Parks, People and Professionals:

Putting `Participation' into Protected Area Management

by

Michel P Pimbert

and

Jules N Pretty

UNITED NATIONS RESEARCH INSTITUTE FOR SOCIAL DEVELOPMENT

INTERNATIONAL INSTITUTE FOR ENVIRONMENT AND DEVELOPMENT

WORLD WIDE FUND FOR NATURE

Discussion Paper No 57, February 1995. UNRISD, Geneva

Parks, People and Professionals: Putting `Participation' into Protected Area Management[1]

Michel P Pimbert2 and Jules N Pretty

Abstract

Since the first establishment of protected areas of outstanding natural beauty or species and habitat uniqueness during the last century, there has been a remarkable expansion in numbers and area conserved. There are now close to 8500 major protected areas in 169 countries, covering some 5% of the world's land area. Many developing countries have more than 10% of their land area set aside for conservation purposes, and others are seeking to transform as much of their land as possible to strictly protected areas.

The dominant ideology underpinning this conservation has been that people are bad for natural resources. Policies and practice have, therefore, sought to exclude people and so discourage all forms of local participation. This style of conservation has neglected local people, their indigenous knowledge and management systems, their institutions and social organisation, and the value to them of wild resources. The cost to conservation has been high. Social conflicts have grown in and around protected areas, and conservation goals themselves have been threatened.

Conservation itself needs rethinking. It has been dominated by the positivist and rationalist paradigm, in which professionals assume they know best and so can analyse and influence natural resources in the ways they desire. Professionals tend to be reductionist in their approach, taking only the presence of a particular species or total species diversity as indicators of value. Such preservationist ideology is dominated by the desire to exclude local people. Yet, there is growing empirical evidence to show that local people have long influenced natural systems in ways that improve biodiversity. Many apparently `primary' forests or habitats did in fact support large numbers of people in the past, whose management actions significantly influenced what remains today. What is needed is a rethinking of conservation science itself. This will need to draw on emerging experience on post-positivist science and philosophy from other fields as well as ecology itself.

The central challenge is to find ways of putting people back into conservation. Such participation will not be easy, as the term itself is interpreted in many different ways. Only certain types of participation will lead to sustainable conservation. Alternative systems of learning and interaction will help this process of participation, and lead to a new vision for protected area management that builds strongly on vernacular conservation.

The new vision will need a new professionalism, new supportive policies, and innovative inter-institutional arrangements.

[1] We are very grateful for comments on earlier drafts by Tony Cunningham, Grazia Borrini Feyerabend, Krishna Ghimire, Peter Utting, Solon Barraclough & Sari Nissi. The views and opinions expressed in this paper, together with any omissions, are naturally the responsibility of the authors.

2 For any correspondence contact Dr Michel Pimbert, International Institute for Environment and Development, 3 Endsleigh Street, London, WC1H 0DD, UK. E-mail: michel.pimbert@iied.org

1. The Contradictions of Conventional Protected Area Programmes

1.1 The Designation of Protected Areas

The first protected areas were established during the last century. In the industrialising countries, governments began to set aside areas of particular scenic beauty or uniqueness exclusively for conservation. But the creation of most of these protected areas involved the exclusion of local people. In the USA, for example, a tract of hot springs and geysers in northwestern Wyoming was established as the Yellowstone national park in 1872. The inhabitants of Yellowstone, mainly Crow and Shoshone native Americans, either left for reservations or were driven out by the army, which then managed the Park until 1916 (Morrison, 1993). In African, conservationists usually worked in isolation from the surrounding societies and dissociated themselves from development activities. The leading conservationists were foresters from the Imperial Institute of Forestry at Oxford (UK). Their management philosophy emphasised that *"the public good was best served through the protection of forests and water resources, even if this meant the displacement of local communities"* (McCracken,1987).

This neglect of resident people in parks and reserves still persists today. Until quite recently, few plans for protected area management made any mention of the people living inside forests, coastal strips, wetlands and other biodiversity-rich areas earmarked for conservation. But these areas are often heavily populated. In South America, for example, 86% of National Parks have people living in them and using the natural resources of the Parks to some extent (Amend and Amend, 1992). In India, a study of 171 national parks and sanctuaries conducted in the mid-1980s found that there were 1.6 million people living in the 118 parks that were inhabited (Kothari et al, 1989). By 1993, protected areas in India had already displaced some 600,000 tribal people, some 20% of the country's tribal people. According to social activists in India, as many people may be displaced again if the Ministry of Environment and Forests proceeds with its plans to establish a further 150 National Parks and 650 Wildlife Sanctuaries in the next few years (PRIA, 1993).

The problem is that most national parks in the developing world have been created on the model pioneered at Yellowstone. Despite some remarkable exceptions, the basic underlying attitude is isolationist, in which both the design and management seeks to protect the park or reserve from surrounding society. Decisions on which land or water areas of the country should be incorporated in the national parks are made by the state, who also independently design and execute park management plans.

There are now close to 8500 major protected areas throughout the world. These are widely distributed across continents. Worldwide, the growth in national parks and protected areas has been relatively rapid over the last two decades. Protected areas now exist in 169 countries and they cover about 7,734,900 square kilometres or some 5.2% of the earth's land area (an area

[3] A Protected area is an area of land and/or sea especially dedicated to the protection of biological diversity, and of natural and associated cultural resources, and managed through legal or other effective means (CNPPA, 1993, IUCN, 1994).

The International Union for the Conservation of Nature (IUCN) recognises six management categories:
Category I - Strict Nature Reserve/Wilderness Area. Protected area managed mainly for science or wilderness protection;
Category II - National Park. Protected area managed mainly for ecosystem protection and recreation;
Category III - Natural Monument/Natural Landmark. Protected area managed mainly for conservation of a specific natural feature;
Category IV - Habitat and Species Management Area. Protected area mainly for conservation through management intervention;
Category V - Protected Landscape/Seascape. Protected area managed mainly for Landscape/Seascape protection and recreation;
Category VI - Managed Resource Protected Area. Protected area managed mainly for the sustainable use of natural resources.

roughly equivalent to twice the size of India). In 115 countries, 1,328 sites covering some 3,061,300 square kilometres have marine or coastal elements within them (WCMC, 1992). Strictly protected areas (national parks, strict nature reserves, natural monuments) constitute 3% of the earth surface. Out of these areas 1508 are national parks of the Yellowstone model. At least another 40,000 protected areas of various sorts have been established that do not meet the CNPPA's criteria, but which contribute to biodiversity conservation. This brings the total land area protected up to almost 10% (McNeely, 1994).

Many of these protected areas are lowland tropical moist forests, which are often strictly protected reserves in which no human use is permitted (Sayer, 1991). It is widely accepted that national parks may also expand at the expense of land currently cropped: the integrity of new protected areas may be secured by resettling villages out of the parks and reserves, and preventing traditional human use of forested and other areas (WWF and ODNRI, 1989; MacKinnon et al, 1986; MacKinnon et al, 1989). It is also claimed that *"as little human interference as possible is desirable in rainforest"* (IUCN, 1986) and in other biodiversity rich environments. In Africa, some 134 million hectares are now protected in some 700 sites, of which two thirds permit no use of wild resources by local communities (WCMC, 1992).

Despite all this designation combined with exclusion of people, several international organizations have continued to call for an expansion of the network of protected areas in the 1990's. This is because parks and natural reserves are seen as central instruments for the conservation of biological diversity. According to the IVth World Congress on National Parks and Protected Areas (CNPPA) held in Caracas in 1992, each country should now designate a minimum of 10% of each biome under its jurisdiction (e.g. oceans, forests, tundra, wetlands, grasslands etc.) as a protected area (CNPPA, 1993). Many countries have already included more than 10% of their territories into protected areas. These include Costa Rica with 29%, Honduras with 22%, Bhutan with 22%, Botswana and Panama with 18%, Guatemala with 16%, Nicaragua with 14%, Central African Republic with 12%, Malaysia, Benin and Tanzania with 11.5%, Senegal with 10.8% and Rwanda with 10.4% (MacKinnon et al, 1986; Utting, 1993; CNPPA, 1993).

Following the Earth Summit in Rio and the ratification of the Biodiversity Convention, many more developing countries are seeking to transform `as much land as possible' to strictly protected regimes. This could make things very much more worse for local people, or it could represent an opportunity to learn from mistakes made in the past and encourage more sustainable approaches to protected area management.

Some of the ideas behind protected area management are being changed. Internationally accepted criteria for defining protected areas (IUCN, 1994) now recognise a wide spectrum of categories ranging from strictly protected nature reserves to managed resource protected areas. The inclusion of a category in the list, which allows the sustainable use of resources in protected areas, is particularly noteworthy in this context. In this new credo, it is implied that protected areas should be managed in ways that sustain both local livelihoods and the conservation of

[4] The CNPPA (1992) has defined seven purposes for protected areas. These are to:

1. Safeguard the world's outstanding areas of living richness, natural beauty and cultural significance as a source of inspiration and an irreplaceable asset;
2. Maintain the life-supporting diversity of ecosystems, species, genetic varieties, and ecological processes;
3. Protect genetic variation and species which are needed to meet human needs, e.g. in food and medicine;
4. Provide homes to human communities with traditional cultures and knowledge of nature;
5. Protect landscapes reflecting a history of human interaction with the environment;
6. Provide for scientific, educational, recreational and spiritual needs of societies;
7. Provide benefits to local and national economies and as models for sustainable development to be applied elsewhere.

nature. This view sharply contrasts with the conservation thinking that has informed much of protected area management during the past century.

1.2 Coercion and Control in Nature Conservation

The pursuit of environmental conservation has been a significant theme in rural development in the 20th century. Conservationist beliefs have generally held that there is an inverse relationship between human actions and the well-being of the environment. The problems have been widely agreed upon by professionals: soil erosion, degradation of rangelands, desertification, loss of forests and the destruction of wildlife. All of these problems have appeared to require intervention to prevent further deterioration, and official policies have consistently defined local misuse of resources as the principal cause of destruction.

Recent examinations of all of these areas have shown that the technologies and models of intervention arose in particular historical settings. These were all in industrialised countries, and all the models have been transferred to completely different contexts with little or no regard for the receiving environments or people. These historical studies include analyses of the establishment of national parks for the preservation of biodiversity (Anderson and Grove, 1987; Manning, 1989; Ghimire, 1992; Gómez-Pompa and Kaus, 1992; West and Brechin, 1992); of soil and water conservation with its beginnings in the USA (Pretty and Shah, 1994; Anderson, 1984; Beinart, 1984); and of rangeland management and its origins in USA and Australia (Russell and Ison, 1991; Benkhe and Scoones, 1991; Sandford, 1983).

Parks and nature reserves have long been thought of as the best way of preserving wildlife. These areas have been seen as *"pristine environments similar to those that existed before human interference, delicately balanced ecosystems that need to be preserved for our enjoyment and use and that of future generations"* (Gómez-Pompa and Kaus, 1992). They are presented as being useful to modern society because they are sites with high biodiversity and/or rare or unique species exist.

But this concept of the wilderness as an *"untouched or untamed land is mostly an urban perception, the view of people who are far removed from the natural environment they depend upon"* (Gómez-Pompa and Kaus, 1992). It does not recognise the importance of local management and land-use practices in sustaining and protecting biodiversity. The notion that these can only be maintained without people has long influenced conservation policy (Manning, 1989; Whyte, 1967; Gómez-Pompa and Kaus, 1992; Kothari et al, 1989; West and Brechin, 1992). Traditional conservationists see the aesthetic and biological value of, for example, a rainforest, but do not see the people. Local people are actively excluded, often leaving only the visitors and tourists.

In South and South East Asia, for example, some 200-300 million people live in close association with forests. Yet most of these people are politically and culturally marginalised, being officially distinguished from the society of the national majority by a wide range of heavily value-laden terms. These include `scheduled tribes' of India, the `hill tribes' of Thailand, the `minority nationalities' of China, the `cultural minorities' of the Philippines, the `isolated and alien peoples' of Indonesia, the `aboriginal tribes' of Taiwan, the `aborigines' of Peninsular Malaysia, and the `natives' of Borneo (Colchester, 1992).

Yet virtually every part of the world has been inhabited and modified by people in the past, and apparent wildernesses have often supported high densities of people. People value and utilise wild resources, and there is good evidence from many different environments for local involvement and management (Scoones et al, 1992; Gómez-Pompa and Kaus, 1992; Nabhan et al, 1991; Oldfield and Alcorn, 1991). Indeed, it is when local people are excluded that

degradation is more likely to occur. This reasoning represents a complete reversal for conservation policy. It suggests that the mythical pristine environment exists only in our imagination.

Many similar themes have reoccurred in soil and water conservation and rangeland management. The knowledge that soil erosion was both costly and damaging was first appreciated on a wide scale by agricultural authorities in the USA and colonial Africa and India in the early part of the 20th century (Pretty and Shah, 1994). They took the view that farmers were mismanagers of soil and water, and so had to be encouraged to adopt conserving practices. Erosion was considered a technical problem requiring technical action. And so authorities have encouraged farmers to construct terraces, bunds, ditches and drains, and to adopt alternative cropping patterns and contour planting. They have resettled people to discourage the use of certain lands. They have destocked regions of livestock to reduce grazing pressure, and introduced compulsory paddocking. They have isolated water sources and prevented cultivation of riverine areas.

The style of intervention was first established in the USA, and particularly followed the Dust Bowl of the early 1930s. Even though there were subsidies to encourage farmers to adopt new measures, authorities were granted wide-ranging powers to enforce land use regulations and overcome non-compliance. These were extensive, and included fines, the authority to gain access to farms to conduct conservation work, and the capacity for direct tax-billing to pay for such remedial work (Headley, 1985; Trimble, 1985).

This pattern of intervention was then repeated by colonial authorities in Africa and Asia. Early regulations had been tuned finely according to soil type and were grounded in local farming and grazing practice (Stocking, 1985; Gichuki, 1991). But in the later campaigns following the alarms created by the Dust Bowl, the new rules were applied widely. Administrators travelling to the USA saw the devastation, and brought back recommendations for large-scale bunding and ridging, combined with contour ploughing and planting. Locally-adapted practices were largely ignored, even though they were more effective in droughts (Beinart, 1984). These measures were imposed on farmers, who were then monitored closely to ensure their compliance. In some countries, this meant the compulsory resettlement of large numbers of people to new villages.

This has been the style for soil and water conservation ever since. Technologies known to work under certain conditions are widely used or recommended, and backed up by imposing local and national policies that give powers to the State to execute specified improvements on farmers' fields and allocate the costs of these improvements between the farmers and the state. Careless construction of contour banks, terraces and ridges made many of them susceptible to breaching, and there are many examples of local people coming to believe that "*gully erosion was caused by the government*" (Beinart, 1984; Showers & Malahleha, 1990).

The quantitative achievements of conventional conservation programmes can appear impressive. Throughout the world, terraces have been built, trees planted and farmers trained on a massive scale. Yet these impressive results have mostly been short-lived, tending to occur only within project boundaries and before project completion. Because of a lack of consultation and participation, local people, whose land is being treated, rehabilitated or upgraded, find themselves participating for no other reason than to receive food or cash. These incentives slow down the pace of work, create dependencies and effectively dissuade farmers from voluntary conservation (Treacy, 1989; Kerr, 1994). Seldom are the structures maintained, and so conservation works rapidly deteriorate, accelerating erosion instead of reducing it. If performance is measured over long periods, the results have been extraordinarily poor for the amount of effort and money expended (Shaxson et al, 1989; Hudson, 1989; Reij, 1991; Pretty

and Shah, 1994; Pretty, 1995). Technologies have neither persisted nor spread independently into non-project areas.

Rangeland science and management has had a remarkably similar history. The concept of a `sustainable yield' and the goal of improved productivity had their origins in North America and rapid adoption in Australia. The approach was well adapted to the social and ecological context of their rangelands. A central feature of range management is that it has evolved to meet the needs of a system based on privately-owned land. As Russell and Ison (1991) put it: *"so pervasive is this history, which constitutes this particular `tradition of understanding', that it is difficult for those involved in it to see range management in any way other than their own way"*.

For at least fifty years, policy makers have consistently defined the major concern of pastoral regions as overstocking leading to `certain' ecological disaster. The problem was clear (too many cattle), as was the technical solution (destocking of the cattle). The central assumption is that pastoral ecosystems are potentially stable and equilibrial systems, which can become destabilised by overstocking and overgrazing. This led to the establishment of group ranches, grazing blocks and grazing associations. But these have never worked, and the ground assumptions behind this modernizing tradition of range management are being increasingly discredited (Russell and Ison, 1991; Benkhe and Scoones, 1991; Ellis and Swift, 1988). Pastoral systems do not vary around some equilibrium. Instead they are continually adapting to varying conditions, and their long persistence is a function of their capacity to change. Indeed it is the conventional development practices themselves that are the destabilizing influences on pastoral systems, as they have prevented traditional adaptive systems from being used.

2. The Social and Ecological Costs of Protected Area Management

The designation and expansion of protected areas has also brought associated social and ecological costs. These are rarely considered as likely to be significant during the process of designation, yet may eventually come to threaten the long-term viability of the protected areas themselves.

In the past, conservation has been achieved through enforcement. International conservation agencies, together with groups of national elites, have tended to put their combined efforts behind preservationist, `people out' approaches. These have been supported by the mobilisation of armed police forces or the army, combined with heavy penalties imposed on those who break conservation laws and regulations. However, this approach to protected area management has brought many social costs. It also raises both technical and ethical issues which need to be considered by policy makers.

2.1 The Neglect of Local People

The expropriation and exclusion of local communities who once used to occupy protected areas has led to increasingly severe social and ecological impacts in many countries. A growing body of empirical evidence now indicates that the transfer of `Western' conservation approaches to the Third World has had adverse effects on the food security and livelihoods of people living in and around protected areas (Ghimire, 1992; Kothari et al, 1989; Wells and Brandon, 1992; West and Brechin, 1992). On several occasions, local communities have been expelled from their settlements without adequate provision for alternative means of work and income. In other cases, local people have faced restrictions in their use of common property resources for food gathering, harvest of medicinal plans, grazing, fishing, hunting, collection of wood and other products from forests and wetlands. Policy and technical measures that combine protected area

management with socio-economic development in surrounding `buffer' zones have often tended to be top down, centralised, underfunded and of an *ad hoc* and short term nature.

It has been common for governments to take the view that indigenous peoples who rely on forest and other wild resources are `backward', and so need help to be developed out of this state (Colchester, 1992). In Indonesia, the *suku suku terasing* tribes are defined by government as *"people who are isolated and have a limited capacity to communicate with other more advanced groups, resulting in their having backward attitudes, and being left behind in the economic, political, socio-cultural, religious and ideological development process"* (Down to Earth, 1991, quoted in Colchester, 1992).

This policy usually involves some compulsory resettlement, on security as well as conservation grounds (Cernea, 1991; Colchester, 1992). In Thailand, there are many development programmes aimed at settling the `hill tribes', and many of them are still denied Thai nationality. In Laos, the government is aiming to remove some 900 000 people from the upland forests and resettle them in sedentarised agriculture by the end of the century. Of the released forests, the Lao government's intention is to allocate 2.5 million ha for nature conservation and 5 m ha for timber extraction.

Tribal people, poor farmers, fishermen and pastoralists displaced by such conservation projects have seen their needs and rights poorly met in their new, more risk-prone, environments. Lack of livelihood security ultimately undermines conservation objectives as poverty and rates of environmental degradation intensify in areas surrounding parks and natural reserves. Furthermore, there is a real risk that the growing rural conflict induced by such management schemes will actually destroy within a very short period what has been protected with a great deal of effort and time. Open protest and rallies against protected areas, attacks on park guards, poisoning of animals, deliberate burning of forests have become common experience in many developing countries (Box 1).

BOX 1. Open protest and rallies against protected areas.

• In India, resentment by local people to national parks legislation and enforcement agencies has led to acts of sabotage and civil disobedience. Villagers have set fire to large areas of national parks, such as in the Kanha National park of Madhya Pradesh (Gadgil and Guha, 1992). In the Nagarhole National Park in south India, which displaced the Jen Kurumbas and Bette Kurumbas people, about 20 square kilometres of forest were recently burned after wildlife guards were accused of killing a poacher (Roy and Jackson, 1993).

