as an opportunity to learn and improve, and using one's own best judgement at all times. It means accepting personal responsibility rather than vesting it in a manual or a rigid set of rules.
- Information and ideas are shared: among rural people and between them and the facilitators. The sharing of field camps, training and experiences between different organizations is encouraged; as is the sharing of information and insights, without seeking ownership or acknowledgement.

The participatory learning of PRA is more than a collection of innovative techniques. It is a way of being, and of relating to others. For outsider facilitators it involves self-critical awareness of their own attitudes and behaviour, and for local people it entails engagement in an on-going participatory process.

allowing and enabling them to spin freely, offsetting the normal with reversals.

Primacy of the personal

The ultimate reversal is personal, yet this crucial dimension has been curiously neglected. 'Uppers' need to step down and to become allies, convenors, consultants and facilitators of 'Lowers'. This entails reversals and transfers of power, rights, claims and responsibilities, from centre to periphery and from strong to weak. It also entails some personal disempowerment for almost all peoples, since almost all are 'Uppers' in some of their relationships.

To induce these reversals, two approaches are needed:

- *Confrontation, negotiation and persuasion.* Quite often some conflict and tension is inevitable where change is implicated, which threatens, or is seen as threatening, to the powerful. This can apply to bureaucrats, business people, politicians and professionals.

- *The satisfaction and rewards of disempowerment, mutuality, and altruism.* These tend to be neglected. It can, however, be hugely satisfying for an individual to devolve power to others. Part of the challenge is to find new ways of enabling the powerful to save face, so that it is easier for them to 'hand over the stick', and to experience those satisfactions.

Faced with normal market capitalism, bureaucracy, politics, law and professionalism, the individual appears powerless: the forces seem too universal, too strong, too overwhelming to be affected by personal action. But the 'magnetic' fields of these forces are no more than the product of the habits and actions of individuals. If individuals change, so too do the fields. So an important step is to recognize the primacy of the personal, that every individual has an effect, that analysis and action can start with the individual. This is the final reversal – to put the personal at the centre and on top. It is to recognize that individual action can make a difference; that we are not just the helpless victims of blind forces, but are collectively their creators; and that change comes about through accumulations of personal decisions to change and be different.

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6.3 SEEDS OF HOPE

A Vote for conscience over capital

On 1 March 1995, eight years of bitter squabbling and noisy protest finally came to an end when the European Parliament voted against a controversial directive on biotechnology patents. After heavy lobbying from groups opposed to the patenting of animals, plants and human genes, it resolved by 244 votes to 188 to abandon the directive. The directive's ousting was claimed as a major moral victory by those who had fought it, and was a big blow to industry.

The directive would have ironed out differences between national patent rules, so that a patent awarded in one member country would be accepted in the others. A setback for industry perhaps, but some representatives were relieved at the decision because the directive was a mess, reflecting the confusion among parliamentarians about the implications of the directive. Nick Scott-Ram of the BioIndustry Association is reported to have said that the final draft of the directive contained ambiguities that left some points of ethics open to more than one interpretation. This could have left patents vulnerable to challenge, thus holding up commercial development. The woolliest compromise, according to Scott-Ram, was the attempt to draw a moral distinction between human genes in the body – which were deemed unpatentable – and synthetic versions of those genes produced in the laboratory – which the directive suggested could be patented. In industry's eyes, there is no question that they should *all* be patentable.

Throwing out the directive will have little *direct* impact on the awarding of patents, since this still remains under the jurisdiction of the European Patent Office, but it may have quite an impact indirectly, as it may indicate a change in the climate of opinion among parliamentarians. The following is the response of one NGO representative to the European Parliament's vote:

It was agony sitting in the semicircle of the European Parliament. MEPs spent two and a half hours voicing their final concerns about the directive, before passing to the resolve of action. The body was clearly divided, and the arguments were clearly split. Some said the directive meant 'white', while others insisted it meant 'black'. The power of