• The Manas Tiger Reserve in Assam, India, is located on the former traditional home land of the Bodo tribal people. The Bodo have begun to demand the establishment of an independent Bodo state and have taken up arms to achieve this. Taking advantage of the remoteness of the Manas area and the resentment of local Bodo who lost lands to the reserve, the insurgents have taken over the area and driven out park guards (Roy and Jackson, 1993). The Bodo insurgents have been killing wildlife to provide funds to arm their movement (Kumar, 1993).

• In the south of Madhya Pradesh, 52 villages of Maria tribals were evicted from their lands in 1984 to create the Kutru Tiger and Buffalo Reserve. The resentment of the Maria people to the impositions of the Tiger programme have encouraged them to side with Naxalite insurgents who have long championed tribal rights (Furer Haimendorf, 1986). Insurgents have invaded reserves and harassed park guards.

• In Africa, forms of both active and passive resistance against the imposition of protected areas are common.

• Created on lands traditionally used by Masai pastoralists, the Amboseli National Park in Kenya denied the local Masai access to dry season grazing lands and watering points. Although the national park management tried to provide compensations for the local people in a buffer zone, the Masai expressed their resentment towards the park by spearing lions, rhinos and other wildlife. The Masai are said to have hunted the black rhino to near extinction, not so much for its valuable horn, but because they believed white tourists desire to see the animal was the cause of them losing so much land to the Amboseli National park (Koch, 1994).

• When Namibia became independent in March 1990, Ovambo tribesmen living on the boundary of the Etosha National park celebrated their freedom by cutting the game fence and driving into the park armed with guns to hunt meat for their families (Koch, 1994).

2.2 The Neglect of Indigenous Knowledge and Management Systems

There is good evidence to show that virtually every part of the globe, from the boreal forests to the humid tropics, has been inhabited, modified, or managed throughout our human past (Gómez-Pompa, 1987; Kunstadter, 1978; Lundell, 1937; Parsons, 1975; Sauer, 1958). Table 1 contains a selection of the archaeological evidence for the former agricultural use of land now covered by tropical forest in several parts of the world. Although they may appear untouched, many of the `last refuges' of wilderness conservationists wish to protect are still inhabited or have been so for millennia.

New interactions between anthropology, ecology, historical analysis and ethnoecology have shed new light on the role of indigenous people and rural society in directing the course of evolution and the level of biological diversity in what are essentially humanised ecosystems. Anthropogenic influence has often actively maintained and enhanced biological diversity in

forests, wetlands, grasslands, agroecosystems and other environments from which rural people have historically derived their livelihoods. Recent findings in ecology suggest that nature is a state of continuous change. The importance of disturbance is increasingly acknowledged for the maintenance of biological diversity and other fundamental ecological processes. Some of these changes are in part random and independent of each other, whilst others are human induced.

Table 1. Archaeological evidence for the former agricultural use of land now forested (Wood, 1993).

Region	Evidence
Africa:	
Southern Nigeria	Pottery, charcoal and mounds present in forest left no doubt that the whole of what was continuous forest had been inhabited and cultivated
South America:	
Amazon lowlands	Sites of formerly widespread and sometimes dense settlements of aboriginal group in parts of *the terra firma* that occupies some 95% of region
	Areas of *terra preta,* black soil are anthropogenic, testifying to prolonged human occupation and cultivation of the site
Rio Magdalena, Colombia	Archaeological evidence shows the floodplains were intensively exploited for thousands of years
Central America:	
Northern Veracruz, Mexico	Recent forest clearing has made visible 90,000 ha of patterned ground
Mexico, Guatemala and Belize	Vast areas of raised fields exist
	Vast areas of the forested lowlands are covered with terraces and remains of raised fields; the rainforest of Péten region of Guatemala is the centre of former Mayan empire which supported more than 2 million people.
Belize	
eastern Panama	Many signs of habitation and cultivation in areas now under forest
Pacific:	
Fiji and New Hebrides	Presence of phytoliths in soil of maize associated with shifting cultivation
	Widespread field evidence of former taro terracing

All too often, however, outside professionals fail to build on indigenous knowledge and techniques, either through ignorance or cultural myopia. The conflicting perspectives on forest management in the Rwenzori Mountains of Uganda is a classical example of this problem. In the Rwenzoris, local resource users have limited stewardship over natural resources, with the state assuming management responsibility over resources that directly affect farmers in their own fields. To support the Forest Department's rationale for its retaining control over highly valued common-property resources, department representatives have indicated that, if the

commons were managed by local resource users, degradation of the resources would result (PVO-NGO/NRMS 1991). In the case of the Rwenzori Mountain Forest Reserve, however, the state control of the common resources is undermining farming households. But should local farmers react against the trend of forest incursion (and lack of stewardship) of resources occurring on their own fields, this could lead to degradation of the common-property resources and protected area over which the government now maintains stewardship.

Local systems of knowledge and management are sometimes rooted in religion and the sacred. Sacred groves, for example, are clusters of forest vegetation that are preserved for religious reasons. They may honour a deity, provide a sanctuary for spirits, or protect a sanctified place from exploitation; some derive their sacred character from the springs of water they protect, from the medicinal and ritual properties of their plants, or from the wild animals they support (Chandrakanth and Romm, 1991). Such sacred groves are common throughout southern and southeastern Asia, Africa, the Pacific islands and Latin America (Shengji, 1991; Ntiamoa-Baidu et al, 1992). The network of sacred groves in countries such as India has since time immemorial been the locus and symbol of a way of life in which the highest biological diversity occurs where humans interact with nature (Apffel Marglin and Mishra, 1993).

Sacred groves have gained attention only recently because they have become increasingly visible amidst the surrounding forest clearings. This sharp contrast humbles the understanding of technicians working to reverse deforestation (Chandrakanth and Romm, 1991). Sacred groves are preserved by villagers, *"not because it represents the antithesis of their productive activities but because it safeguards their livelihoods and their continued existence.... When the commons of local communities are still protected by the Goddess, nature's diversity is preserved"* (Apffel Marglin and Mishra, 1993). Clearly these pockets of biological diversity could be the focus for the conservation and regeneration of forest cover, so perhaps forming the basis of more `culturally appropriate' protected areas.

2.3 The Neglect of Local Institutions and Social Organisation

Worse than ignoring local knowledge and skills, many initiatives and projects have ignored existing formal and informal institutions. In the Philippines, for example, the law establishing the National Integrated Protected Area System claims to have the *"preservation of ancestral domain and customary rights within protected areas as a management objective"* (DENR, 1992). However, the law also aims to put protected areas under *"close management, control and study"* so that *"experts"* can decide where, when and how much of the natural resources can be extracted by local communities (DENR, 1992). As a result, local systems of decision making and resource management are eroded and local institutions are replaced by the bureaucracy and professional bodies. Similarly in India, State control over natural resources has led to *"severe conflicts with the local populations attempting to maintain their customary rights to resources. In the process, the local traditions of resource conservation have been increasingly disrupted or have broken down altogether"* (Gadgil, 1992).

Local organisations are crucial for the conservation and sustainable use of biodiversity. As Michael Cernea (1993) has put it *"resource degradation in the developing countries, while incorrectly attributed to `common property systems' intrinsically, actually originates in the dissolution of local level institutional arrangements whose very purpose was to give rise to resource use patterns that were sustainable"*. Local groups enforce rules, incentives and penalties for eliciting behaviour conducive to rational and effective resource conservation and use. For example, in the Marovo Lagoon in the Solomon Islands fishermen rely on many complex, unwritten rules on ownership, management and use of marine and agricultural resources (Hviding and Baines, 1992). Rules specify fishing and cultivation methods and limit

the period and quantity of fishing in areas threatened by excessive off-take. Social committment to ecologically sound resource management is preserved through a flexible and equitable access to resources based on exchange of rights to use resources and rules on inheritance. Although the system is currently under pressure from increased commercialisation of fishing and population expansion, local communities are successfully accommodating these developments within their customary framework. Community management based on customary marine tenure is proving to be the best option for the sustainable management of lagoon and near shore resources (Hviding and Baines, 1992).

However, the preservation and adaptation of informal customary systems of natural resource management is generally not a national priority. Thus, despite the demonstrated success of the CAMPFIRE (Communal Areas Management Programme For Indigenous Resources) projects in devolving proprietorship of wildlife from central government to district councils, only a few councils have taken further steps to delegate proprietorial ownership to local communities in Zimbabwe. Because many councils do not trust local communities to take the right decisions, such initiatives do not yet have the formal combination of production, management, authority and benefit necessary for an effective community-based regime of conservation and management (Murphree, 1993).

Existing organisations are resources to be strengthened, changed and developed, not ignored and suppressed. The problem with many newly-imposed institutions is that they do not do the job as envisaged. Institution building is not easy, and there have been many mistakes made in the name of participation and conservation. In India, the attempts to place local resources under the control of *panchayats* has been not as successful as expected. This has been because the users' groups have been too large and undemocratic (Agarwal and Narain, 1989).

2.4 The Neglected Value of Wild Resources

It is well known that hunter-gathering communities, such as the !Kung San in Botswana or Indian groups in the Amazon, depend heavily or entirely on wild resources for their livelihood needs (Scoones et al, 1992). Less well understood is that many farming households also rely heavily on wild resources. Individually and cumulatively, wild species can contribute to the food and financial security of rural households as dietary supplements, hedges against crop failure, income generators, medicinal plants, construction materials, fodder and fuelwood. Despite the widespread use of wild products, protected area management plans and resettlement schemes pay very little, if any, attention to the importance of wild resources for local livelihood security.

Wild foods can supply a substantial portion of the diet, and a great diversity of wild species are utilised by rural farming communities (Table 2). For example, in Swaziland over 200 edible wild plants are collected (Ogle and Grivetti, 1985). Villagers near the Oban National Park in Nigeria collect over 150 species of wild food plants from the forested areas (Okafor, 1989). In western Kenya, where villagers use about 100 different species of fruits and vegetables, 47% of households routinely collect plants from the wild and 49% keep wild species within their farms (Juma, 1989). Such diversity of species is not only restricted to tropical moist areas, as drier regions also have an abundance of useful species. In Zimbabwe, local foods include 20 wild vegetables, 42 wild fruits, 29 insects, 4 edible grasses and one wild finger millet (Gomez, 1988). There are at least 60 wild grass species in desert and savanna lands utilized as food in Sub-Saharan Africa (Harlan, 1989).

In Ghana, wild foods are particularly important during times of food shortages known as the hunger season which precedes crop harvests (Dei, 1989). Men are responsible for hunting, while women and children collect wild foods. The most frequently hunted species are the

grasscutter *(Thyronomys swinderianus)*, giant rat (*Critetomyx gambianus*) and antelope (*Neotragus pygamaeus*). Farmers then rely on these forest foods to replace the missing nourishment of staples, and to provide the necessary energy to harvest their fields. Before the harvest in Ghana, on average households obtained 16-20% of their food supply from the bush as compared to 6% after the harvest.

The diversity of forest foods not only enhances diets, but can also ensure a steady supply of food throughout the year. These forest foods can also be considered as a form of insurance against crop failure, pest attack or drought. During such times, not only are the usual forest products more heavily relied upon, but also those which would be less utilized because of their requirements for extensive processing. In West Africa, wild famine foods include roots, rhizomes, tubers, bark, buds, gums, leaves, flowers, fruits, cereals and seeds (Irvine, 1952; de Garine and Koppert, 1988). In response to the 1984-85 famine in Sudan, 91% of the people collected or bought on average two to three types of wild foods. These foods included wild grass (*Echinochloa colonum*), wild rice (*Echinochloa crus galli*), wild finger millet (*Dactyloctenium aegyptium*) and fruits (*Balanites aegyptiaca, Boscia senegaliensis*). The berries of *Boscia senegaliensis* were eaten either cooked or dried by 94% of the households in northern Darfur and were the most important food in the diet providing when cooked 70% of the energy and 75% of the protein of cultivated millet (De Waal, 1989).

Many wild foods are also sold or bartered, so allowing subsistence farmers to obtain cash for other goods or services. These foods vary from vegetables, fruits, insects, palm wine, wild mushrooms, and game. Even if forest foods are not directly sold, their consumption saves a family money by reducing the necessity to buy food. About 25% of the respondents of a survey in Swaziland sold wild plants and 46% purchased wild products (Ogle and Grivetti, 1985). The use of forest foods as an income source is particularly important for women and the landless. In Lushoto, Tanzania, wild greens can be sold in markets by women who usually are single or do not have enough land to sell cultivated foods (Fleuret, 1979).

Table 2. Use of wild plants for food and medicine by farming communities

Location	Importance of Wild Resources
Brazil (1)	Kernels of babbasu palm provide 25% of household income for 300,000 families in Maranhâo State
China, West Sichuan (2)	1320 tonnes of wild pepper production; 2000 t fungi collected and sold; 500 t ferns collected and sold
Ghana (3)	16-20% of food supply from wild animals and plants
India, Madya Pradesh (4)	52 wild plants collected for food
Kenya, Bungoma (5)	100 species wild plants collected; 47% of households collected plants from the wild and 49% maintained wild species within their farms to domesticate certain species
Kenya, Machakos (6)	120 medicinal plants used, plus many wild foods
Nigeria, near Oban National Park (7)	150 species of wild food plants
South Africa, Natal/KwaZulu (8)	400 indigenous medicinal plants are sold the area
Sub-saharan Africa (9)	60 wild grass species in desert, savanna and swamp lands utilized as food
Swaziland (10)	200 species collected for food
Thailand, NE (11)	50% of all foods consumed are wild foods from paddy fields, including fish, snakes, insects, mushrooms, fruit and vegetables
South west of USA (12)	375 plant species used by Native Indians
Zaire (13)	20 tonnes chanterelle mushrooms collected and consumed people of Upper Shaba
Zimbabwe (14)	20 wild vegetables, 42 wild fruits, 29 insects, 4 edible grasses and one wild finger millet; tree fruits in dry season provide 25% of poor people's diet

Sources: (1) Fowler and Mooney, 1990; (2) Zhaoqung and Ning, 1992; (3) Dei, 1989; (4) Oommacha and Masih, 1988; (5) Juma, 1989; (6) Wanjohi, 1987; (7) Okafor, 1989; (8) Cunningham, 1990a, b; (9) Harlan, 1989; (10) Ogle and Grivetti, 1985; (11) Somnasung et al, 1988; (12, 13) Scoones et al, 1992; (14) Wilson, 1990.

2.5 The Neglect of Different Ways of Satisfying Human Needs

Livelihood systems are diverse in rural areas. They commonly rely on a mix of wild foods, agricultural produce, remittances, trading and wage labour. Household decision making continually adjusts to the changing nature of the environment and local economies. At higher levels, it is simply impossible to predict the needs and preferences of households, particularly in resource-poor areas where there is much biological and social diversity. There are therefore no

ready made blueprints for designing protected areas that integrate environment and development into sustainable livelihoods.

Many protected area schemes have overlooked the importance of locally specific ways of meeting needs for food, health, shelter, energy and other fundamental human needs. Outside professionals all to often failed to see the difference between fundamental human needs and their satisfiers: the ways and means of satisfying these needs. Whilst fundamental human needs are universal, their satisfiers vary according to culture, region and historical conditions (Max-Neef,1989).

Despite some remarkable exceptions, resettlement housing for displaced people, health care and agricultural developments in park buffer zones, changes in tenure laws and other externally driven activities have, implicitly or explicitly, adopted the dominant cultural model of industrial society. In industrial societies fundamental human needs are almost exclusively catered by satisfiers that must be bought in the market and/or produced industrially.

People in and around many protected areas are thus seen as poor if they wear home-made garments of natural fibre rather than synthetics. They are perceived as poor if they live in houses constructed from natural materials like bamboo, thatch and mud rather than concrete. The ideology of development declares them to be so because they neither fully participate in the market economy nor consume commodities produced for and distributed by the market, even though they may be satisfying their fundamental needs through self provisioning mechanisms. This neglect of human ingenuity and diversity ultimately reinforces the dominant model of development based on uniformity, centralisation and control.

2.6 The High Cost of Preservation

On a strictly technical and logistical level, this mode of intervention is financially expensive and governments are rarely able to sustain any uniformity. For some countries, the expenditure on protected areas and wildlife is very high, consuming 0.45% of the total government budget for Tanzania, and 0.6% for Zimbabwe. In comparison, the United States spends only 0.15% of its total budget on protected areas and wildlife (Adams and McShane, 1993). These funds are often highly dependent on outside help and subject to the vagaries of international politics. In Kenya, for example, the government's capacity to manage natural resources within its territory has recently declined as a result of structural adjustment programs and cut backs in international aid.

A substantial amount, if not the bulk, of the protected areas budget has to be spent on aircraft, radios, machine guns, vehicles, salaries of armed guards, night goggles, and other anti-poaching equipment. In Nepal, for example, 80% of the protected areas' budget goes for policing activities (Ghimire, 1992; Wells, 1993). As a result, the enforcement of park regulations becomes progressively more difficult because of the sustained opposition by local people. The result of this situation is that many parks and other protected areas exist only on paper.

The main ethical issue raised by this widely-practised enforcement approach to park and protected area management has been well summarised by Peluso (1993): *"Although many state*

[5] A definition of the "good life" implies different ways of satisfying *fundamental human needs.* Max-Neef and his colleagues have identified nine fundamental human needs, namely: *subsistence* (for example, health, food, shelter, clothing); *protection* (care, solidarity, work, etc.); *affection* (self-esteem, love, care, solidarity and so on); *understanding* (among others: study, learning, analysis); *participation* (responsibilities, sharing of rights and duties); *leisure/idleness* (curiosity, imagination, games, relaxation, fun); *creation* (including intuition, imagination, work, curiosity); *identify* (sense of belonging, differentiation, self-esteem and so on), *freedom* (autonomy, self-esteem, self-determination, equality).

agencies or factions may be interested in joining international conservation interests to preserve threatened resources and habitats, some state interests appropriate the ideology, legitimacy and technology of conservation as a means of increasing or appropriating their control over valuable resources and recalcitrant populations (our emphasis). While international conservation groups may have no direct agenda for using violence to protect biological resources, their support of states which either lack the capacity to manage resources or intend to control `national' resources at any price, contributes to the disenfranchisement of indigenous people with resource claims".

3. Normal Professionalism and the Narrowness of Conservation Science

3.1 The Prevalence of Positivism as the Scientific Method

Since the early 17th century, scientific investigation has come to be dominated by the Cartesian paradigm, usually termed positivism or rationalism. This posits that there exists a reality driven by immutable laws. Science seeks to discover the true nature of this reality, the ultimate aim being to discover, predict and control natural phenomena. Investigators proceed in the belief that they are detached from the world. The process of reductionism involves breaking down components of a complex world into discrete parts, analysing them, and then making predictions about the world based on interpretations of these parts. Knowledge about the world is then summarised in the form of universal, or time- and context-free, generalisations or laws. The consequence is that investigation with a high degree of control over the system being studied has become equated with good science. And such science is equated with `true' knowledge.

It is partly this positivist approach that has led to the application of an effectively uniform model for protected areas and natural parks. Yet there are some fundamental contradictions, particularly when it comes to emergent concerns over sustainability. A great deal of effort has gone into trying to define sustainability in absolute terms. Since the Brundtland Commission's definition of sustainable development in 1987, there have been at least 70 more definitions constructed, each different in subtle ways, each emphasising different values, priorities and goals. The implicit assumption is that it is possible to come up with a single correct definition, and each author presumably regards his/her effort as the best.

But precise and absolute definitions of sustainability are impossible (Pretty, 1995). Sustainability itself is a complex and contested concept. To some it implies persistence and the capacity of something to continue for a long time. To others, it implies resilience, and the ability to bounce back after unexpected difficulties. With regard to the environment, it involves not damaging or degrading natural resources. Others see it as a concept that means developmental activities that simply take account of the environment. Economies are sometimes said to be sustainable if they carry on growing at the same rate, or only if growth does not reduce the natural resource base.

In any discussions of sustainability, it is important to clarify what is being sustained, for how long, for whose benefit and at whose cost, over what area and measured by what criteria. Answering these questions is difficult, as it means assessing and trading off values and beliefs. Andrew Campbell (1994) says that *"attempts to define sustainability miss the point that, like beauty, sustainability is in the eye of the beholder... It is inevitable that assessments of relative sustainability are socially constructed, which is why there are so many definitions"*.

The problem is that no scientific method will ever be able to ask all the right questions about how we should manage resources for sustainable development, let alone find the answers. The

results are always open to interpretation. All actors, and particularly those stakeholders with a direct social or economic involvement and interest, have a uniquely different perspective on what is a problem and what constitutes improvement in a livelihood system. As Wynne has put it: *"the conventional view is that scientific knowledge and method enthusiastically embrace uncertainties and exhaustively pursue them. This is seriously misleading"* (Wynne, 1992). The trouble with normal science is that it gives credibility to opinion only when it is defined in `scientific' language, which may be inadequate for describing the complex and changing experiences of rural people and other actors in conservation and development. As a result, it has alienated many of them.

Conservation science is firmly set within the positivist paradigm, and it is this that has determined the basic values and assumptions of conservation professionals. This has been fundamentally reductionist, with specialist disciplines prevailing. This has produced a mode of working that has systematically missed the complexity of ecological and social relationships at local level.

3.2 Reductionist Science and Disciplinary Specialisation

Conservation scientists and field officers tend to perceive ecosystems through the narrow window of their own professional discipline. Their training has taught them to look at just that aspect of the ecosystem on which they specialise, which may be medicinal plants, rare orchids, trees, birds, elephants or tigers. This then becomes the main focus of attention when visiting an area rich in biological diversity. As a result, specialists commonly adopt just one or two criteria for deciding on priorities and measuring the performance of conservation projects. This might be a simple measure of the number of species, or of a particularly valued species, such as migrating birds over-wintering at a wetland site.

Species diversity is a central concept used by professionals to establish priorities for conservation. Two largely descriptive examples, 'ecological hotspots' and 'mega-diversity countries', use lists of plant species or other taxa to identify biologically-rich sites, biogeographic units and countries (Myers, 1988; Mittermeier and Werner, 1990). Although there have been some recent efforts to go beyond this specialisation, the new approaches to conservation planning remain firmly rooted in natural science categories and criteria. For example, the proposed Conservation Potential/Threat Index (CPTI) compares biological richness with reserve size, size of protected areas, size of remaining forest cover and deforestation rate (Dinerstein and Wikramanayake, 1993). Conservation biologists see the CPTI and related indices as broadly useful for setting global priorities on biological diversity and for convincing donors and multilateral banks to `invest' in the expansion of the protected area network.

But, there are still some fundamental problems. Despite claiming scientific rigour, the approaches based on species diversity indices rely on crude approximations. They promote an illusory precision and are uncritical about the consequences of their inherent biases. The reality constructed by CPTIs is based on a limited knowledge of the extent and distribution of species diversity. Few taxonomic groups are represented: mammals, birds, reptiles, amphibians, freshwater fish, swallow tail butterflies and vascular plants. Then, these databases underestimate the species richness of invertebrates and, more significantly, that of insects and other arthropods. And yet, arthropods dominate the diversity of species, making up some 90% of all known and estimated species (Kim, 1993; Stork, 1993). They play a key role in the structure and function of both natural and human-managed ecosystems, and it could be argued that some of the more intensively managed ecosystems might attract more priority investments for biodiversity conservation if insect and other arthropod species were taken into account in CPTIs and similar indices.

Another related problem is that, combined with Geographic Information Systems (GIS), dynamic modelling and other aspects of the computer revolution, the approach based on the use of CPTIs and species diversity indices is likely to raise even higher the amount of time conservation professionals spend in the company of computers. Inevitably, this will mean a reduction in time spent in the field, working with, and learning from, the users of natural resources. The approach may further shift attention upwards and away from people: from their means of subsistence and their local resource management systems.

In the context of conservation, the term `interdisciplinarity' usually refers just to well known tribes of botanists, zoologists and other natural scientists: the emphasis is on getting the `science' right. Although it is recognised that priority setting exercises should also integrate socioeconomic data, land use patterns and the like, advocates argue that *"it is best to avoid 'mixing apples and oranges' and instead focus on getting the biological priorities right in the first step of the process. Other kinds of data can then be superimposed on the biological foundation using a GIS and thus develop meaningful and scientifically-based conservation agendas"* (our emphasis) (Mittermeier and Bowles, 1993).

The key specialists are invariably international and national scientists, even when priorities are set at the local level. The knowledge, perceptions and conservation priorities of local resource users are rarely included in the new generation of rapid assessments that provide quality data in very short periods of time. In the words of two senior staff members of an influential international conservation organisation: *"The best example of the short term approach to priority setting at the local level is to deploy the RAP team (for Rapid Assessment Program), which uses a small group of world class field biologists with cumulative tropical experience in excess of 100 years"* (our emphasis) (Mittermeier and Bowles, 1993).

But what all these professionals miss are the complex internal linkages that matter in biodiverse environments. Disciplinary specialisation often militates against understanding the factors behind the success of indigenous systems of natural resource management. As a result, opportunities to design culturally appropriate biodiversity conservation schemes are missed. What Nabhan et al (1991) say about plant conservation illustrates the more general problem of Western, positivist, disciplinary science and its inherent ethnocentric bias: *"Regardless of the potential for building on indigenous peoples plant traditions to further the conservation of rare species, certain ethnocentric attitudes remain among Western-trained conservation biologists which keep this potential from being fully realised. Because many biologists are intent on analysing so-called natural systems, they often ignore that they are really observing relationships between organisms and environments that have been influenced by humankind over thousands of years... Even when they do not ignore human influences, such "natural systems" biologists typically treat human presence as a purely negative phenomenon, a nuisance or intrusion."*

Indigenous and rural people as managers of complex systems have many different criteria which they weigh up and combine in the choice of management activities that influence the fate of biological diversity,- at a genetic, species and ecosystem level. This raises some important questions. Whose knowledge counts in the design of national parks and protected areas? Whose priorities and preferences count for successful conservation of biodiversity? Is it those of the scientist or those of rural people who participate in the making and reproduction of both nature's diversity and their own culturally specific livelihood system?

3.3 Preservationist Ideology

Over the last century or so, some western ideologies have exalted the values associated with both the preservation of unspoilt wilderness and the restoration of `degraded' areas to a more pristine condition. During this time, a range of beliefs have been propagated. These include the assumptions that:

- wildlife conservation can only work by adopting a total position against killing and use of wildlife;
- biodiversity conservation can be achieved by not buying wildlife products, regardless of whether they were produced through approved management schemes;
- wildlife conservation in the developing world can succeed without generating economic returns to landowners and to the traditional custodians of biological diversity;
- all wildlife populations are fragile entities driven closer to extinction by any human use.

More recently, this preservationist ideology has been radically extended by a North American version of the `deep ecology' movement (Devall and Sessions, 1985; Foreman, 1987). For deep ecologists, preserving nature has an intrinsic worth quite apart from any benefits preservation may provide to future human generations. Truly radical policy proposals have been put forward by deep ecologists on the basis of this argument. Interventions in nature should be guided primarily by the need to preserve biological diversity and integrity rather than by the needs of humans. Some of the more militant deep ecologists have, for example, forcefully argued that a large proportion of the globe must be immediately cordoned off from human beings (Foreman, 1987).

However, whilst the tenets of deep ecology are no doubt valuable in challenging man's arrogance and ecological hubris, their growing influence on conservation planning is disturbing. For example, the international conservation elite is increasingly using the philosophical, moral, and scientific arguments used by deep ecologists in advancing their wilderness crusade. Writing in the prestigious *Annual Review of Ecology and Systematics*, Daniel Janzen says that only biologists have the competence to decide how the tropical landscape should be used. As *"the representatives of the natural world"*, biologists are *"in charge of the future of tropical ecology"*, and only they have the expertise and mandate to *"determine whether the tropical agroscape is to be populated only by humans, their mutualists, commensals, and parasites, or whether it will also contain some islands of the greater nature-the nature that spawned humans, yet has been vanquished by them"* (Janzen, 1986). Whilst clearly extreme, Janzen's views are by no means atypical. Two years after the Earth Summit in Rio, it is not uncommon to hear western-trained conservation biologists argue in favour of taking over large portions of the world to expand the network of protected areas.

These conclusions of deep ecology have been criticised both in North America (Bookchin, 1990; Chase, 1991; Merchant, 1992) and by Third World scholars worried about the consequences of this obsession with wilderness (Guha, 1993). As Guha (1989) points out *"This frankly imperialist manifesto highlights the multiple dangers of the preoccupation with wilderness preservation that is characteristic of deep ecology"..."it seriously compounds the neglect by the American movement of far more pressing environmental problems within the Third World"*,- environmental problems that impinge far more directly on the lives of the poor e.g. food, fuel, fodder and water shortages. *"But perhaps more importantly, and in a more insidious fashion, it also provides an impetus to the imperialist yearning of Western biologists and their financial sponsors....The wholesale transfer of a movement culturally rooted in American conservation history can only result in the social uprooting of human populations in other parts of the globe"*.

3.6 The Blueprint Approach of Normal Conservation Professionalism

The methods and means deployed to preserve areas of pristine wilderness largely originated in the affluent West where money and trained personnel ensure that technologies work and that laws are enforced to secure conservation objectives. During and after the colonial period, these conservation technologies, and the values associated with them, were extended from the North to the South,- often in a classical top down manner. Positivist conservation science and the wilderness preservation ethic hang together with this top down, transfer of technology model of conservation. They are mutually constitutive elements of the blueprint paradigm which still informs much of today's design and management of protected areas in developing countries (Table 3).

Managerially, the blueprint approach fits the type of organisations with clear and fixed definitions of roles, procedures and methods, hierarchical authority, punitive management style and inhibited lateral communications. Such organisations are better suited to routine activities and do not cope well with fast changing circumstances. The main actors in these organisations are normal professionals who are concerned not just with research, but also with action. Normal professionals are found in research institutes and universities as well as in international and national organisations where most of them work in specialised departments of government (forestry, fisheries, agriculture, health, wildlife conservation, administration...). The thinking, values, methods and behaviour dominant in their profession or discipline tends to be stable and conservative. Lastly, normal professionalism generally *"values and rewards "first" biases which are urban, industrial, high technology, male, quantifying, and concerned with things and with the needs and interests of the rich"* (Chambers, 1993).

Table 3. Biodiversity conservation and natural resource management paradigms: the contrast between blueprint and learning-process approaches (adapted from David Korten)

	Blueprint	**Process**
point of departure	nature's diversity and its potential commercial values	the diversity of both people and nature's values
keyword	strategic planning	participation
locus of decision making	centralised, ideas originate in capital city	decentralised, ideas originate in village
first steps	data collection and plan	awareness and action
design	static, by experts	evolving, people involved
main resources	central funds and technicians	local people and their assets
methods, rules	standardised, universal, fixed package	diverse, local, varied basket of choices
analytical assumptions	reductionist (natural science bias)	systems, holistic
management focus	spending budgets, completing projects on time	sustained improvement and performance
communication	vertical: orders down, reports up	lateral: mutual learning and

		sharing experience
evaluation	external, intermittent	internal, continuous
error	buried	embraced
relationship with people	controlling, policing, inducing, motivating, dependency creating. People seen as beneficiaries	enabling, supporting, empowering. People seen as actors
associated with	normal professionalism	new professionalism
outputs	1. diversity in conservation, and uniformity in production (agriculture, forestry,...) 2. the empowerment of professionals	1. diversity as a principle of production and conservation 2. the empowerment of rural people

The blueprint approach to conservation is also selectively promoted by wider economic forces that can appropriate the commercial values of biological resources in and around protected areas. For example, both the World Bank's private sector lending arm, the International Finance Corporation (IFC), and the World Bank-controlled Global Environment Facility (GEF), have begun talks with potential investors about the possibilities of selling biological diversity for a profit (Chatterjee, 1994; Shand, 1993). This biodiversity venture capital fund would work on a planetary scale. Three possible areas have been identified for funding so far, including ecotourism, the marketing of tourism in protected areas and natural habitats to wealthy tourists; genetic materials' screening, the study of species in protected areas and tropical ecosystems for medical and other properties useful for new natural product development (e.g oils, perfumes, waxes, biopesticides); and the commercialisation of existing knowledge of traditional medicines.

More generally, the proposed biodiversity venture capital fund could help sell the rights to `charismatic' ecosystems and protected areas to large corporations for public relations value (Chatterjee, 1994).

Increasingly powerful economic and political forces shape conservation science and technology: the practitioners, the conceptual frameworks, the research questions, the funding institutions that promote certain directions, and the official histories of their progress. The blueprint approach of normal conservation science is thus much more than a collection of true or false facts. It is best understood as a set of definite choices of world views and power relations. Choices are not between pristine wilderness and human use but between different kinds of use and between different forms of political control. Moreover, the `objectivity' claimed by this conservation paradigm is, in and by itself, a way of selecting from and shaping Nature, or protected areas in this context.

However, at a time when many other aspects of knowledge and culture are being seen as expressions of contending social forces, science, and conservation science in particular, still claims to be above the battle (Rose and Rose, 1976; Levidow 1986a, 1986b; Dickson, 1984; Merchant, 1980; Levins and Lewontin, 1985). The official view that conservation science is in itself neutral, though open to use and abuse, has been reinforced in the post UNCED period (Hildyard, 1993). Conservation experts and their products are, after all, being asked to play a dramatically increased role in the formulation of global environmental management strategies in

the 1990s. One of the central messages of UNCED is that the world is to be saved by more and better managerialism. The blueprint approach to conservation meshes well with the new language of global ecology in which satellite pictures of the globe's vegetative cover, computer graphs running interacting curves through time and threshold levels are held up as its worldwide norms.

As Sachs (1993) writes, the language of global ecology *"constructs a reality that contains mountains of data, but no people. The data do not explain why Tuaregs are driven to exhaust water holes, or what makes Germans so obsessed with high speed on freeways; they do not point out who owns the timber shipped from the Amazon or which industry flourishes because of a polluted Mediterranean sea; and they are mute about the significance of forest trees for Indian tribals.... In short, they provide a knowledge which is faceless and placeless; an abstraction that carries a considerable cost: it consigns the realities of culture, power and virtue to oblivion. It offers data, but no context; it shows diagrams, but no actors; it gives calculations, but no notions of morality; it seeks stability, but disregards beauty. Indeed, the global vantage point requires ironing out all the differences and disregarding all circumstances; rarely has the gulf between observers and the observed been greater than between satellite based forestry and the seringueiro in the Brazilian jungle".*

Conservation science still operates on a narrow intellectual base emphasising categories, criteria, knowledge and procedures that serve the interests of professional control over protected area management. Conservation priorities often turn out to be inappropriate, the field conservation packages are rejected, some conservation technologies do not fit, are non-sustainable or inequitable because of an emphasis on purchased inputs in resource poor contexts. The broader implications of recommended conservation technologies are largely ignored. Similarly, the ideologies which inform and legitimate dominant conservation practices are assumed to be valid for all people, all places and all times. These are all features of the positivist paradigm. If conservation efforts are to become more effective, efficient and just, then they will have to seek alternative values, methods and approaches.

4. Alternatives to the Positivist Paradigm for Conservation

4.1 Emerging Themes

The problem with the positivist paradigm is that its absolutist position appears to exclude other possibilities. Yet the important point about positivism is that it is just one of many ways of describing the world, and what is needed is pluralistic ways of thinking about the world and acting to change it (Kuhn, 1962; Checkland, 1981; Vickers, 1981; Reason and Heron, 1986; Habermas, 1987; Giddens, 1987; Maturana and Varela, 1987; Arthur, 1989; Rorty, 1989; Röling, 1994; Pretty, 1994; Bawden, 1991; Uphoff, 1992; Waldrop, 1992; Wynne, 1992). Recent years have seen the emergence of a remarkable number of advances in a wide range of disciplines and fields of investigation. The sources include the so-called `hard' sciences, such as physics, biology and mathematics, as well as the `soft' sciences of economics, philosophy and sociology.

Despite this wide ranging list, those arguing for the seriousness and importance of developing alternatives to positivism are still in the minority. Many scientists argue strongly that information is produced by science and then interpreted and applied by the public and policy makers. It is this process of interpretation that introduces values and confuses certainties.

The advances in alternative paradigms have important implications for how we go about finding out about the world, generating information and so taking action. All hold that *"the truth is*

ultimately a mirage that cannot be attained because the worlds we know are made by us" (Eisner, 1990). All suggest that we need to reform the way we think about methodologies for finding out about the world. This should not be surprising, as *"the language of reductionism and positivism does not entertain the very complex and dynamic phenomena associated with the quest for sustainable practices"* (Bawden, 1991).

It is clearly time to add to, or even let go of, the old paradigm of positivism for science, and explore the new alternatives. This is not to suggest that there is no place for reductionist and controlled science. This will continue to have an important role to play. But it will no longer be seen as the sole type of inquiry. The process will not be without conflict. Thomas Kuhn's (1962) hugely influential analysis of paradigm changes in science describes for the process of revolution for case after case. It inevitably means some huge transformations. But the result can be fundamental shifts in understanding: *"During revolutions scientists see new and different things when looking with familiar instruments in places they have looked before"*.

4.2 Underlying Principles of Alternative Paradigms

Five principles set out the crucial differences between these emerging paradigms and positivist science (Pretty, 1994). The first is that any belief that sustainability can be precisely defined is flawed. It is a contested concept, and so represents neither a fixed set of practices or technologies, nor a model to describe or impose on the world. The question of defining what we are trying to achieve is part of the problem, as each individual has different values. Sustainable development is, therefore, not so much a specific strategy as it is an approach to learning about the world.

The second is that problems are always open to interpretation. All actors have uniquely different perspectives on what is a problem and what constitutes improvement. As knowledge and understanding is socially constructed, what each of us knows and believes is a function of our own unique contexts and pasts. There is, therefore, no single `correct' understanding. What we take to be true depends on the framework of knowledge and assumptions we bring with us. Thus it is essential to seek multiple perspectives on a problem situation by ensuring the wide involvement of different actors and groups.

The third is that the resolution of one problem inevitably leads to the production of another `problem-situation', as problems are endemic. The reflex of positivist science is to seek to collect large amounts of data before declaring certainty about an issue or problem. As this position is believed to reflect the `real world', then courses of action can become fixed and actors no longer seek information that might give another interpretation. Yet in a changing world, there will always be uncertainties.

The fourth is that the key feature now becomes the capacity of actors continually to learn about these changing conditions, so that they can act quickly to transform existing activities. They should make uncertainties explicit and encourage rather than obstruct wider public debates about pursuing new paths for protected area management. The world is open to multiple interpretations, and so it is impossible to say which one is true. Different constructed realities can only be related to each other.

The fifth is that systems of learning and interaction are needed to seek the multiple perspectives of the various interested parties and encourage their greater involvement. The view that there is only one epistemology (that is, the scientific one) has to be rejected. Participation and collaboration are essential components of any system of inquiry, as any change cannot be effected without the full involvement of all stakeholders and the adequate representation of their

views and perspectives. As Sriskandarajah et al (1991) put it: *"ways of researching need to be developed that combine `finding out' about complex and dynamic situations with `taking action' to improve them, in such a way that the actors and beneficiaries of the `action research' are intimately involved as participants in the whole process."*

The positivists' response to these principles is often to suggest they are all a recipe for chaos. If information is changeable, locally-valid, value-laden and entirely open to interpretation, how can it be trusted? Whose illusion are we going to believe today? Where is the order? Does this not suggest that science is unbelievable and that `anything goes'? Is there no more justification for scientific claims?

Few non-positivists would say that science does not work. They point out that what positivist science wants is ways of predicting and controlling nature, and so a good scientific theory simply gives better control and prediction. A more realistic way of thinking about science is as a human tool, and not because it is in touch with some absolute reality. This simply means that *"no longer can it be claimed there are any absolutely authoritative foundations upon which scientific knowledge is based... The fact is that many of our beliefs are warranted by rather weighty bodies of evidence and argument, and so we are justified in holding them; but they are not absolutely unchallengeable"* (Phillips, 1990).

For the pioneers, this process will be extraordinarily difficult. When Richard Bawden quotes Thomas Kuhn (1962) *"I am quite aware that I risk fierce controversies, international name-calling, and dissolutions of old friendships"*, he says this has all happened during the changes initiated in recent years of Hawkesbury College in Australia: *"my Hawkesbury experience confirmed that all of this occurred in reality (to me) in our attempts to do things profoundly differently".* Charles Darwin, at the end of the `Origin of Species' (1859) perceptively wrote; *"Although I am fully convinced of the merit of the views given in this volume, ...I by no means expect to convince experienced naturalists whose minds are stocked with a multitude of facts all viewed, during a long course of years, from a point of view directly opposite to mine... But I look with confidence to the future - to young and rising naturalists, who will be able to view both sides of the question with impartiality".*

It is only when some of these old professional norms and practices are challenged and new ones in place that widespread change in the livelihoods of rural people and their natural environments is likely to be achieved. This has important implications for the whole process of transition towards a more sustainable approach to conservation.

4.3 The Transition to a New Conservation Science

In parallel with these developments in other fields, there have also been recent advances in ecological theory and knowledge. It has become increasingly clear that existing ecological systems of plants and animals are a function of their unique pasts. Understanding the particular history of a modern community or ecosystem is critical to its current management. Ecosystems are dynamic and continuously changing, and this has very significant implications for management principles and practices (Box 2). This contrasts with the conventional view, which has too long held the notion that systems are largely a function of current operating mechanisms, and that any human interference will cause a depletion of biological diversity. This conventional view has justified the removal of people from national parks and restrictions on the use of protected area resources.

BOX 2. Emerging views on the historical development of ecosystems

A "paradigm shift" is occurring in ecological thinking. It has been recently realised that past management of animal populations and vegetation have been based on a far too static concept. For example:

• Hobbs and Huenneke (1992) state that *"Preservation of natural communities has historically consisted of measures protecting them from physical disturbance."* ... Ecologists and conservationists have come to recognize, however, that many forms of disturbance are important components of natural ecosystems. *"...growing empirical evidence suggest [sic] that moderate frequencies or intensities of disturbance foster maximum species richness." "To preserve biotic diversity and functioning natural ecosystems, then, conservation efforts must include explicit consideration of disturbance processes."*

• Foster and his colleagues (1992) argue that *"Ecologists are becoming progressively sensitized to the importance of the effect of history on the structure and function of modern communities and ecosystems. ... the present study provides some indication of the extreme complexity of this historical activity and outlines how naively that we as ecologists generally deal with it."* ... *"The conclusion is that it is inevitable that ecologists will simplify greatly the history of inferred human impacts on the forest. However, a consideration of the extensive and variable nature of human use of the landscape suggests that we bear in mind some understanding of this complexity."*

• Using experimental communities Drake and his colleagues (1993) concluded that: *"... historical information is essential to understand observed community structure. When information about the assembly of a community is lacking, and structure is assumed to be caused by current operating mechanisms, erroneous conclusions about the factors responsible for the structure are likely to occur."*

• Foster (1992) points out that *"The changing quality and intensity of human activity resulted in the dynamic vegetation characteristic of this period."...". The continually dynamic nature of the vegetation pattern in central New England is one of the most remarkable aspects of the post-settlement landscape."..."The ramifications of this history in terms of contemporary ecological processes are too great to be dismissed by modern-day ecologists."*

• Referring to the contemporary wilderness myth, Gomez-Pompa and Kaus (1992) say that *"The concept of wilderness as the untouched or untamed land is mostly an urban perception, the view of people who are far removed from the natural environment they depend on for raw resources.... The current composition of mature vegetation may well be the legacy of past civilisations, the heritage of cultivated fields and managed forests.... Until we understand and teach that the tropical forests are "both artifact and habitat", we will be advocating policies for a mythical pristine environment that exists only in our imagination"*.

It is because of narrow views of the historical development of ecological systems that we have missed the importance of people. In the Amazon region, for example, local people have a profound effect on rain forest structure and species composition through a process of succession management. Recent studies indicate that Amerindians played a far greater role in manipulating scrub savannas and similar vegetation types than has been previously suspected (Anderson and Posey, 1989; Irvine, 1989). This manipulation appears to have influenced not only the physiognomy of the vegetation but also its floristic composition, and could have important implications concerning the origins of natural vegetational communities.

Nonetheless, conservationists have begun to realise that some of the biodiversity loss observed in protected areas stems from the restrictions placed on the activities of local communities. For example, with the expulsion of the Maasai from their lands in Kenya, the Serengeti is increasingly being taken over by scrub and woodland, meaning less grazing for antelopes (Adams and McShane, 1992). The rich Serengeti grassland ecosystem was in part maintained by the presence of the Maasai and their cattle. Resource management policies to protect and control elephant populations in Tsavo National park in East Africa have led to severe deterioration of the land within the park boundaries (Botkin, 1990). The inhabited area around the park remained forested. The sharp demarcation of the park boundaries in the LANDSAT images and aerial photos appeared "*as a photographic negative of one's expectation of a park. Rather than an island of green in a wasted landscape, Tsavo appeared as a wasted island amid a green land"* (Botkin, 1990).

The central issue for a new conservation science is, therefore, to find ways of putting people back into conservation. What Toledo (1988) says of Mexico applies to many countries: *"In a country that is characterised by the cultural diversity of its rural inhabitants, it is difficult to design a conservation policy without taking into account the cultural dimension; the profound relationship that has existed since time immemorial between nature and culture... Each species of plant, group of animals, type of soil and landscape nearly always has a corresponding linguistic expression, a category of knowledge, a practical use, a religious meaning, a role in ritual, an individual or collective vitality. To safeguard the natural heritage of the country without safeguarding the cultures which have given it feeling is to reduce Nature to something beyond recognition; static, distant, nearly dead."*

5. Putting Participation into Conservation Science

5.1 Local People as Conservers

The first thing that a new conservation science recognises is the historical importance of local people as conservers. There are many places where people have helped to produce landscapes rich in biodiversity. According to Turner (1976), the Maya population of southeastern Mexico may have ranged from 150 to 500 people per km^2 in the Late Classic Period, contrasting sharply with current population densities of 4.5 to 28.1 people per km^2 in the same region (Pick et al, 1989). These past civilizations apparently managed the forests for food, fibre, wood, fuel, resins, and medicines (Gómez-Pompa, 1987). Present-day parks, reserves, and other protected areas in the region are filled with archaeological sites.

The great `pristine' forests of Amazonia supported a human population of at least 8 million people when Columbus arrived in the New World (Denevan, 1992a). People were managing kinds, numbers, and distributions of useful species of trees. Modern day tropical forest dwellers with simple technology also have significant impacts on the forest: for example, while routinely hunting and gathering through the forest, the Kayapo Indians of Amazonia collect dozens of tubers, fruit, beans and other plants, carry them back to forest campsites or trails, and replant them in natural forest clearings. These `forest fields' are often located near streams and in the savanna, where patches of forest are scattered. Areas where collected plants have been replanted then form useful food depots for the indigenous people (Posey, 1982). The `virgin forest' alleged to have been encountered by European explorers in the 16th and 17th centuries, and which still has such a profound influence on global perceptions of tropical rainforests, was in fact invented by romantic writers about nature in the late 18th and early 19th centuries (Pyne, 1982).

Many rural communities enrich their agricultural plots and forest fallows with valued perennial plants. Through such enrichment practices, successional vegetation can become a site for economic production as well as for ecological rehabilitation (Dubois, 1990). Each of the major tropical forest regions has many economic woody plants that have been managed, probably for millenia, in enriched fallows (Wood, 1993). In Vanuata the natural composition of forests has been dramatically altered by centuries of itinerant gardening, favouring tree species that bear edible fruits and nuts (Weightman, 1989). Fallows have been enriched with rattan in East Asia, rubber in Sumatra, *Casuarina* in Papua new Guinea, *Gliricidia* and peach palm in Central America, oil palm in West Africa, and edible fruits and nuts universally. The value of extractive reserves, where economic plants are harvested from the forest, is almost certainly due to past enrichment management during phases of agricultural fallow, and not to the bounty of the natural forest. For example, virtually pure stands of the economically useful babassu palm (*Orbignya phalerata*) have been generated by human activities and cover nearly 200,000 km^2 in the Amazon basin (Anderson et al, 1991).

There is also growing evidence that indigenous peoples' territories overlap with higher levels of biodiversity than in areas occupied by non-indigenous peoples (Alcorn, 1994). Comparisons with other groups in the landscape provides evidence that indigenous peoples are better conservationists than others operating in biodiverse areas. The local institutions probably offer the most striking evidence for active conservation. These institutions include rules about use of biological resources and acceptable distribution of benefits, definitions of rights and responsibilities, means by which tenure is determined, conflict resolution mechanisms and methods of enforcing rules, cultural sanctions and beliefs (Alcorn, 1994).

In the Sonoran Desert, a study of two oases on either side of the Mexico-United States border indicates that the customary land-use practices of Papago farmers on Mexican side of the border contributed to the biodiversity of the oasis. By contrast, the protection from land use of an oasis 54 km to the northwest, within the US Organ Pipe Cactus National Monument, resulted in a decline in the species diversity over a 25-year period (Nabhan et al, 1982).

The systems of shifting cultivation common in Asia have long been taken to be damaging to natural resources in general and biodiversity in particular. But it is becoming increasingly clear that this simplistic view is inaccurate. Given the opportunity, shifting cultivator communities preserve wild resources. Studies in Asia have concluded that most of the mature forests in this region are not virgin forests, but merely old forests that have reached a relatively stable equilibrium of ecological succession after some earlier clearing by human or natural means (Spencer, 1966; Wharton, 1968; Scoones et al, 1992). Under traditional systems of shifting cultivation, wildlife flourishes, with elephants, wild cattle, deer, and wild pigs all feeding in the abandoned fields. Tigers, leopards and other predators are in turn attracted by the herbivores. Older fields contain a high proportion of fruit trees that attract primates, hornbills, squirrels and a variety of other animals.

Anthropologists report finding fruit-filled, remarkably diverse groves (44 tree species within one-fifth of a hectare) in Kalimantan, Indonesia, that had been created by generations of villagers casually planting, weeding, and even spitting out fruit seeds over their shoulders (Ryan, 1992). The Gola Forest in Sierra Leone is an old agricultural landscape reverted to mature secondary forest (Richards, 1992; Richards and Davies, 1991). It is also particularly bird rich and there is evidence for a positive connection between history of human occupancy and levels of bird biodiversity.

In the Sierra de Manantlan (Jalisco, Mexico), the discovery of a new perennial corn, *Zea diploperennis*, led to the establishment of a biosphere reserve to protect this species and the

ecosystem in which it survives (Iltis, 1988). The difficulty is that *Zea diploperennis* is a secondary species that grows in abandoned cornfields. To protect the species, the slash-and-burn techniques of this form of traditional agriculture have to be continued to provide the habitat that it requires. Without all the human cultural practices that go with the habitat, the species will be lost forever.

Processes of ecological recovery also highlight the critical role played by people in the conservation and enhancement of biological diversity. One of the best documented examples is provided by a study of the semi-arid Machakos district in Kenya (Tiffen et al, 1993). The interactions between people and their environment were examined over a sixty year period (1930-1990). In the 1930s the district was considered an environmental disaster: degraded soils and a treeless landscape supporting little plant and animal life. But between 1930 and 1990 the population of the District increased more than fivefold. And yet, the environment in 1990 was in much better condition than in the 1930s. Soil erosion had been slowed down or reversed. Almost all arable land was protected by terraces. The number of farmed and protected trees increased. The biological richness of the landscape was significantly enhanced, as seen by the radically changed appearance of the countryside. Several factors combined to promote local economic and ecological regeneration: local adaptiveness and innovation, government programmes and enabling policies that led to better contacts with markets and more sources of information.

However, another important lesson from the past is that human activities have sometimes led to spectacular losses of biological diversity and environmental degradation. Civilisations from Bronze Age Crete and Knossos, Mycenaean Greece, Cyprus, Greece and Rome rose and fell with the forests that supported them (Perlin, 1989). Subsequent overgrazing by cattle, sheep and goats prevented the forests from ever becoming established. Clearly indigenous peoples are not a monolithic entity. Whilst many are acutely aware of their close cultural ties to nature and the necessity of conserving this resource for their continued well being, other indigenous groups may not show such awareness or concern for the environment. Small groups in particular seem especially vulnerable to internal and external pressures to exploit their resources in ways that may not lead to conservation (Stearman, 1990; Redford and Stearman, 1993).

All these examples suggest that conserving biological diversity requires a far more subtle appreciation of both human and natural influences. They call into question the separation of people from nature and support the view that people are part of nature. In most terrestrial and coastal environments both the form and degree of biological diversity results from a combination of cyclical ecological and climatic processes and past human action. What Denevan (1992b) says of forests also applies to wetlands, grasslands and other humanised ecosystems: human impacts may enhance or reduce biodiversity, but change has been continual at variable rates and in different directions. This implies that biodiversity conservation efforts may need to give greater attention to ecosystem processes rather than ecosystem products (McNeely, 1994). And, perhaps more importantly, conservation efforts may need to identify and promote those social processes which enable local communities to conserve and enhance biodiversity as part of their livelihood system.

5.2 Multiple Interpretations of Participation

There is a long history of community participation in rural development, and a wide range of development agencies, both national and international, have attempted to involve people in some aspect of planning and implementation. Two schools of thought and practice have evolved. One views community participation as a means to increase efficiency, the central notion being that if people are involved, then they are more likely to agree with and support the new

development or service. The other sees community participation as a right, in which the main aim is to initiate mobilisation for collective action, empowerment and institution building.

In recent years, there have been an increasing number of analyses of development projects showing that ‘participation’ is one of the critical components of success in irrigation, livestock, water and agriculture projects (USAID, 1987; Baker et al, 1988; Reij, 1988; Finsterbusch and van Wicklen, 1989; Bagadion and Korten, 1991; Cernea, 1991; Guijt, 1991; Pretty and Sandbrook, 1991; Uphoff, 1992; Narayan, 1993; World Bank, 1994; Pretty, 1995).

As a result, the terms ‘people's participation’ and ‘popular participation’ are now part of the normal language of many development agencies, including NGOs, government departments and banks (Adnan et al, 1992; Bhatnagar and Williams, 1992). It is such a fashion that almost everyone says that participation is part of their work. This has created many paradoxes. The term ‘participation’ has been used to justify the extension of control of the state and to build local capacity and self-reliance; it has been used to justify external decisions and to devolve power and decision-making away from external agencies; it has been used for data collection and for interactive analysis. But "*more often than not, people are asked or dragged into participating in operations of no interest to them, in the very name of participation*" (Rahnema, 1992).

One of the objectives of rural support institutions must, therefore, be greater involvement with and empowerment of diverse people and groups, as sustainable development is threatened without it. The dilemma for authorities is they both need and fear people's participation. They need people's agreements and support, but they fear that this wider involvement is less controllable, less precise and so likely to slow down planning processes. But if this fear permits only stage-managed forms of participation, distrust and greater alienation are the most likely outcomes. This makes it all the more crucial that judgements can be made on the type of participation in use.

The term participation can mean different things to different people (Ghai, 1988; Adnan et al, 1992; Pretty and Shah, 1994). In past rural development projects, participation has often centred on encouraging local people to sell their labour in return for food, cash or materials. Yet these material incentives distort perceptions, create dependencies, and give the misleading impression that local people are supportive of externally-driven initiatives. This paternalism then undermines sustainability goals and produces results which do not persist once the project ceases. As little effort is made to build local skills, interests and capacity, local people have no stake in maintaining or supporting new practices once the flow of incentives stops.

5.3 Types of Participation

Like many other areas of rural development, conservation has been characterised by very different interpretations of participation. During the colonial period, management was characterised by coercion and control, with people seen as an impediment to conservation. Later, until the 1970s, participation was increasingly seen as a `tool' to achieve the voluntary submission of people to protected area schemes. Here, `participation' was no more than a public relations exercise, in which local people were passive actors. During the 1980s, participation became increasingly defined as taking an interest in natural resource protection. And now, in the 1990s, participation is being seen by some as a means to involve people in protected area management. There has been growing recognition that, without local involvement, there is little chance of protecting wildlife. Moreover, the costs of park management are very high if local communities are not involved in caring for the environment.

Nonetheless, it is rare for professionals to relinquish control over key decisions on protected area design, management and evaluation. Participation is still largely seen as a means to achieve externally-desirable goals. This means that, whilst recognising the need for peoples' participation, many conservation professionals place clear limits on the form and degree of participation that they tolerate in protected area management. This is particularly true for strictly protected areas (National Parks, strict Wilderness Reserves and Natural Monuments) but also applies to some extent to all other protected area categories. Unlike many other forms of natural resource management, it is argued that full participation of local communities in the design and management of protected areas is difficult for two reasons.

First, it is said that protected areas are, and should be, externally managed protective regimes i.e. by the State alone or by the State in partnership with international NGOs with conservation expertise and financial resources. Second, existing management criteria emphasise that national parks and other strictly protected areas should be maintained in a natural state. Minor disturbances caused by visitors are tolerated but not the impacts caused by the livelihood activities of local communities living in and around protected areas.

Although there are many ways that development and conservation organisations interpret and use the term participation, these resolve into seven clear types. These range from passive participation, where people are involved merely by being told what is to happen, to self-mobilization, where people take initiatives independent of external institutions (Table 4). It is clear from this typology that the term ‘participation’ should not be accepted without appropriate qualification. The problem with participation as used in types 1-4 is that the "*superficial and fragmented achievements have no lasting impact on people's lives*" (Rahnema, 1992). The term participation can be employed, knowing it will not lead to action. If the objective is to achieve sustainable conservation, then nothing less than functional participation will suffice. All the evidence points towards long-term economic and environmental success coming about when people's ideas and knowledge are valued, and power is given to them to make decisions independently of external agencies.

But the dominant applications of participation are at best instrumental. A recent study of 230 rural development institutions employing some 30,000 staff in 41 countries of Africa found that people participate at different stages of the project cycle and in different ways (Guijt, 1991). External agencies rarely permitted local groups to work alone, some even acting without any local involvement. External agencies usually controlled all the funding, though some did permit joint decisions. Participation was more likely to mean simply having discussions or providing information to external agencies. Components of functional or interactive participation are seldom present.

Great care must, therefore, be taken over both using and interpreting the term participation. It should always be qualified by reference to the type of participation, as most types will threaten rather than support the goals of sustainable conservation. What is important is to ensure that those using the term participation both clarify their specific application and define better ways of shifting from the more common passive, consultative and incentive-driven participation towards the interactive end of the spectrum.

Table 3. A typology of participation (modified from Pretty, 1994).

Typology	Components of Each Type
1. *Passive Participation*	People participate by being told what is going to happen or has already happened. It is unilateral announcement by an administration or project

	management without any listening to people's responses. The information being shared belongs only to external professionals.
2. *Participation in Information Giving*	People participate by answering questions posed by extractive researchers and project managers using questionnaire surveys or similar approaches. People do not have the opportunity to influence proceedings, as the findings of the research or project design are neither shared nor checked for accuracy.
3. *Participation by Consultation*	People participate by being consulted, and external agents listen to views. These external agents define both problems and solutions, and may modify these in the light of people's responses. Such a consultative process does not concede any share in decision-making and professionals are under no obligation to take on board peoples's views.
4. *Participation for Material Incentives*	People participate by providing resources, for example labour, in return for food, cash or other material incentives. Much in-situ research and bioprospecting falls in this category, as rural people provide the fields but are not involved in the experimentation or the process of learning. It is very common to see this called participation, yet people have no stake in prolonging activities when the incentives end.
5. *Functional Participation*	People participate by forming groups to meet predetermined objectives related to the project, which can involve the development or promotion of externally initiated social organization. Such involvement does not tend to be at early stages of project cycles or planning, but rather after major decisions have been made. These institutions tend to be dependent on external initiators and facilitators, but may become self-dependent.
6. *Interactive Participation*	People participate in joint analysis, which leads to action plans and the formation of new local groups or the strengthening of existing ones. It tends to involve interdisciplinary methodologies that seek multiple perspectives and make use of systematic and structured learning processes. These groups take control over local decisions, and so people have a stake in maintaining structures or practices.
7. *Self-Mobilization*	People participate by taking initiatives independent of external institutions to change systems. Such self-initiated mobilization and collective action may of may not challenge existing inequitable distributions of wealth and power.

5.3 Alternative Systems of Learning and Interaction

There has been in recent years a rapid expansion of new participatory methods and approaches in the context of agricultural development. 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. To the wider body of development and conservation programmes, projects and initiatives, these approaches represent a significant departure from standard practice. Some of the changes underway are remarkable. In a growing number of government and non-government institutions, extractive research is being superseded by investigation and analysis by local people themselves. Methods are being used not just for local people to inform outsiders, but also for people's own analysis of their own conditions (Chambers, 1992a, b; Pretty and Chambers, 1993).

The interactive involvement of many people in differing institutional contexts has promoted innovation and ownership, and there are many variations in the way that systems of interaction have been put together. There are many different terms, some more widely used than others. Participatory Rural Appraisal (PRA), for example is now practised in at least 130 countries, but Samuhik Brahman is associated just with research institutions in Nepal.

These have drawn on many long-established traditions that have put participation, action research and adult education at the forefront of attempts to liberate and emancipate disempowered people (see Chambers 1992a; RRA Notes, *passim*; Pretty et al, 1994; Pretty, 1995). Many have developed as alternatives to questionnaire surveys. Using a formal survey with a preset questionnaire has long been the standard choice for those wishing to gather information for project design and management. The questionnaire is given to trained enumerators who interview a sample group selected from a larger population. As each informant is asked the same set of questions, it is assumed that the interviewer does not influence the process. Where the new systems of learning differ is in the emphasis on the interactive participation of all actors.

This diversity of systems of learning is a strength. Despite the different ways in which these approaches are used, there are important common principles uniting most of them (Pretty, 1994). 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. The assumption is that different individuals and groups make different evaluations of situations, which lead to different actions. 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. This implies three possible mixes of investigators, namely those from different disciplines, from different sectors, and from outsiders (professionals) and insiders (local people).

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.

[6] These systems of inquiry include, for example, Agroecosystems Analysis (AEA), Beneficiary Assessment, Diagnosis and Design (D & D), Diagnostico Rural Rapido (DRR), Farmer Participatory Research, Groupe de Recherche et d'Appui pour l'Auto-Promotion Paysanne (GRAAP), Méthode Accélérée de Recherche Participative (MARP), Naturalistic Inquiry, Participatory Analysis and Learning Methods (PALM), Participatory Action Research (PAR), Participatory Research Methodology (PRM), Participatory Rural Appraisal (PRA), Participatory Rural Appraisal and Planning (PRAP), Participatory Technology Development (PTD), Participatory Urban Appraisal (PUA), Planning for Real, Process Documentation, Rapid Appraisal (RA), Rapid Assessment of Agricultural Knowledge Systems (RAAKS), Rapid Assessment Procedures (RAP), Rapid Assessment Techniques (RAT), Rapid Catchment Analysis (RCA), Rapid Ethnographic Assessment (REA), Rapid Food Security Assessment (RFSA), Rapid Multi-perspective Appraisal (RMA), Rapid Organisational Assessment (ROA), Rapid Rural Appraisal (RRA), Samuhik Brahman (Joint trek), Soft Systems Methodology (SSM), Theatre for Development, Training for Transformation, and Visualisation in Participatory Programmes (VIPP).

[7] Strictly speaking the term `questionnaire' applies only to a form that is filled in by the respondent. Where an enumerator is employed to ask the questions and fill in the answers - as with development surveys in the Third World - the form is actually a `schedule'. Usage has by now sanctioned the use of `questionnaire' for both types of form, so this term is used here to avoid confusion (see Gill, 1993).

Facilitating Experts and Stakeholders - the methodology is concerned with the transformation of 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 may be stakeholders themselves.

Leading to Sustained Action - the learning process leads to debate about change, including confronting of the constructions of others', and this debate changes the perceptions of the actors and their readiness to contemplate action. This leads to more sophisticated and informed constructions about the world. The debate and/or analysis both defines changes which would bring about improvement and seeks to motivate people to take action to implement the defined changes. 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 action on their own.

These alternative systems of learning and interaction imply a process of learning leading to action. A more sustainable conservation, with all its uncertainties and complexities, cannot be envisaged without all actors being involved in continuing processes of learning.

In recent years, the creative ingenuity of practitioners worldwide has hugely increased the range of participatory methods in use (see *RRA Notes*, *passim*, Pretty et al, 1994; Chambers, 1992b, c; Mascarenhas et al, 1991; KKU, 1987; Conway, 1987). Many have been drawn from a wide range of non-agricultural contexts, and were adapted to new needs. Others are innovations arising out of situations where practitioners have applied the methods in a new setting, the context and people themselves giving rise to the novelty. The methods are structured into four classes, namely those for group and team dynamics, for sampling, for interviewing and dialogue, and for visualisation and diagramming. It is the collection of these methods into unique approaches, or assemblages of methods, that constitute systems of learning and interaction.

6. Challenges for a New Vision of Protected Area Management

6.1 The Need for Alternatives and Reversals

Despite their theoretical appeal, national parks and protected areas have not been models of success for long term conservation in developing countries. Perhaps most problematic has been the emphasis given to the bio-physical basis and legal status of protected areas as a means to conserve high levels of biological diversity, frequently ignoring the needs and aspirations of resource users living in and around these areas. Large sums of money have been spent in the name of conservation and environmental protection encouraging and coercing rural people to accept protected area management schemes. The result has been widespread discrediting of national parks and other protected areas in the eyes of rural people themselves. Few local communities benefit, structures rarely persist, and inadequate implementation by outside technical teams may actually cause a loss in biodiversity. Negative, coercive conservation has failed, and alternatives are needed.

These alternatives must be based on both a coherent set of ethics and draw on existing empirical experience. There are several key issues. The twin goals of long term conservation and local livelihood security are incompatible with the escalation of violence around valuable protected areas in developing countries, and with the losses of local resource control and local knowledge of resource management.

Careless conservation ideologies and policies encourage only partial recognition of the many benefits associated with protected areas. More specifically, coercive conservation that exalts the commercial and ecological values of protected areas can indirectly or directly legitimate the state's use of force and violence in natural resource management. The historical custodians of the biodiversity thus monopolised by the state or private interests are effectively excluded from enjoying the benefits of protected areas, with dire consequences for the environment and human well-being.

Only by seriously examining how local communities will tangibly and immediately benefit from conservation activities will protected areas be sustainable and cost effective. The aim is to integrate development and environment concerns by operationalising the concept of sustainable livelihoods for all. This is to be achieved through an approach that emphasises community empowerment, enabling all people to secure their basic needs and rights, and care of the environment that sustains life in all its forms.

Empirical evidence from other areas of natural resource management (forestry, agriculture, soil and water conservation) have highlighted the misfits between what normal professionals and bureaucrats perceive and do, and what poor rural people need for sustainable livelihoods. A new paradigm is clearly needed. The professional challenge for protected area management is to replace the top-down, standardised, simplified, rigid and short-term with local-level diversified, complicating, flexible, unregulated and long-term natural resource management practices.

The reversals for diversity, democracy and decentralisation which characterise this process oriented approach to biodiversity conservation are shown in Table 1. Chambers (1991) has best captured the essence of this paradigm shift: *"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, destandardising 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."*

The failures of the top-down, transfer of technology model of conservation has led some professionals to explore new approaches that hinge on people's participation. In parallel with the paradigm shift taking place in agricultural research and development (Chambers et al, 1989; Scoones and Thompson, 1994; Pretty, 1995), these participatory approaches reverse part of the mainstream conservation model. Rather than blame peoples' ignorance or local constraints for the non adoption of conservation technologies (e.g. actions to protect a biodiversity rich area), a reversal in explanation points to deficiencies in the technology and the very processes that generated it. A reversal in learning has conservation staff (project designers, donors and field extension) learning with, by and from rural people in bio-diversity rich areas. Roles and locations are also reversed, with rural people and their environments central instead of conservation headquarters offices, government departments, scientists and abstract theories. Analysis, choice, experiment, project design and evaluation are conducted by and with people themselves, with outside professionals in a facilitating and support role.

6.2 Towards A New Professionalism for Conservation

The devolution of planning, implementation, management, monitoring and evaluation of protected areas to villagers and low income groups is a frontier that needs to be explored by modern conservation organisations. People in and around protected areas should no longer be seen simply as informants, but as teachers, activists, extensionists and evaluators. These local specialists include village game wardens, beekeepers, women veterinarians, herbalists, wild food collectors, fishermen, farmers, pastoralists and so on. An emphasis on village specialists and different resource user groups allows their skills and knowledge to shape protected area management priorities.

Clearly conservation professionals and rural people both have strengths and limitations. Conservation and other professionals have advantages at two levels. At a macrolevel, computer-assisted geographic information systems can allow landscape ecologists to integrate temporal and spatial variation in ecological factors. Professionals can also rely on worldwide electronic communications networks and data banks for information exchange on fragmentation theory, landscape ecology and the fractal geometry of nature. At a micro level, conservation scientists have accurate identification techniques and taxonomic skills. They can use the instrumentation and expertise needed to understand cellular, physiological and behavioral processes. But the collective knowledge that rural people have of their watersheds, forests, rangelands, coastal strips and wetlands gives them distinct advantages at the meso-level,- where the protected area management schemes are ultimately aimed at. This is after all the ecological and social context in which rural people experiment, adapt and innovate.

What is needed is for the advantages and skills of professionals (at the micro and macro levels) should be effectively combined with the strengths of indigenous knowledge and experimentation when people are empowered by modifying conventional roles and activities.

A more decentralised approach would permit the generation of diverse, locally-negotiated conservation programmes which may be more sustainable in the long-term than current projects. Through interactive participation, people could take control over local decisions, and so have a stake in maintaining structures and conservation practices. Participation should be clearly distinguished from other, more manipulatory, practices which essentially seek to implement the agenda of outside experts (see Table 4). A high level of interactive, enabling participation also satisfies the equity criterion: it allows people to make their own demands on their national conservation organisations (public sector and NGOs alike) and introduces some measure of accountability and democratic control over conservation programmes.

Such an approach would establish and develop parks and protected areas with a view to strengthening local livelihood opportunities, and then integrate these measures with nature conservation objectives. Design and management of protected areas thus rely on participatory processes that seek to give more power to local communities. Empowerment includes forms of interactive and spontaneous participation defined in Table 4 as well as *"organised efforts to increase control over resources and regulative institutions in given social situations, on the part of groups and movements of those hitherto excluded from such control"* (UNRISD, 1979).

The central concept of a new vision for conservation and protected area management is that it must enshrine new ways of learning about the world. Learning should not be confused with teaching. Teaching implies the transfer of knowledge from someone who knows to someone who does not know. Teaching is the normal mode of educational curricula, and is also central to many organisational structures (Ison, 1990; Russell and Ison, 1991; Bawden, 1992; Pretty and Chambers, 1993). Universities and other professional institutions reinforce the teaching paradigm by giving the impression that they are custodians of knowledge which can be dispensed or given (usually by lecture) to a recipient (a student).

Professionals who are to work for conservation must be able to let go of certain ideas and adopt new ones as situations and they themselves change: *"No one learns who claims to know already in advance"* (Rahnema, 1992). But, the existing policy culture *"gives credibility to opinion only when it is defined in scientific language, which may not be adequate to describe human and social experience, and this has alienated people. This is not usually the fault of scientists themselves; it is a function of the form of science, including social science, that has been allowed to dominate"* (Wynne and Mayer, 1993).

A move from a teaching to a learning style has profound implications for conservation 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 interaction, therefore, implies new roles for conservation professionals, and these all require a new professionalism with new concepts, values, methods and behaviour (Pretty and Chambers, 1993). The challenge is to make the shift from the old professionalism to the new (Table 5).

Table 5. Conservation priorities: changing professionalism from the old to the new (modified from Pretty and Chambers, 1993)

	From the Old Professionalism	**To the New Professionalism**
Who sets priorities ?	Conservation professionals set priorities	Local people & professionals set priorities together
Conservation science and method	Scientific method is reductionist & positivist, with a strong natural science bias; complex world split into independent variables and cause-effect relationships; conservationists' categories and perceptions are central	Scientific method holistic & post-positivist; local categories and perceptions are central; subject-object and method-data distinctions are blurred
Strategy and context of intervention	Conservation 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 conservation, 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, 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 conservation interventions
Mode of working	Single disciplinary - working alone	Multidisciplinary - working in groups

Conservation technology or services	Rejected technology or service assumed to be fault of local people or local conditions ; conservation technology first	Rejected conservation technology or service is a failed technology; 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

6.3 The Existing Policy Context

The problem with existing national and international policies is that, although they may be trying to encourage conservation, they tend to do so in a way that excludes local people and leads to greater degradation (Conway and Pretty, 1991; Utting, 1993; Pretty, 1995).

Governments apply a wide range of policy instruments to their agricultural, forestry and fishery sectors. To date, these have not been used with a view to directing practices towards greater sustainability. Indeed, sometimes they have had the opposite effect. Mostly this is because policies are pursuing some other objective, such as an increase in timber exports, an increase in tourism, a growth in livestock sector, etc. Sometimes it is because their impact on the environment is not fully understood. The result is often deforestation, overgrazing, erosion and agricultural pollution. In Mexico, for example, agricultural policy encourages farmers to monocrop using modern varieties so as to raise national food production (Borowitz, 1989). Such farming inevitably leads to the loss of biological diversity and natural buffers against adversity. But to receive any government aid or support in the form of bank loans, farmers must follow the policy prescriptions.

Throughout the world, conservation policy has taken the predominant view that rural people are mismanagers of natural resources. There are great dangers in this conservation ideology. When local people reject new practices or technologies that are prescribed for them, policies have tended to shift to seeking success through the manipulation of social, economic and ecological environments. Eventually this leads to outright enforcement. This is not the basis for sustainable management of natural resources.

The central belief is that it is people who threaten conservation, and recent rapid growth of populations represents an ever increasing threat, has led to the formulation of some conservation policies that appear logical according to the conventional beliefs, but are now being revealed as badly wrong. A particularly good example comes from Nepal, where it has long been thought that a growing rural population is expanding into the forests, so causing soil to erode and threaten the floodplains of northern India and Bangladesh (Thompson et al, 1986; Ives and Messerli, 1991; Gill, 1993). This myth is widely regarded as true, yet recent examinations of the way forestry and agricultural statistics are gathered and presented suggests a very different interpretation is needed.

The facts, indeed, cannot be agreed upon: the 'scientific' estimates of fuelwood consumption in Nepal vary by a factor of 67, and those of sustainable forest production by a factor of 150. Agricultural statistics are collected in two ways, and these too give very different values for the amount of land under cultivation. Again, it is the mode of collection that determines the results. The agricultural census survey is also used for tax purposes, so farmers inevitably underestimate the amount of cultivated land. The cadastral survey, which is proceeding through

the country district by district (one each year), establishes land rights, and farmers claim every piece of village land otherwise it all goes to the Forest Department. The result is some Districts have shown 10 to 15 fold increases in cultivated area in a single year. This is clearly impossible, but as the data are aggregated across the whole country, they simply show a steady rise of crop area over many years. This has led many to believe that agriculture is expanding into the forests, so causing erosion and degradation. Policies are therefore designed to prevent this mythical expansion.

For national parks and protected area management to succeed, policy formulation must not repeat these mistakes. New policies will have to be enabling, creating the conditions for self-reliant development based more on the use of locally-available resources.

6.4 Operational Components of the Alternative Conservation Practice

Sustainable and effective protected area management calls for reversals in normal conservation professionalism and an emphasis on community-based natural resource management and enabling policy frameworks. These are not the easy options. Contemporary patterns of economic growth, of modernisation and nation building all have strong anti- participatory traits. The integration of rural communities and local institutions into larger, more complex and urban centred systems often stifles whatever capacity for decision making the local community might have had and renders its traditional institutions obsolete. So the challenges of adapting the ingredients of these community based successes to the design and management of national parks and protected areas are enormous. To achieve this, considerable attention will have to be given to the following six operational issues.

Local systems of knowledge and management. Local management systems are generally tuned to the needs of local people and often enhance their capacity to adapt to dynamic social and ecological circumstances. Although many of these systems have been abandoned after long periods of success, there remains a great diversity of local systems of knowledge and management which actively maintain biological diversity in areas earmarked for the expanding protected area network (Kemf, 1993; West and Brechin, 1992). Despite the pressures that increasingly undermine local systems of knowledge and management, protected area management plans should start with what people know and do well already, so as to secure their livelihoods and sustain the diversity of natural resources on which they depend.

Local institutions and social organisation. In developing protected area management schemes increased attention will need to be given to community-based action through local institutions and user groups. They include, for example, natural resource management groups, women's associations and credit management groups. Successful group initiatives include investing in protecting watersheds and reafforestation; organising community run wildlife management schemes; establishing small processing plants for natural products derived from the wild. Available evidence from multilateral projects evaluated 5 to 10 years after completion shows that where institutional development has been important the flow of benefits has risen or remained constant (Cernea, 1987). Past experience therefore suggests that if this type of institutional development is ignored in protected area management policies, economic rates of return will decline markedly and conservation objectives may not be met.

[8] This section draws on analyses of case studies on sustainable development at the community or neighbourhood level (PEC workshop, 1990; ; Conroy and Litvinoff,1988; Farrington et al, 1993; Bebbington et al 1993; Wellard and Copstake, 1993; Pretty and Sandbrook,1991; Pretty, 1994; Ghai and Vivian, 1992). Whilst the concepts presented here have not penetrated the harder conservation literature and everyday field conservation practices, they may provide useful pointers for protected area management in the near future.

Local rights to resources. Conservation groups have begun to realise that effective resource protection is only possible if local communities are both fully involved in protected area planning and gain direct benefits from the project. One notable success is the Arfak Mountains Nature Reserve in west Papua. This both recognises the ancestral land rights of the Hatam people, and that Indonesian law does not secure them. Although the legal definition of the area as a `Strict Nature Reserve' makes indigenous resource use theoretically illegal, the project, which has local government approval, allows local people to continue to use the area until the law is changed in their favour. Aware of the benefits, the local people have begun to act as an effective guard force for the forest reserve (Craven, 1990; Colchester, 1992). A similar community centred approach has ensured that the ancestral homes and sacred garden sites of the Kanum, Marind, Marori and Yei are now safeguarded and accessible to them in the Wasur National Park in Irian Jaya, Indonesia (Craven and Wardoyo, 1993). But it is not all plain sailing once local rights have been granted. In Papua New Guinea, for example, where collective land rights are strongly protected by law, communities have frequently negotiated away rights over their lands by leasing them to logging and mining companies. Only lately have they come to regret the damage that their environments have sustained from such activities (Colchester, 1992). One of the critical issues is that the law does not make clear who at local level has the rights to negotiate land deals, and this can mean collective ownership is undermined.

Locally available resources and technologies to meet fundamental human needs. Protected area projects seeking to provide benefits for local and national economies should give preference to informal innovation systems, reliance on local resources and local satisfiers of human needs. Preference should be given to local technologies by emphasising the opportunities for intensification in the use of available resources. Sustainable and cheaper solutions can often be found when groups or communities are involved in identification of technology needs and then the design and testing of technologies, their adaptation to local conditions and, finally, their extension to others. The potential for intensification of internal resource use without reliance on external inputs is enormous. Greater self reliance and reduced dependency on outside supplies of pesticides, fertilisers, water and seeds can be achieved within and around protected areas, by complicating and diversifying farming systems with locally available resources. Similarly, if local communities fully participate in the design, implementation and maintenance phases of projects designed to meet health, housing, sanitation, water needs and revenue generating activities (e.g. tourism), then the results are likely to be more sustainable and effective than those imposed by outside professionals.

Local participation in planning, management and evaluation. Seven different types of participation are shown in Table 4. The implication of this typology is that the meaning of participation should be clearly spelt out in all programmes. If the objective of conservation is to achieve sustainable and effective protected area management, then nothing less than functional participation will suffice. If protected area schemes are to become adaptive and participatory, this will imply significant changes in the way the `project' is conceived and organised. It "*demands questioning the whole concept of the `project'. In participatory projects, elements of the project cycle come in new and different sequences and often occur simultaneously. There is a complex and permanent interaction, identification, monitoring and evaluation, which are not divisible into neat boxes beloved of planners"* (Roche, 1992). Support is needed for learning approaches in which the main goals are qualitative shifts in the ways people and institutions interact and work together.

Process-Oriented Flexible Projects. In this new protected area management, the initial focus is on what people articulate as most important to them. This may mean embarking on tasks not central to the project's remit. After beginning, community-based conservation projects may remain small, or be combined into larger protected area programs once the participatory

procedures and processes have been fully worked out. Error is treated as a source of information and flexibility permits continuous adaptation of procedures. Local people are encouraged to develop a stake in the project goals and outcome. Indicators are developed from those most important to local communities. These are seen as milestones rather than absolute, eternally fixed and illusory targets. Innovative extension methods promote group demonstrations, visits, village level workshops, and community to community extension to achieve effective multiplication of conservation technologies, both in and around protected areas. Protected area management schemes based on this participatory, open ended approach must be of realistic lengths of time for real social development and natural resource conservation. Projects of short duration probably have a much greater chance of failure than long term projects (five to ten years or more). Donors and conservation organisations must be prepared for low initial levels of disbursement and for changes in priorities.

7. Policy Implications for Conservation Organisations, Government Agencies and Donors

7.1 Institutional Challenges

The success of community-based conservation projects depends on the behaviour and attitudes of outsiders. *"While directly repressive measures against popular participation have recurred throughout history and up to the present, the anti-participatory character of dominant ideologies has provided the most pervasive form of control, as they have moulded the attitudes of different classes and groups to one another. Hardy mental stereotypes about the innate character and propensities of social classes, castes, "races" distinguished by physical traits, and groups having cultural or religious affiliations different from those of the dominant group, have served this purpose. So have the cultural stereotypes through which most societies have maintained the subordination of women. In more subtle ways, dominant classes have glorified the heredity and processes of socialization entitling them to rule, and have consigned others to the more modest roles for which their heredity and processes of socialization qualify them"* (Stiefel and Wolfe, 1994).

The notion that educated professionals may have something to learn from the uneducated and illiterate is still sheer heresy for some. As many have not been trained to put the views of local communities before considering their own potential contributions, training and re-orientation is essential.

Promoting participation has proven difficult for organisations experienced in managing rural development projects. Even greater difficulty has been experienced by the organisations implementing Integrated Conservation and Development Projects (ICDPs). A recent analysis of 23 ICDPs in 14 developing countries, concluded that these projects had been designed without adequate understanding of the local socio-economic context. Local people have been treated as passive beneficiaries of project activities (Wells and Brandon, 1992). As yet international conservation NGOs have only limited experience in projects targeting poor rural people. National environmental NGOs also tend to lack this experience, as they were initially set up to lobby governments, raise money for the establishment of protected areas or raise conservation awareness through education programmes.

To date, there have been few systematic attempts by conservation organizations (public sector and non governmental) to adopt participatory planning methods. Moreover, among those in favour of a transfer of park management activities to local communities, insufficient attention has been given to methodological research and development that promotes genuine people participation in the conservation and sustainable use of biodiversity. And yet, recent experience shows that when outsiders behave differently and use new participatory methods, rural people

show an unexpected creativity and capacity to present and analyze information, to diagnose, plan, manage and evaluate. They know the complexity and diversity of their livelihoods and environment. They are experts on their own, immediate, realities.

This new vision for conservation implies new roles for project staff and local people in protected area management. This calls for a greater emphasis on training in communication rather than technical skills. Outside professionals must learn to work closely with colleagues from different disciplines or sectors, as well as with rural people themselves, including women and children. Judgement and interpersonal skills should be cultivated through the adoption and use of participatory methods. This may imply a significant shift in technique for conventional trainers, since training for participation must itself be participatory and action-based (Chambers, 1992a).

The challenge for top and middle management is to design appropriate institutional mechanisms and rewards to encourage the spread of participatory methods within the organisation. Without this support from the top, it is unlikely that participatory approaches which enhance local capacities and innovation will become core professional activities. They will remain isolated and marginalised within NGOs and government departments responsible for conservation programs.

Managerially, the learning process approach described in Table 3 fits the type of organisation best described as organic. Organic structures are characterised by flexible and changing definitions of roles, obligations, procedures and methods, collegial authority, and free lateral communications (Chambers, 1993). Organic organisations can adjust to changing circumstances and are more compatible with the needs and dynamics of modern conservation. The central challenge for directors and board members of public, NGO and private sector conservation organisations is to radically restructure procedures and working relationships within their organisations.

Experience shows that donor efficiency improves where intermediate organisations or federations pass on resources to the smaller, more local and more flexible organisations. Greater efficiency and effectiveness, improved cost-recovery, the ability to delegate responsibility in order to reduce dependency on expatriate staff, and fewer inappropriate interventions requiring costly repair often mean that money is better spent by international organisations. Donors may also be encouraged to fund NGOs based in their own countries. This could avoid potential political problems as local NGOs and their partners in rural areas may be in conflict with national government policies on protected areas.

Whilst organised groups within civil society hold much promise for more equitable and sustainable protected area management, the limitations of NGOs and local people's organisations must be clearly acknowledged. This is particularly important at a time when State inefficiency in programme management has been compounded by economic crises that leave public agencies even shorter of funds, and even more inefficient. Much of the enthusiasm for NGOs and local organisations has been partly motivated by crises in the State's performance over the last decades and by recent structural adjustment programs which have reduced the State's administrative capacity.

When donors have identified relatively competent NGOs for protected area management, they should, wherever possible, also encourage complementary linkages between NGOs and the public sector now forced to search for new "partners" in natural resource management. Donors will require imagination and diplomatic audacity to bring together the matching skills and complementary strengths of civil society and of a waning, but still resourceful, State. A donor's failure to do so would be an implicit acceptance of public sector retrenchments and of policies whose cumulative effect is to question the principle that the State has a responsibility to provide welfare to its citizens (Bebbington et al, 1993).

7.2 Enabling Policies for Vernacular Conservation of Protected Areas

National protected area policies must be based on an understanding that modern local environmental attitudes are in part a legacy of past people-nature interactions. This demands that policy makers and other professionals pay serious attention to ecological and social history.

This policy imperative is particularly well highlighted in the case of Guinea's Ziama forest reserve (Fairhead and Leach, 1994). The Ziama forest in Guinea is considered by conservationists as a relic of the diminishing Upper Guinean forest. It was designated a forest reserve in 1932 and then made into a Biosphere reserve in 1981. Rare animals and birds of Ziama, including the forest elephant, pygmy hippopotamus, zebra duiker, bongo, golden cat, yellow throated olive greenbul and the bald-headed rock fowl have also been publicised to attract international concern and funding. However, in valuing the apparently `pristine' characteristics of the forest, modern conservationists overlook its long history of influence by people. Whilst often portrayed as being at risk of clearance for the first time under modern demographic pressures, the Ziama forest biosphere was, in fact, one of the most populous and agriculturally prosperous parts of the Upper Guinean region in the mid-nineteenth century. Like many other African forests, Ziama is not an ancient relic of a forgotten past.

Fairhead and Leach (1994) argue that *"the mismatch between the locally lived history that has shaped local priorities and conservationists' representations of it is extraordinary. The local antagonism towards the reserve which has built since its establishment cannot be understood or addressed outside this historical context".* As the senior most elder of the region says: *"This forest problem is complicated. If you see that we no longer have control over the forest, it is because of the forest agents who come with their papers and delimit the forest. If we are given responsibility for the forest, we are ready to act in the interests of conservation... If we had full responsibility for the management of the forest, we could give you the assurance of protecting it. But as long as control is left in the hands of the State, we can do nothing"* (quoted in Fairhead and Leach, 1994).

`Participatory' protected area management will not prove possible unless such historical claims to land and political authority are high up on the agenda. Following the recommendations of the village elders, policy makers will need to consider conservation agreements that cede tenurial control to local landholders, within the context management agreements that fully recognise the value their lands now have for others.

Without secure rights of access to protected area resources, rural communities will always consider parks and other protected areas as lost village resources that are not worth caring for in the long term. Protected area policies will therefore need to be reformed to allow indigenous peoples and other rural communities to play a more central role in determining what is conserved, how and for whom. This implies that ancestral land claims be legally recognised and that indigenous communities be provided with effective control over the natural resources contained in national parks and all other protected area categories.

However, the CNPPA's recently revised protected area categories remain firmly rooted in the western tradition of scientific conservation based on strictly protected areas and wildlife management regimes (institutional conservation). Other traditions of vernacular conservation

are neither embodied in CNPPA's new classification nor enshrined in current protected area policies. Vernacular conservation is based on site specific traditions and economies; it refers to ways of life and resource utilisation that have evolved in place and, like vernacular architecture, is a direct expression of the relationship between communities and their habitats (Poole, 1993).

Some indigenous peoples and rural communities have established protected areas that resemble the parks and reserves codified in the CNPPA's system and in national protected area policies. In Ecuador, for example, the Awa have spontaneously decided to establish conservation areas. They have secured rights over a traditional area, which has been designated the Awa Ethnic Forest Reserve (Poole, 1993). Sacred places such as the Loita Maasai's forest of the lost child in Kenya (Loita Naimana Enkiyio Conservation Trust, 1994) are also widespread forms of vernacular conservation.
However, the similarities between vernacular and institutional models of conservation obscures the fact that motivations for setting up such areas are quite distinct from those leading to national parks, even though the ultimate contribution to biodiversity conservation may be identical. The crucial distinction is that such areas are established to protect land for rather than from use; more specifically for local use rather than appropriation and exploitation by outside interests. To support vernacular conservation, the CNPPA's categories will need to be reformed to acknowledge peoples' own definitions of what constitutes a protected area and how it should be managed.

7.3 Enabling Policies for Local Action

The success of people-oriented conservation will hinge on promoting socially differentiated goals in which the differing perspectives and priorities of community members, and local communities and conservationists, must be negotiated. Signed agreements between conservation professionals and local community organisations could promote responsible and accountable interaction. In the case of indigenous peoples, national protected area policies need to be brought in line with internationally recognised human rights: they should allow indigenous peoples to represent their own interests through their own organisations and not through consultative processes controlled by conservation organisations. International law and other agreements already provide clear principles which professionals working for conservation should observe in dealing with indigenous peoples such as ILO 169, Chapter 26 of Agenda 21 of the UNCED agreements and parts of the Biodiversity Convention (Colchester, 1994).

However, in many instances, meaningful changes may only come about as a result of strong popular mobilisation at the local level in favour of greater access to resources within protected areas. The establishment of a nature reserve by the Kuna Indians in Panama, during the early 1980s, highlighted the crucial role of grassroot mobilisation and organisation in ensuring that conservation initiatives serve the interests of local people (Utting, 1994). A proposal for local participation has also recently come about following action of Gujjar inhabitants over the proposed Rajaji National Park in Uttar Pradesh, India (Box 3). In seeking a new deal, excluded groups like the Kuna Indians and the Gujjars confront social arrangements that determine patterns of access to resources. The encounter sequences include many continually changing forms of interaction, from mutual accommodation between power holders and the disadvantaged, through forms of bargaining, persistent friction and informal political skirmishing, through armed confrontation and violent repression of the weaker groups by the local or national power holders.

The goal of these grassroots initiatives is *"not to conquer or vanquish the state but to forge selective alliances with parts of the state and its bureaucracy while avoiding new clientelistic constraints. Such successful political action would gradually lead to what the excluded would*

view as a `better' state, one where their claims and interests are taken more seriously and where the authorities may be willing to tip the balance of power in their favour.... In the last analysis, there may be no alternative to the joint efforts of a reformist state and a reinvigorated and organised civil society in which the excluded can make their voices heard" (Stiefel and Wolfe, 1994).

BOX 3. The Gujjars of the Rajaji national park have put forward a proposal for managing the park.

India's Wildlife Act. of 1972, and its amendment in 1991 eroded the Gujjars' traditional right to graze their cattle in the forest and gather minor forest produce. Van Gujjars of the proposed Rajaji national park in Uttar Pradesh have asserted their right over the forest in no uncertain terms. Though faced with eviction from their traditional forest huts, they have refused to budge and have gone a step further by demanding a say in the park's management.

The Gujjars say they will then shoulder the responsibility of regenerating the forest, protecting the core areas and guarding against poaching and timber smuggling. They will pay higher taxes by giving the government the money they currently spend as bribes. In return, they want a proportion of what the government spends on the park's bureaucracy. They say the government can also set feasible biological goals, which they will achieve within a reasonable stipulated time.

A group of non-governmental organisations (NGOs), under the initiative of the Rural Litigation and Entitlement Kendra (RLEK) and the Centre for Science and Environment (CSE), have jointly endorsed the involvement of the Gujjars in the management of Rajaji National Park. NGOs have lauded this as a model for park management across India because it involves local communities in the sustainable management of natural resources. C R Bijoy, a social activist from Coimbatore, *says "while each of the sanctuaries and regions have unique characteristics, a beginning has to be made in suggesting a clear alternative model for conservation. The Gujjars have indeed set a unique example."*

Source: Cherail, 1993

If a national or local government wants to involve people in the management of protected areas will need to review the legal basis for such an involvement. There are a variety of legal arrangements that can be introduced by government to assure local control over resources. The range of choices is not limited to private property of land: communal property of land and/or resources are often more culturally appropriate options in much of the developing world (Bromley and Cernea, 1989). Where local communities have been granted secure usufruct rights over neighbouring forests, governments have witnessed clear reversals in forest degradation and its associated biodiversity (Fortmann and Bruce, 1988). As VK Bahuguna recently (1992) put it *"The only solution to the present day crisis of depletion of forest resources, and the circumstantial alienation of people, is to opt for people's forests by involving local people in forest protection and development".*

The key activity at the local level is the establishment of local rules for the protection and conservation of natural resources. These rules, with the necessary local institutions, are the foundation for sustainable development. A sense of the types of local rules developed by the forest protection committees in India can be gained from the following quotes by villagers. *"It*

was resolved by the committees that all those areas where the trees are marked with red paints along the boundary are closed for grazing and hence all of us unanimously resolve not to take our cattle for grazing in these areas, nor allow the villages of other villagers to do so. We shall keep our cattle at home and all cases of violation would be reported to the forest officer". For the protection of trees *"it was unanimously resolved that we shall not girdle any tree nor allow others to do so. We shall have some strict watch over illegal cutting of trees".* For goats *"it is resolved that all those villagers who are having goats with them must sell them within a period of 3 days, otherwise action will be taken"*. As for firewood, *"no villager would carry the fuelwood head load for sale outside the village. The defaulters would be charged Rs.51 per head load"* (in Bahuguna, 1992).

In some cases, social fines have been imposed not only on villagers but also on forest guards, and in others, communities have taken action on social issues, punishing for anti-social drinking and abuse. In Madhya Pradesh, the benefits have included improvements in fuelwood, grass and crop yields; reduced poaching of elephants and other animals; changed relations between forest officials and local people; and the creation of democratic local organisations (Bahuguna, 1992).

7.4 Conditions for Joint and Co-Management Partnerships

Enabling legal arrangements for communal access to biological resources are an essential starting point for co-management arrangements between governments and local communities. The concept of joint or co-management grew out of a recognition that centralised forms of control over resources have failed to halt resource degradation in many countries, and that local level (village or user group level) control may be more effective where there is local vested interest in exercising management control. Joint management means the management of resources by the sharing of products, responsibilities, control and decision making authority between the local users and the government agencies. At the heart of co-management is some form of negotiated contract which specifies the distribution of authority and responsibility among the major parties to the contract. Joint management recognises the capacity of local resource users to be active partners (usually with government) in a power sharing arrangement. In this way, both the government's policy objectives and local peoples' use requirements have better chances of being met (Pye-Smith and Borrini, 1994).

By combining formal ownership by the government with people's security of access through time, these co-management schemes are well suited for the effective and sustainable management of protected areas,- in forests, wetlands, coastal areas, mountains, grasslands and other biodiversity rich ecosystems. One example comes from Uganda: two years after the National Park service granted rights of access to beekeeepers in one of the country's parks, local involvement in resource management and stewardship has already begun to benefit both people and wildlife. Joint forest management, participatory rural appraisal and visual communication techniques are used with communities to set up multiple-use areas and the sustainable harvesting, utilisation and monitoring of species in Bwindi Impenetrable National Park, in south west Uganda (Wilde, 1994).

Governments have much to gain by decentralising control and responsibility for protected area management. Such protection is likely to be more cost effective and sustainable when national regulatory frameworks are left flexible enough to accommodate local peculiarities. However, local control and secure access to protected area resources will not, in and by themselves, enable local communities to fully benefit from, and care for, biodiversity rich sites. Governments will also need to pay attention to other requirements for effective and sustainable protected area management at the local level.

In addition to security of tenure and access, local communities must have the right to retain their knowledge about biological and genetic resources in and around protected areas. They should be able to access all the information about the medicinal plants and other biological material they manage in protected areas. They will also need funds, if they are to develop their biological resources in and around protected areas. Local communities must also be free to develop their own technologies and to take advantage of other technologies they find useful. Lastly, recognising that biological resources, information, funds and technologies function within cultural and marketing systems, a further requirement is for local communities to exercise their right to choose and retain those systems that best meet their needs.

The devolution of protected area management to local communities does not mean that state agencies have no role. A central challenge will be to find ways of allocating limited government resources so as to obtain widespread replication of community initiatives in protected area management. Honouring local intellectual property rights, promoting wider access to biological information and funds, designing technologies, markets and other systems on the basis of local needs and aspirations call for new partnerships between the state, rural people and the organisations representing them.

Building appropriate partnerships between states and rural communities requires new legislation, policies, institutional linkages and processes. It requires the creation of communication networks and participatory research linkages between the public sector, NGOs and rural people involved in protected area management. Such changes will not come about simply through the increased awareness of policy makers and professionals. They will require shifts in the balance of social forces and power relations.

Institutional frameworks should thus ensure support for community participation and governance. All community members need to be able to play a role in decision-making that affects livelihoods. In particular decisions over access, control and management of common resources. This implies the right to set up community gatherings and organisations. Women must be able to fully participate in these processes as environmental managers for the benefit of themselves, their households and the whole community. Public sector professionals should be encouraged to use enabling participatory methods through exposure to participatory training workshops and appropriate rewards.

Legal frameworks should focus on the granting of rights, access and security of tenure to farmers, fishermen, pastoralists and forest dwellers. This is essential for the poor to take the long term view. Similarly, the application of appropriate regulations to prevent pollution and resource degrading activities is essential to control the activities of the rich and powerful e.g timber and mining companies. Economic policies should include the removal of distorting subsidies that encourage the waste of resources; targeting of subsidies to the poor instead of the wealthy, who are much better at capturing them; and encourage resource enhancing rather than degrading activities through appropriate pricing policies.

How far governments can be encouraged to create this enabling context for protected area management depends on circumstances. This is clearly a problem where governance is not democratic and where reliance on strongly coercive conservation is the norm. Moreover, *"governments are not neutral administrative bodies but political expressions of dominant social forces, and the poor and excluded are not part of these ruling forces and alliances unless, briefly, in revolutionary political conjunctures. Quite naturally, governments tend thus to resist any policy that entails dilution of power and above all participatory approaches that aim to empower the hitherto excluded"* (Stiefel and Wolfe, 1994, our emphasis).

Nonetheless, when empowerment of local communities is a political priority, then the successes that have followed are significant. These include:

- reduced environmental degradation;
- more efficient use of resources;
- reduced dependency on external resources;
- reversing of migration patterns;
- enhanced livelihood security, particularly in resource poor areas; and
- increased human capacity for conservation.

In practical terms, local empowerment and popular participation can generate more productive means of livelihood and, through local control and co-management agreements, maintain `protected areas' that the State currently manages inefficiently or can no longer afford.

9. Concluding Remarks: Emerging Constraints and Opportunities

Although a significant proportion of the world's biological diversity is increasingly conserved in situ in national parks and other protected areas, there are emerging constraints that may prevent the development of joint- or co-management schemes. The role and importance of protected area networks in national economies are changing as genetic resources increasingly acquire market value.

Governments of biodiversity-rich countries are now beginning to make bilateral agreements with foreign research institutes and multinational corporations to organise the collection, identification and the exploitation of useful genes in the fauna and flora of protected areas. Such agreements have already been signed between Glaxo and Ghana, between U.K. research institutes and Cameroon as well as by Novo Industry and the government of Nigeria. The pharmaceutical company Mercks has recently signed a 5-year contract with Costa Rica's National Biodiversity Institute (INBio). Mercks pays for its prospection rights (US$ 1 million) and has agreed to share royalties on sales of products derived from useful genes identified in Costa Rica's protected areas. Many more bilateral agreements of this type are reported by Reid et al (1993).

The subsistence values of protected areas may be further marginalised by the potential commercial values of genetic resources which government and local elites can more readily benefit from, with or without international help. Patenting regimes and other intellectual property rights enable industrial users to protect and profit from technological innovations based on the use of these genetic resources. Conversely, the knowledge and informal innovations of local people in conserving and extending the genetic diversity of species with medicinal or agricultural values may not be compensated for, as has been the case up till now (Crucible Group, 1994).

As the capacities of developing country governments become increasingly undermined by structural adjustment programs, diminishing aid and worsening terms of trade, the tendency is to continue to use the existing conservation paradigm. This emphasises the ecological and commercial values of biodiversity and only secondarily, if at all, the subsistence values on which local livelihood security depends. As a result, coercive conservation strategies, backed by outside private interests and careless ideologies, may be further extended to preserve wildlife for tourism and `scientific research'. These trends may serve both the economic and political interests of developing country governments but the long term effectiveness of this conservation strategy is as questionable as the ethics of its militaristic approach (Peluso, 1993).

Despite their theoretical appeal, national parks and protected areas have not been successful instruments for long term conservation in developing countries. There has been little or no involvement of local communities in the management of national parks and other protected areas. Large sums of money have been spent in the name of conservation and environmental protection encouraging and coercing people to accept protected area management schemes. The result has often been widespread discrediting of national parks and protected areas in the eyes of rural people themselves. Few local communities benefit, structures rarely persist, and inadequate implementation by outside technical teams ultimately undermines both long term conservation and livelihood security, in and around protected areas.

Sustainable and effective protected area management calls for reversals from the normal: for diversity, democracy and decentralisation. The vision for conservation presented here would establish and develop parks and protected areas with a view to strengthening local livelihood opportunities, and then integrate these measures with nature conservation objectives. This new paradigm asserts that the multiple livelihood activities of rural communities are not necessarily incompatible with the conservation of biological diversity. Indeed, under certain conditions, community participation in natural resource management can help maintain and actually enhance the diversity of nature in and around protected areas.

Popular participation in defining what constitutes a `protected area', how it should be managed, and in whose interests, implies a shift from the more common passive, consultative and material-driven participation to more interactive and genuinely empowering forms of participation. Genuine people's participation in the conception, design, management and evaluation of protected areas imply new roles for conservation professionals and other outsiders. These new roles all require a new professionalism with new concepts, values, methods and behaviour. Enabling policies are also needed to provide favourable conditions and appropriate forms of support for local initiatives in protected area management.

In this context, participation involves far more than the active and willing involvement of local people in the conception, design, implementation, management and review of protected areas. It is primarily about empowerement,- the organised efforts of marginalised groups within civil society to transform patterns of resource allocation and increase their control over material resources and decision-making processes. Empowerement often necessitates the creation of new forms of socio-economic or socio-political organisations that are more more representative and accountable than the traditional ones. Strong community organisation and mobilisation are also features of a participatory process that seeks to ensure that conservation initiatives serve the interests of local people.

The challenges of adapting the ingredients of participatory, community based successes to the design and management of national parks and other protected areas are therefore enormous. But it would be socially irresponsible not to pursue actively this approach in contexts where rural people directly depend on biological diversity and natural resources for their food, health, fuel, shelter, and cultural needs. Without participatory, learning-centred approaches that support local livelihood interests in protected area management, it is likely that conservation will further aggravate resource degradation, economic deprivation, social tension and loss of biological diversity.

Naturally, governments will tend to shy away from the power implications of participation and from approaches that seek to empower the hitherto excluded. But the increasing magnitude of environmental problems, the continued inability of governments to manage natural resources, and increasing international advocacy for sustainable development could make governments more open to participatory protected area management. International conservation organisations have a unique responsibility in this context. Through their political and financial influence they

can encourage policy changes by openly supporting indigenous and rural peoples' rights to their lands, instead of supporting the actions of elites.

The inherent contradictions between State control and autonomous participation will best be resolved through jointly negotiated agreements between governments and local communities. National parks and other protected areas, including their vernacular definitions, could be managed under agreements between governments and rural communities. The jointly negotiated co-management schemes would establish mutually agreed processes to achieve both long-term conservation goals and livelihood security. Elements of these agreements could include government assistance for strong defence against powerful outside interests, such as cattle ranchers, mining and timber companies. The co-management agreements could also cover technical assistance from conservation biologists for monitoring and advice, and perhaps trust funds and local credit systems set up to improve access to health care, education and other locally defined community improvements.

It is this new vision for protected areas, in which conservation professionals and local people `participate' together in joint or co-management, that will lead to greater conservation. It will require great changes in professionals, policies and institutions. Local people, biodiversity and natural resources depend on these changes.

BIBLIOGRAPHY

Adams, J.S. and Thomas O. McShane (1992)
The Myth of Wild Africa: Conservation without Illusion, W.W. Norton and Co., New York, London.

Adnan, S., A. Barrett, S.M. Nurul Alam, and A. Brustinow (1992) **People's Participation. NGOs and the Flood Action Plan**, Research and Advisory Services, Dhaka.

Agarwal, A. and S. Narain (1989)
Towards Green Villages, Centre for Science and the Environment, New Delhi.

Alcorn, Janis B., (1994)
"Noble savage or noble state?: northern myths and southern realities in biodiversity conservation", **Etnoecologica**, 3: 7-19.

Amend, S. and T. Amend, (1992)
"Espacios sin habitantes?: parques nacionales de America del Sur", Editorial, **Nueva Sociedad**, Caracas.

Anderson, D. (1984)
"Depression, Dust Bowl, Demography, and Drought: the Colonial State and Soil Conservation in East Africa During the 1930s", **African Affairs,** 321-343.

Anderson, D. and R. Grove (1987)
Conservation in Africa: People, Policies and Practice, Cambridge University Press, 355 pp.

Anderson, A.B., P.H. May and M.J. Balick (1991)
The Subsidy from Nature: Palm Forests, Peasantry and Development of an Amazonian Frontier, Columbia University Press, New York, NY.

Anderson, A. B. and D.A. Posey (1989)
Management of a Tropical Scrub Savanna by the Gorotire Kayapò of Brazil, **Advances in Economic Botany** 7: 159-173.

Apffel Marglin, F. and P.C. Mishra (1993)
"Sacred groves: Regenerating the Body, the Land, the Community", in Sachs, W. (ed.) **Global Ecology. A New Arena of Political Conflict**, Zed Books, London.

Arthur, B. (1989)
"Competing Technologies, Increasing Returns and Lock-In by Historical Events: the Dynamics of Allocation Order Increasing Returns", **Economic Journal**, 99, 116-131.

Bahuguna V.K. (1992)
Collective Resource Management. An Experience of Harda Forest Division, Regional Centre for Wastelands Development, Bhopal.

Baker, G., H.C. Knipscheer and Neto J. de Souza (1988)
"The Impact of Regular Research Field Hearings (RRFH) in On-Farm Trials in Northeast Brazil", **Experimental Agriculture** 24, 281-288.

Bawden, R. (1991)
"Systems Thinking and Practice in Agriculture", **Journal of Dairy Science**, 74: 2362-2373

_____ (1992)
Creating Learning Systems: a Metaphor for Institutional Reform for Development, paper

prepared for joint IIED/IDS Conference, Beyond Farmer First: Rural People's Knowledge, Agricultural Research and Extension Practice, IIED, London, 27-29 October 1992.

Bebbington, A. and G. Thiele with P. Davies P, M. Prager and H. Riveros (1993)
Rethinking Roles in Sustainable Agricultural Development. Non-Governmental Organizations and the State in Latin America, Routledge, London.

Beinart, W. (1984)
"Soil erosion, Conservationism and Ideas About Development: a Southern African Exploration, 1900-1960", **Journal of Southern African Studies,** II, 52-83.

Benkhe, R. and I. Scoones (1991)
Redefining Range Ecology. Drylands Programme, IIED, London.

Bhatnagar, B. and A. Williams (1992)
Participatory Development and the Worl Bank: Potential Directions for Change, World Bank, Washington, D.C.

Bookchin, M. (1990)
Remaking Society: Pathways to a Green Future, South End Press, 222 pp.

Borowitz, S. (1989)
"Lessons from a Traditional Agroecosystem", **The Cultivar**, 7 (1): 1-4.

Botkin, D.B. (1990)
Discordant Harmonies: A New Ecology for the Twenty-First Century, Oxford University Press, New York.

Bromley, D.W. and M.M. Cernea (1989)
The Management of Common Property Natural Resources, Discussion paper no 57, The World Bank, Washington D.C.

Campbell A. (1994)
Participatory inquiry: beyond research and extension in the sustainability era, paper for International Symposium Systems-Oriented Research in Agriculture and Rural Development, Montpelier, France, 21-25 Nov. 1994.

Cernea, M.M. (1987)
"Farmer Organisations and Institution Building for Sustainable Development", **Regional Development Dialogue**, 8, 1-24.

_____ (1991)
Putting People First, Oxford University Press, Oxford. 2nd Edition.

_____ (1993)
"Culture and Organisation: The Social Sustainability of Induced Development", **Sustainable Development**, 1(2) 18-29.

Chambers, R. (1991)
Farmers' Practices, Professionals and Participation: Challenges for Soil and Water Management, paper for the 1991 workshop on Farmers' Practices and Soil and Water Conservation Programmes, Hyderabad, ICRISAT, June 1991.

_____ (1992a)
"The Self-Deceiving State: Psychosis and Therapy", **IDS Bulletin** 23 (4): 31-42, Brighton.

_____ (1992b)
Methods for Analysis by Farmers: the Professional Challenge, paper for 12th Annual Symposium of Association for FSR/E, Michigan State University, Sept 13-18 1992.

_____ (1992c)
Rural Appraisal: Rapid, Relaxed and Participatory, IDS Discussion Paper 311, IDS, Brighton.

_____ (1993)
Challenging the Professions: Frontiers for Rural Development, Intermediate Technology Publications, London

Chambers, R., A. Pacey and L.A. Thrupp (eds.) (1989)
Farmer First: Farmer Innovation and Agricultural Research, Intermediate Technology Publications Ltd., London.

Chandrakanth, M.G. and J. Romm, (1991)
"Sacred Forests, Secular Forest Policies and People's Actions", **Natural Resources Journal**, 31 (4): 741-756.

Chase, S. (ed.) (1991)
Defending the Earth: a Dialogue between Murray Bookchin and Dave Foreman, Boston, South End Press.

Chatterjee, P. (1994)
Biodiversity for Sale, **Bankcheck,** January issue pp.3,23.

Checkland, P.B. (1981)
Systems Thinking, Systems Practice, John Wiley, Chichester.

Cherail, K. (1993)
"Time to Change: Wildlife Conservation Strategy", **Down to Earth**, 2 (13): 5-9.

CNPPA, (1993)
Parks for Life, Report of the IVth World Congress on National Parks and Protected areas, edited by J. McNeely, IUCN, Geneva.

Colchester, M. (1992)
Sustaining the Forests: the Community-based approach in South and South-East Asia, Discussion Paper 35, United Nations Research Institute for Social Development, Geneva.

Colchester, M. (1994)
Salvaging Nature: Indigenous Peoples, Protected Areas and Biodiversity Conservation. UNRISD/World Rainforest Movement/WWF-International discussion paper, UNRISD, Geneva.

Conroy, C. and M. Litvinoff (1988)
The Greening of Aid, Earthscan Publications Ltd, London.

Conway, G.R. (1987)
"The Properties of Agroecosystems, **Agricultural Systems** 24, 95-117.

Conway, G.R. and J.N. Pretty (1991)
Unwelcome Harvest: Agriculture and Pollution, Earthscan Publications Ltd.

Craven, I. (1990)

Community Involvement in Management of the Arfak Mountains Nature Reserve, WWF (Indonesia), Jakarta.

Craven, I. and W. Wardoyo (1993)
"Gardens in the Forest", in E. Kemf (ed.),**Indigenous Peoples and Protected Areas. The Law of Mother Earth**, Earthscan Publications Ltd, London.

Crucible Group, (1994)
Patents, Plants and People: The Impact of Intellectual Property on Agricultural Biodiversity, Conservation, Trade and Rural Society, IDRC, Canada.

Cunningham, A.B. (1990a)
People and Medicines: the Exploitation and Conservation of Traditional Zulu Plants, proceedings of the 12th plenary meeting of AETFAT. Mitt. Indt. Allb. Bot., Hamburg.

_____ (1990b)
"Income, Sap Yield and Effects of Sap Tapping on Palms in South-Eastern Africa", **S. Affrican J. Bot.** 56(2), 137-144

Darwin, C. (1859)
The Origin of Species, London.

Dei, G.J.S. (1989)
"Hunting and Gathering in a Ghanaian Rain Forest Community", **Ecology of Food and Nutrition**, 22: 225-243.

Denevan, W.M. (1992a)
The Native Population of the Americas in 1492 (2nd edition), Madison. University of Wisconsin Press.

_____ (1992b)
"The Pristine Myth: the Landscape of the Americas in 1942", **Annals of the Association of American Geography**, 82: 369-85.

DENR, (1992)
The Nipas Law: a Primer, Department of Environmment and Natural Resources/Conservation International/Foundation for Sustainable Development Inc., Manila.

Devall, B. and G. Sessions, (1985)
Deep Ecology, Peregrine Smith, Salt Lake City.

De Waal, A. (1989)
Famine That Kills: Darfur, Sudan, 1984-1985, Clarendon Press, Oxford.

Dickson, D. (1984)
The New Politics of Science Pantheon books, New York.

Dinerstein, E. and E.D. Wikramanayake (1992)
"eyond "hotspots": How to Prioritise Investments to Conserve Biodiversity in the Indo-Pacific Region" **Conservation Biology**, 7 (1): 53-65.

Drake, J.A., T.E. Flum, G.J. Witteman, T. Voskuil, A.M. Hoylman, C. Creson, D.A. Kenny, G.R. Huxel, C.S Larue and J.R. Duncan (1993).
"The Construction and Assembly of an Ecological Landscape", **Journal of Animal Ecology**, 62:117-130.

Dubois J.C.L. (1990)
"Secondary Forests as a Land-Use Resource in Frontier Zones of Amazonia", in A.B. Anderson (ed.) **Alternative to Deforestation: Steps toward Sustainable Use of the Amazon Rainforest**, Columbia University Press, New York, NY.

Eisner, E.W. (1990)
"The Meaning of Alternative Paradigms for Practice", in Guba, E.G. (ed.) **The Paradigm Dialog**, Sage Publications, Newbury Park.

Fairhead, J. and M. Leach (1994)
"Contested Forests: Modern Conservation and Historical Land Use in Guinea's Ziama Reserve", **African Affairs** (in press).

Farrington, J., A. Bebbington, K. Wellard, and D.J. Lewis (1993) **Reluctant Partners? Non Governmental Organisations, the State and Sustainable Agricultural Development**, Routledge, London.

Farrington, J. and D.J. Lewis with S. Satish and Aurea Miclat-Teves (1993)
Rethinking Roles in Sustainable Agricultural Development: Non-Governmental Organizations and the State in Asia, Routledge, London.

Finsterbusch, K. and W.A. van Wicklen (1989)
"Beneficiary Participation in Development Projects: Empirical Tests of Popular Theories", **Economic Development and Cultural Change**, 37 (3) 573-593.

Fleuret A. (1979)
"The Role of Wild Foliage Plants in the Diet: a Case Study from Lushoto, Tanzania", **Ecology of Food and Nutrition** 8: 87-93.

Foreman, D. (1987)
"A Modest Proposal for a Wilderness System, **Whole Earth Review**, 53: 42-45.

Fortmann, L. and J.W. Bruce (eds.) (1988)
Whose Trees? Proprietary Dimensions of Forestry, Westview Press, Boulder.

Foster, D.R. (1992)
"Land Use History (1730-1990) and Vegetation Dynamics in Central New England", USA. **Journal of Ecology**, 80:753-772.

Foster, D.R., Z. Zebryk, P. Schoonmaker, and A. Lezberg (1992) "Post Settlement History of Human Land Use and Vegetation Dynamics of a Tsuga Canadensis (hemlock) Woodlot in Central New England", **Journal of Ecology**, 80: 773-786.

Fowler, C. and P. Mooney (1990)
The Threatened Gene: Food, Policies and the Loss of Genetic Diversity, The Lutterworth Press, Cambridge.

Fürer-Haimendorf, C. von (1986)
Statement to the Fourth International conference on Hunting and Gathering Societies, London, 8-13 September.

Gadgil, M. (1992)
Conserving Biodiversity as if People Matter: a Case Study From India, **Ambio** 21 (3), 226-270.

Gadgil, M. and R. Guha (1992)
This Fissured Land -- An Ecological History of India, Oxford University Press, Delhi, Oxford, Melbourne.

Ghai, D. (1988)
Participatory Development: Some Perspectives From Grass-Roots Experiences, Discussion Paper No. 5, UNRISD, Geneva, 32pp.

Ghai, D. and J. Vivian (eds.) (1992)
Grassroots Environmental Action - People's Participation in Sustainable Development, Routledge and UNRISD, 351 pp.

Ghimire, K. (1992)
Parks and People: Livelihood Issues in National Parks Management in Thailand and Madagascar, UNRISD Discussion Paper 29, Geneva.

Gichuki, F N. (1991)
"Conservation Profile", **Environmental Change and Dryland Management in Machakos District, Kenya 1930-90**, ODI Working Paper 56, ODI, London.

Giddens, A. (1987)
Social Theory and Modern Society, Blackwells, Oxford.

Gill, G. (1993)
"OK, the Data's Lousy, But It's All We've Got (Being a Critique of Conventional Methods)", **Sustainable Agriculture Programme Gatekeeper Series** SA36, IIED, London.

Gomez, M. I. (1988)
"A Resource Inventory of Indigenous and Traditional Foods in Zimabawe", **Zambezia** XV (i): 53-73.

Gomez-Pompa, A. (1987)
"On Maya Silviculture", **Mexican Studies**, 3: 1-17.

Gomez-Pompa A. and A. Kaus (1992)
"Taming the Wilderness Myth", **Bioscience**, 42(4): pp 271-279.

Guha, R. (1989)
"Radical American Environmentalism and Wilderness Preservation: A Third World Critique", **Environmental Ethics**, 11: 71-83

_____ (1993)
"Two Phases of American Environmentalism: A Critical History", in Appfel Marglin, F. and S.A. Marglin (eds.), **Decolonising Knowledge: From Development to Dialogue**.

Guijt, I. (1991)
Perspectives on Participation, IIED, London.

Habermas, J. (1987)
The Theory of Communicative Action, Volume II, Heinneman, London

Harlan, J.R. (1989)
"Wild-Grass Seed Harvesting in the Sahara and Sub-Sahara of Africa", in Harris, D.R. and G.C. Hillman (eds.), **Foraging and Farming: The Evolution of Plant Exploitation**, One World Archaeology-B, Unwin Hyman, London.

Headley, J C. (1985)
"Soil Conservation and Cooperative Extension", **Agricultural History**, 59, 290-306.

Hildyard, N. (1993)

"Foxes in Charge of the Chickens", in Sachs, W. (ed.), **Global Ecology -- A New Arena of Political Conflict**, Zed Books, London.

Hobbs, R.J. and L.F. Huennekke (1992)
"Disturbance, Diversity and Invasion: Implications for Conservation", **Conservation Biology** 6, 3240.

Hudson, N. (1989)
A Study of the Reasons for Success or Failure of Soil Conservation Projects, FAO, Rome.

Hviding, E. and G.B.K. Baines (1992)
"Fisheries Management in the Pacific: Tradition and Challenges of Development in Marovo, Solomon Islands", Discussion Paper No.32, UNRISD, Geneva, 23pp.

Iltis, H.H. (1988),
"Serendipity in the Exploration of Biodiversity: What Good are Weedy Tomatoes?", in Wilson, E.O. (ed.), **Biodiversity**, National Academy Press, Washington, DC.

Irvine, F.R. (1952)
"Supplementary and Emergency Food Plants of West Africa", **Economic Botany**, Lancaster 6(1):23-40.

Irvine, D. (1989)
"Succession Management and Resource Distribution in an Amazonian Rain Forest, **Advances in Economic Botany**, 7:223-237, 1989.

Ison, R. (1990)
Teaching Threatens Sustainable Agriculture, Sustainable Agriculture Programme Gatekeeper Series SA21, IIED, London.

IUCN (1986)
Managing Protected Areas in the Tropics, Gland, Switzerland

_____ (1994)
Guidelines for Protected Area Management Categories, IUCN Commission on National Parks and Protected Areas. IUCN, Gland, Switzerland.

Ives, J.D. and B. Messerli (1989)
The Himalayan Dilemma: Reconciling Development and Conservation, Routledge, London.

Janzen, D. (1986)
"The Future of Tropical Ecology", **Annual Review of Ecology and Systematics**, 17: 305-306.

Juma, C. (1989)
Biological Diversity and Innovation: Conserving and Utilizing Genetic Resources in Kenya, African Centre for Technology Studies, Nairobi, Kenya.

Kemf, E. (ed.) (1993)
Indigenous Peoples and Protected Areas -- The Law of Mother Earth, Earthscan Publications Ltd, London.

Kerr, J. (1994)
How Subsidies Distort Incentives and Undermine Watershed Development Projects in India, paper for IIED conference, New Horizons: The Social, Economic and Environmental Impacts of Participatory Watershed Develoment, November, Bangalore,

India.

Kim, K.C. (1993)
"Biodiversity, Conservation and Inventory: Why Insects Matter, **Biodiversity and Conservation** 2(3): 191-214.

KKU (1987)
Rapid Rural Appraisal, Khon Kaen University, Khon Kaen, Thailand.

Koch, E. (1994)
Reality or Rhetoric ?: Ecotourism and Rural Reconstruction in South Africa, UNRISD/GEM Discussion Paper, Geneva, (in press).

Kothari, A., P. Pande, S. Singh, and R. Dilnavaz (1989)
Management of National Parks and Sanctuaries in India, status report, Indian Institute of Public Administration, New Delhi.

Kuhn, T. (1962)
The Structure of Scientific Revolutions, University of Chicago Press, Chicago.

Kumar, S. (1993)
"Taiwan accuses princess of smuggling rhino horn", **New Scientist**, 16 October 1993:11.

Kundstadter, P. (1978)
Ecological Modification and Adaptation: An Ethnobotanical View of Lua' Swiddeners in Northwestern Thailand, Anthropological Papers 67:169-200.

Levidow, L. (ed.) (1986a)
Science as politics, Free Association Books, London.

_____(1986b)
Radical Science essays, Free Association Books, London.

Levins, R. and R. Lewontin, (1985)
The Dialectical Biologist, Harvard University Press, Harvard

Loita Naimana Enkiyio Conservation Trust (1994)
Forest of the Lost Child. A Maasai Conservation Success Threatened by Greed, 8pp. Narok, Kenya.

Lundell, C.L. (1937)
The vegetation of Petén, Carnegie Institute, Washington, D.C.

MacKinnon, J., K. MacKinnon, G. Child and J. Thorsell (Eds.) (1986) **Managing Protected Areas in the Tropics,** IUCN, Gland.

MacKinnon, J. et al. (1989)
National Conservation Management Plan for the Giant Panda and its Habitat, Ministry of Forestry of China and WWF.

Manning, R.E. (1989)
"The Nature of America: Visions and Revisions of Wilderness", **Natural Resources Journal**, 29: 25-40.

Mascarenhas, J., P. Shah, S. Joseph, R. Jayakaran, J. Devavaram, V. Ramachandran, A. Fernandez, R. Chambers, and J.N. Pretty (eds.) (1991)
"Participatory Rural Appraisal", **RRA Notes** 13, IIED, London.

Maturana, H. and F. Varela (1987)
The Tree of Knowledge -- The Biological Roots of Human Understanding, Shambala Publications, Boston.

Max-Neef, M., A. Elizalde, M. Hopenhayn, F. Herrera, H. Zemelman, J. Jataba, L. Weinstein (1989)
"Human Scale Development: An Option for the Future", **Development Dialogue**, 1989 (1): 5-80.

McCracken, J. (1987)
"Conservation Priorities and Local Communities", Introduction in, Anderson, D. and R. Grove (eds.), **Conservation in Africa -- People, Policies and Practice,** Cambridge University Press, Cambridge.

McNeely, J.A. (1994)
"Lessons From the Past: Forests and Biodiversity", **Biodiversity and Conservation**, 3: 3-20.

Merchant, C. 1980.
The Death of Nature -- Women, Ecology and the Scientific Revolution, Harper and Row, San Francisco.

_____(1992)
Radical Ecology -- The Search for a Livable World, Routledge, London.

Mittermeier, R.A. and T.B. Werner (1990)
"Wealth of plants and animal unites 'megadiversity' countries" **Tropicus** 4 (1): 4-5.

Mittermeier, R.A. and I.A. Bowles (1993)
"The Global Environment Facility and Biodiversity Conservation: Lessons to Date and Suggestions for Future Action. **Biodiversity and Conservation** 2: 637-655.

Morrison, J. (1993)
Protected Areas and Aboriginal Interests in Canada, WWF-Canada Discussion paper.

Murphree, M.W. (1993)
Communities as Resource Management Institutions, Gatekeeper Series 36, IIED, London.

Myers, N. (1988)
"Threatened Biotas 'Hotspots' in Tropical Forests", **The Environmentalist** 8: 1-20.

Nabhan, G.P., A.M. Rea, K.L. Reichhardt, E. Mellinck, and C.F. Hutchinson (1982)
"Papago influences on habitat and biotic diversity: Quitovac oasis ethnoecology", **Journal of Ethnobiology**, 2: 124-143.

Nabhan, G.P., D. House, S.A. Humberto, W. Hodgson, H.S. Luis and M. Guadalupe (1991)
"Conservation and Use of Rare Plants by Traditional Cultures of the US/Mexico Borderlands", in Oldfield M.L. and J.B. Alcorn (eds.), **Biodiversity: Culture, Conservation and Ecodevelopment**, Westview Press, Boulder.

Narayan, D. (1993)
Focus on Participation: Evidence from 121 Rural Water Supply Projects, UNDP-World Bank Water Supply and Sanitation Program, World Bank, Washington D.C.

Ntiamo-Baidu, Y., L.J. Gyiamfi-Fenteng, W. Abbiw, (1992) **Management Strategies for Sacred Groves in Ghana**, a report prepared for the World Bank and EPC Ghana.

Ogle, B.M. and L.E. Grivetti (1985)
"Legacy of the Chameleon: Edible Wild Plants in the Kingdom of Swaziland, Southern Africa: A Cultural, Ecological, Nutritional Study, Part II -- Demographics, Species Availability and Dietary Use, Analysis by Ecological Zone"**, Ecology of Food and Nutrition**, 17:1-30.

Okafor, J.C. (1989)
Agroforestry Aspects, World Wide Fund for Nature, Surrey, UK.

Oldfield, M.L. and J.B. Alcorn (1991)
Biodiversity: Culture, Conservation and Ecodevelopment, Westview Press.

Parsons, J.J. (1975)
"The Changing Nature of New World Tropical Forests Since European Colonisation", pp. 28-38, in **Proceedings of the International Meeting on the Use of Ecological Guidelines for Development in the American Humid Tropics**, IUCN Publications New Series 31, Morges, Switzerland.

PEC Workshop (1990)
Lessons Learnt in Community-Based Environmental Management, Proceedings of the 1990 Primary Environmental Care workshop, Jan. 29 - Feb. 2, 1990, Grazia Borrini (ed.), Italian Ministry of Foreign Affairs and the Instituto Superiore di Sanita, Rome, Italy.

Peluso, N.L. (1993)
"Coercing Conservation? The Politics of State Resource Control", **Global Environmental Change**, June 1993: 199-217.

Perlin, J. (1989)
A Forest Journey: the Role of Wood in the Development of Civilization, W.W. Norton, New York.

Phillips, D.C. (1990)
Postpositivistic Science -- Myths and Realities, in Guba, E.G. (ed.) **The Paradigm Dialogue**, Sage Publications, Newbury Park, London.

Pick, J.B., E.W. Butler, and E.L. Lanzer (1989)
An Atlas of Mexico, Westview Press, Boulder, Colorado.

Poole, P.J. (1993)
Indigenous Peoples and Biodiversity Protection, in Davis, S.H., **The Social Challenge of Biodiversity Conservation**, Working paper No.1, Global Environment Facility, pp 14-25.

Posey, D.A. (1982)
"The Keepers of the Forest", **Garden** 6, 18-24.

Pretty, J.N. (1994)
"Alternative Systems of Inquiry for Sustainable Agriculture", **IDS Bulletin** 25(2): 37-48, IDS, University of Sussex.

_____(1995)
Regenerating Agriculture: Policies and Practice for Sustainability and Self-Reliance, Earthscan Books Ltd., London (in press).

Pretty, J.N. and R. Chambers (1993a)
"**Towards a Learning Paradigm: New Professionalism and Institutions for Sustainable Agriculture**, IDS Discussion Paper DP 334, IDS, Brighton.

Pretty, J.N. and R. Sandbrook, (1991)
Operationalising Sustainable Development at the Community Level: Primary Environmental Care, paper presented to the DAC Working Party on Development Assistance and the Environment, OECD, Paris, October 1991.

Pretty, J.N. and P. Shah (1994)
Soil and Water Conservation in the 20th Century: A History of Coercion and Control, Rural History Centre Research Series No.1. University of Reading, Reading.

Pretty, J.N., I. Guijt, I. Scoones and J. Thompson (1994)
A Trainer's Guide to Participatory Learning and Interaction, IIED Training Materials Series No. 2, IIED, London.

PRIA (1993)
Doon Declaration on People and Parks, resolution of the National Workshop on Declining Access to and Control over Natural Resources in National Parks and Sanctuaries, at the Forest Research Institute, Dehradun, October 28-30, 1993, organised by the Society for Participatory Research in Asia (PRIA), Delhi.

PVO-NGO/NRMS (1991)
Buffer Zone Management in Africa report from a workshop, October, 1990. Washington, D.C.

Pye-Smith, C. and G. Borrini Feyaerabend (1994)
The Wealth of Nations, Earthscan Publications Ltd., London.

Pyne, S.J. (1982)
Fire in America: A Cultural History of Wild Land and Rural Fire, Princeton University Press, New Jersey.

Rahnema, M. (1992)
"Participation", in Sachs, W. (ed.) **The Development Dictionary**, Zed Books Ltd., London.

Reason, P. and J. Heron (1986)
"Research With People: The Paradigm of Cooperative Experiential Inquiry", **People-Centred Review** 1:457.

Redford, K.H. and A.M. Stearman (1993)
"Forest-Dwelling Native Amazonians and the Conservation of Biodiversity: Interests in Common or in Collision? **Conservation Biology** 7(2): 248-255.

Reid, W., S.A. Laird, C. Meyer, R. Gomez, A. Sittenfeld, D. Janzen, M.A. Gollin, C. Juma, (1993)
Biodiversity Prospecting: Using Genetic Resources for Sustainable Development, World Resources Iinstitute, Washington D.C.

Reij, C. (1988)
"The Agroforestry Project in Burkina Faso: An Analysis of Popular Participation in Soil and Water Conservation", in **The Greening of Aid**, Conroy, C. and M. Litvinoff (eds.) Earthscan Publications Ltd., London, pp. 74-77.

_____ (1991)
Indigenous Soil and Water Conservation in Africa, Sustainable Agriculture Programme Gatekeeper Series SA27. IIED, London.

Richards, P. and A.G. Davies (1991)
Rainforest in Mende Life: Resources and Subsistence Strategies in Rural Communities Around the Gola North Forest Reserve (Sierra Leone), Final Report to ESCOR

(Overseas Development Administration), Department of Anthropology, University College London.

Richards, P. (1992)
"Saving the Rain Forest? Contested Futures in Conservation", in Wallman, S. (ed.), **The Anthropology of the Future**, Routledge, London.

Roche, C. (1992)
Operationality in Turbulence: The Need for Change, ACORD, London.

Röling, N. (1994)
Platforms for Decision Making About Ecosystems, in Fresco, L. (ed.), **The Future of the Land**, John Wiley and Sons, Chichester.

Rorty, R. (1989)
Contingency, Irony and Solidarity, Cambridge University Press, Cambridge.

Rose, H. and S. Rose (1976)
The Political Economy of Science: Ideology of/in the Natural Sciences MacMillan Press, London.

Roy, S. D. and P. Jackson (1993)
"Mayhem in Manas: The Threats to India's Wildlife Reserves, in Kemf, E. (ed.), **Indigenous Peoples and Protected Areas -- The Law of Mother Earth**, Earthscan Publications Ltd., London.

RRA Notes (1988-1994)
Issues 1 to present, Sustainable Agriculture Programme, International Institute for Environment and Development, London.

Russell, D.B. and R.L. Ison (1991)
The Research-Development Relationship in Rangelands: An Opportunity for Contextual Science, plenary paper for 4th International Rangelands Congress, Montpellier, France, 22-26 April 1991.

Ryan, J.C. (1992)
Life support: Conserving Biological Diversity, Worldwatch Paper No. 108, Worldwatch Institute, Washington, D.C.

Sachs, W. (1993)
"Global Ecology and the Shadow of Development" in Sachs W. (ed.), **Global Ecology - A New Arena of Political Conflict**, Zed Books, London.

Sandford S. (1983)
Management of Pastoral Development in the Third World, John Wiley & Sons, London.

Sauer, C. (1958)
Man in the Ecology of Tropical America, proceedings of the 9th Pacific Science Congress 20: 105-110.

Sayer J. (1991)
"Conservation and Protection of Tropical Rain Forests: The Perspective of the World Conservation Union", **Unasylva**, 166, 40-50.

Scoones, I., M. Melnyk and J.N. Pretty (1992)
The Hidden Harvest: Wild Foods and Agricultural Systems, an annotated bibliography, IIED, London with WWF, Geneva and SIDA, Stockholm.

Scoones, I. and J. Thompson (1994)
Beyond Farmer First, IT Publications Ltd, London.

Shand, H. (1993)
"A Landmark Year for Biodiversity or Bio-Piracy?" **Biotechnology and Development Monitor** 17:24.

Shaxon, T.F., N.W. Hudson, D.W. Sanders, E. Roose and W.C. Moldenhauer (1989)
Land Husbandry: A Framework for Soil and Water Conservation, Soil and Water Conservation Society, Ankeny, Iowa.

Shengji, P. (1991)
"Conservation of Biological Diversity in Temple-Yards and Holy Hills by the Dai Ethnic Minorities of China, **Ethnobotany**, 3: 27-35.

Showers, K.B. and G. Malahleha (1990)
Pilot Study for the Development of Methodology to be Used -- an Historical Environmental Impact Assessment of Colonial Conservation Schemes, paper presented at workshop on Conservation in Africa: Indigenous Knowledge and Conservation Strategies, Harare, Zimbabwe.

Sriskandarajah N., R.J. Bawden and R.G. Packham (1991)
"Systems Agriculture: A Paradigm for Sustainability", **Association for Farming Systems Research-Extension Newsletter** 2 (2), 1-5.

Stearman, A.M. (1990)
"The Effects of Settler Incursion on Fish and Game Resources of the Yuqui, Anative Amazonian Society of Eastern Bolivia", **Human Organisation**, 49(4): 373-385.

Stiefel, M. and M. Wolfe (1994)
A Voice for the Excluded -- Popular Participation in Development: Utopia or Necessity? Zed books, London, 265pp.

Stocking M. (1985)
"Soil Conservation Policy in Colonial Africa", **Agricultural History**, 59,148-161.

Stork, N.E. (1993)
"How Many Species are There?" **Biodiversity and Conservation**, 2 (3), 215-232.

Thompson, M., M. Warburton and T. Hatley (1986)
"Uncertainty on a Himalyan Scale", **Ethnographica**, London.

Tiffen, M., M. Mortimore and F. Gichuki (1993)
More People, Less Erosion. Environmental Recovery in Kenya, John Wiley and Sons, Chichester.

Toledo, V.M. (1988)
"La diversidad biologica de Mexico -- Ciencia y Desarollo", Concyt, Mexico City (cited in Nabhan et al., 1991).

Trimble, S.W. (1985)
"Perspectives on the History of Soil Erosion Control in the Eastern United States", **Agricultural History**, 59, 162-180.

UNRISD (1979)
Inquiry into Participation, a research proposal, United Nations Research Institute for Social

Development, Geneva.

Uphoff, N. (1992)
Learning from Gal Oya: Possibilities for Participatory Development and Post-Newtonian Science, Cornell University Press, Ithaca.

USAID (1987)
Women in Development: A.I.D.'s Experience, 1973-1985, AID Program Evaluation Report No. 18, Agency for International Development, Washington D.C.

Utting, P. (1993)
Trees, People and Power. Social Dimensions of Deforestation and Forest Protection in Central America, Earthscan Publications Ltd., London.

Utting, P. (1994)
"Social and Political Dimensions of Environmental Protection in Central America", **Development and Change**, 25: 231-259.

Vickers, G. (1981)
"Some Implications of Systems Thinking", in **Systems Behaviour Education by Open Systems Group**, Harper and Row, London with the Open University Press 3rd Edition.

Waldrop, M.M. (1992)
Complexity and the Emerging Science at the Edge of Order and Chaos, Simon and Shuster, New York.

Wanjohi, B. (1987)
"Women's Groups, Gathered Plants and Their Agroforestry Potentials in the Kathama Area", in Wachiira, K.K. (ed.), **Women's Use of Off-Farm and Boundary Lands: Agroforestry Potentials,** pp. 61-104, Final Report, ICRAF, Nairobi, Kenya.

World Conservation Monitoring Centre (WCMC) (1992)
Global Biodiversity: Status of the Earth's Living Resources, Chapman and Hall, London.

Weightman, B. (1989)
Agriculture in Vanuatu: A Historical Review, British Friends of Vanuatu, Cheam, Vanuatu.

Wellard, K. and J.G. Copestake (eds.) (1993)
Rethinking Roles in Sustainable Agricultural Development -- Non-Governmental Organisations and the State in Africa, Routledge, London.

Wells, M.P. and K. Brandon (1992)
People and Parks Linking Protected Area Management With Local Communities, World Bank/WWF/US AID.

Wells, M.P. (1993)
"Neglect of Biological Riches: The Economics of Nature Tourism in Nepal", **Biodiversity and Conservation**, 2(4): 445-464.

West, P.C. and S.R. Brechin (1992)
Resident People and National Parks, University of Arizona Press, Tucson.

Wharton, C.H. (1968)
"Man, Fire and Wild Cattle in Southeast Asia", **Proceedings of the Annual Tall Timbers Fire Ecology Conference** 8, 107.

Whyte, L. (1967)

"The Historical Roots of Our Ecological Crisis", **Science** 155: 1203-1207.

Wilde, R. (1994)
Community Participation in Planning Resource Utilisation From Within a National Park -- Bwindi Impenetrable National Park, Uganda, mimeo, WWF-International (in press).

Wilson, K B. (1990)
Ecological Dynamics and Human Welfare: A Case Study of Population, Health and Nutrition in Southern Zimbabwe, PhD Thesis, Department of Anthropology, University College, London.

Wood, D. (1993)
"Forests to Fields -- Restoring Tropical Lands to Agriculture", **Land Use Policy**, April, pp. 91-107.

World Bank (1994)
The World Bank and Participation, report of the Learning Group on Participatory Development, April 1994, World Bank, Washington, D.C.

WWF and ODNRI (1989)
Cross River National Park (Oban Division): Plan for Developing the Park and its Support Zone, WWF/ODNRI, Natural Resources Institute.

Wynne, B. (1992)
"Uncertainty and Environmental Learning -- Reconceiving Science and Policy in the Preventive Paradigm", **Global Environmental Change**, June, pp. 111-127.

Wynne, B. and S. Mayer (1993)
"How science fails the environment", **New Scientist**, 5 June, pp. 33-35.

Zhaoguang L. and W. Ning (1992)
"A Local Resource-Centred Appraoch to Rural Transformation: Agro-Based Cottage Industries in Western Sichuan, China, in Jodha, N.S., M. Banskota and T. Partap (eds.), **Sustainable Mountain Development**, Volume 1, Oxford and IBH, New Delhi.